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Editors

Information and Communication Technologies in Tourism 2009

SpringerWienNewYork

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Information and Communication Technologies in Tourism 2009

Proceedings of the International Conference in Amsterdam, The Netherlands, 2009

SpringerWienNewYork

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SpringerWienNewYork is part of Springer Science + Business Media
springer.at

Typesetting: Camera ready by the authors
Printing: Krips bv, 7944 HV Meppel, The Netherlands

Printed on acid-free and chlorine-free bleached paper

With 92 figures and 105 tables
SPIN: 12583447

Library of Congress Control Number: 2009920325

ISBN 978-3-211-93970-3 SpringerWienNewYork

Preface

This year the ENTER conference will be celebrated for the 16th time. Founded in 1993 as an interface between information and communication technologies on the one side and travel and tourism on the other, ENTER has steadily matured to become the world's premier global conference in this fascinating and constantly advancing and progressing area of research and praxis.

The aim and unique purpose of ENTER is to bring together practitioners from the travel and tourism industry, representatives from national and regional tourism boards, and academics and researchers from different disciplines to facilitate the exchange and joint development of new ideas, innovative approaches and advanced solutions. Therefore, research findings presented at ENTER always have a strong relationship and relevance to problems faced by the industry.

Information and communication technologies have reshaped the travel and tourism industry in the last decade and new topics and corresponding challenges are evolving rapidly. The dynamic nature of tourism markets has become ever more pronounced and innovative business models like online communities continue to emerge. ENTER 2009 pays attention to this situation and the theme *eTourism: dynamic challenges for travel and tourism* expresses the objective to present a collection of cutting-edge academic and industrial research as well as practical applications dealing with new challenges and new ways of doing business in a rapidly changing and highly dynamic environment.

Over 70 papers have been submitted to ENTER 2009 and the finally selected 42 papers were double blind reviewed by members of the scientific committee. These high quality papers cover a wide range of cutting-edge topics currently driving research and development activities in the field of IT and travel & tourism. Under the topic *online communities* papers deal with the virtualisation of travel communities and experiences as well as the driving forces of online communities within travel and tourism. The topic *user generated content* deals with travel reviews and blogs and their influence and importance within the travel decision making process. The topic *recommender systems* covers papers presenting approaches for knowledge-based decision support and their acceptance under tourism-specific settings. The topic *mobile technology* presents analysis results and practical applications in the area of mobile services and tourist guides. The topic *platforms and tools* covers presentations of several innovative IT tools and their applications in the tourism domain. In the age of online distribution, *website optimisation* is a fundamental aspect and papers in this section discuss different approaches for measuring and improving the performance of tourism websites. The topic *electronic marketing* investigates in more detail specific aspects of using the Internet to market tourism services like affiliate marketing and email communication. Papers in the section *ICT and tourism destinations* especially focus on the application of techniques and approaches mentioned above in the context of tourism destinations as amalgams of different tourism suppliers and stakeholders. The section *technology acceptance* concludes the range of topics by presenting

research results in the areas of technology acceptance and adoption in the travel and tourism industry.

The ENTER paper submission process, following the objective of quality assurance and quality improvement, is a challenging process both for authors and members of the programme review committee and the success of the ENTER research track strongly depends on such input and support. Therefore, the research track chairs would like to thank all the members of the review committee for their continuous support of the ENTER review process and their dedication to ENTER, which has spanned in many cases already more than a decade. And, of course, we would like to thank all authors for their valuable input and effort. A high quality ENTER programme is nothing else than a collection of single high quality papers, written by experienced researchers all over the world.

ENTER is especially characterised by a worldwide community of individuals from all parts of the travel and tourism industry and different research disciplines, coming together once a year to discuss latest trends and developments in this challenging area. We would like to thank all ENTER attendees for their continuous support of ENTER and wish all of us a successful and joyful ENTER 2009 in Amsterdam.

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Amsterdam, January 2009

Contents

4 Mobile Technology

5 Platforms and Tools

6 Website Optimisation

7 Electronic Marketing

8 ICT and Tourism Destinations

9 Technology Acceptance

Index of Authors

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Sixteenth International Conference on Information and Communication Technologies in Travel and Tourism, Amsterdam, Netherlands, January 28-30, 2009

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Role of Community Informatics in Heritage Tourism Development

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Abstract

The paper argues that community informatics research forms the basis for more integrated and participatory forms of heritage tourism development. Principles of community informatics, and specifically virtual community networks and digital storytelling, are reviewed and then discussed within the framework of a Web-based application developed for a small, rural community. The case study illustrates how community informatics guided the design and implementation processes. Specific challenges are discussed and implications for the evaluation of such systems are provided.

Keywords: community informatics; heritage tourism; community development; GIS; digital storytelling; virtual community.

1 Introduction

Small communities often have valuable cultural resources and heritage sites but lack the economic and technical resources for preservation and sustainable tourism development (Collins, Mulholland & Zdrahal, 2004). Outside expertise is often brought in to develop heritage preservation and tourism development plans. However, these two types of plans are commonly not integrated, leading to a disconnect between heritage tourism management and the conservation of the objects/sites it tries to manage. In addition, the goals of these plans are typically presented to the community rather than developed by the community. Such a process that excludes community members from voicing their opinions, from determining their goals, and from being active participants in the planning process, can easily lead to a lack of ownership of the process and its outcomes. Imposed heritage tourism development plans are especially problematic in diasporic communities and/or communities with contested heritage. Thus, integrated and participatory heritage tourism development is needed to achieve sustainable heritage tourism in small communities (Orbasli, 2000; Hasse & Milne, 2005).

Information and communication technology (ICT) plays an increasingly critical role in planning processes. Yet, community members do not typically have access to Geographic Information System (GIS) resources. Small, rural communities frequently

lack even basic Internet access for a majority of their members. Thus, sustainable heritage tourism development should also involve capacity building in terms of ICTs. The Community Informatics (CI) literature has dealt extensively with the role of ICT for community development. This paper discusses CI in the context of participatory heritage tourism development and presents a specific case study that implemented CI principles.

2 Background

Recent research in the area of ICT use for community development suggests that community-based, participatory heritage tourism development can be greatly informed and supported through technologies such as virtual community networks. The following provides an overview of this stream of research and outlines its relevance for heritage tourism development efforts.

2.1 Community Informatics

Community informatics is a rather recent field of study and describes a set of principles and practices concerned with the use of information and communication technology (ICT) for the personal, social, cultural or economic development of and within communities (Gurstein, 2000). It is a radical practice and a critical approach in that it involves grassroots movements and action research (Graham, 2005). CI sees ICT as a means to foster community processes and support community action in the real and virtual world. Thus, ICT is conceptualized as an important agent for community transformation (Williams, Sligo & Wallace, 2005) and is believed to further the goals of community development initiatives (Pitkin, 2001). The assumption is that communities have untapped capacity and that ICT can help them become aware of their resources and capabilities so that local commitment, resources and skills can be harnessed (Romm & Taylor, 2001). A particular emphasis is placed on bridging digital divides and integrating typically excluded populations into the process of community development (Marshall, Taylor & Yu, 2004). Thus, CI is seen as an important driver in fighting community fragmentation (Romm & Taylor, 2001). Taylor (2004) summarizes the goals of CI as using ICT to achieve 1) community building; 2) social inclusion; 3) social mobilization; and, 4) community renewal.

Community informatics projects have mostly focused on Internet access but also Geographic Information Systems (GIS) with the hope that these can not only build local capacity but also influence policy decisions (Pitkin, 2001). Planning tasks typically require access to geographical information, which usually resides in centralized repositories. Democratizing this information is critical in fostering participatory planning processes (Lenk, 1999). However, the democratization of GIS involves not only data aspects but also the GIS structure and technological design (McGarigle, 1998; Sawicki & Craig, 1996; Sclove, 1995). The goal of efforts in this realm is to push the boundaries of participatory planning (Harris et al., 1995; Krouk, Pitkin & Richman, 2000) and to realize a Habermasian vision of communicative action to break down power structures and barriers that exclude some community

members from participation in public decision-making (Pitkin, 2001). Thus, there is a direct linkage between community informatics and participatory heritage tourism development.

Community informatics directly relates to sustainable tourism development in that several scholars have identified community participation as a critical issue in ensuring sustainability (Hardy & Beeton, 2001; Jamal & Tanase, 2005). Stakeholder research in the context of tourism planning also shows the importance of active involvement of key stakeholders in the planning process (Aas, Ladkin & Fletcher, 2005). CI offers a valuable avenue for enabling community participation by providing the technological means to open up communication channels and to allow for a widespread sharing of information.

2.2 Virtual Community Networks

Virtual communities have the potential to create and strengthen social relationships and to provide access to important information (Rheingold, 1993). Hagel and Armstrong (1997) define virtual communities as computer-mediated spaces that allow for integration of content and communication among members, with an emphasis on member-generated content. Virtual community networks are virtual community systems based on real world physical communities. In this sense, they are "territorial" systems (Lastra, 2001). According to Cordell and Romanow (2005), they have the following three characteristics:

1. They focus on local issues, cultures, ownership, and provision of forums for community discussion and problem solving.
2. They strive to reach all groups and individuals in a community.
3. They emphasize democratic participation and community development.

Virtual community networks strive to foster a sense of community, which has been found to lead to satisfaction and involvement in community activities (McMillian & Chavis, 1986). Shared history is seen as an important factor that strengthens sense of community (Blanchard & Markus, 2002). In the context of heritage tourism, virtual community networks can help in the representation, promotion and exchange of a) oral histories; b) original documents; c) descriptions of events (real or imagined); d) descriptions of heritage artefacts; and e) interpretations of historical events (Collins et al., 2004). Yet, harvesting such community knowledge can be a great challenge if the community is diasporic (Lastra, 2001). Storytelling is a natural way to transmit and share information (Schank & Abelson, 1995) and, thus, can help in encouraging community members to provide content.

2.3 Digital Storytelling

Storytelling is a process by which members of a community learn and build identity (Collins et al., 2004). It connects individuals through shared experience (Center for Digital Storytelling, 2002) and, therefore, can be a powerful tool for mobilizing a

community. Further, digital storytelling is a grassroots approach that challenges traditional top-down models of cultural production (Tharp & Hills, 2004). This is especially important in the context of heritage, and specifically contested heritage, where multiple perspectives and potentially contradictory interpretations of historic events exist.

The Community Story Exchange developed within the framework of CIPHER (Communities of Interest Promoting Heritage in European Regions) is an example of a storytelling environment applied to the context of heritage tourism (Mulholland, Zdrahal & Collins, 2002). However, rather than involving the whole community, it is designed to support the community of tour guides at a specific heritage site. Emerging Web 2.0 technologies provide tremendous opportunities for community-based digital storytelling on a broader basis. However, great emphasis has to be placed on building digital storytelling environments with little technical overhead. Collins et al. (2004) further note that ownership as well as maintenance should be placed in the hands of the community. The following provides a description of a system that was developed to achieve these goals.

3 Case Study

The concepts of CI were applied to the design of ICT for the purpose of participatory heritage tourism development in Hearne, Texas, a small, rural community in the southern United States. The project involved the development of a Website portal that allows the community to collect and archive its oral histories and historical photographs and provides opportunities to share the heritage-related information not only with immediate community members but also former residents and potential visitors to the area.

Hearne has a little less than 5000 inhabitants. The community is ethnically diverse, with Caucasians representing a minority. Its heritage includes historic buildings, churches, a vivid past as a railroad junction, a World War II prisoner camp site, a history as an important agricultural community which employed slave labour, and a number of historic community festivals. Thus, its heritage is not only contested but also fragmented. Due to its proximity to a major university, the historic sites have been studied quite extensively; however, the knowledge resides in different archives on campus, rather than within the community.

Community leaders have expressed interest in developing heritage tourism in their community to create new sources of income for the community members. Consequently, a process was designed and implemented that was geared at helping the community in engaging in an integrated and participatory heritage tourism planning and development process. The ultimate goal of this effort is to achieve community empowerment through sustainable tourism development.

3.1 Geographic Information System

As a first step in the process, a heritage preservation inventory database was developed (Rabady & Jamal, 2005). Surveying the historical properties involved collecting information based on secondary data sources such as aerial photographs and historic maps, face-to-face meetings with community leaders and residents, and distributing a paper-based survey to key stakeholders. Once the inventory was completed, a spatial database using ArcMap 9.0 was created (Rabady, Ramchandani & Jamal, 2005). Based on the GIS maps, a visitor brochure was developed. The inventory and spatial database were also critical in applying for funding for historic preservation and tourism development projects in the community.

3.2 Digital Storybook

Building on the information and tools developed in the first stage of the heritage tourism development process, an online heritage website was designed to disseminate heritage-related information and elicit further input from the community (www.hearnestorybook.com). The system was conceptualized as a "storybook", using a historic scrapbook as the design metaphor. The idea emerged during a brainstorming session with community leaders. Colours and shapes were selected to communicate a warm and welcoming atmosphere and to reflect the diverse backgrounds of community members. Different fonts were chosen to give the pages the appearance of reflecting diverse contributions and opinions.

The Storybook contains links to the official community website as well as to GoogleMaps and the Historic Commission site. It further contains a link to a resources page, on which pdf files of all the reports developed in the first phase of the projects are stored. Clicking on the Storybook cover opens the book and presents the user with a welcome message and a table of contents. The contents of the Storybook are organized around six heritage themes: 1) Agriculture; 2) Railroad; 3) Historic Sites; 4) The Home Front; 5) Churches; and 6) Culture. Each section contains historic photographs and a short introductory text summarizing historical facts about the community. Most importantly, the content pages feature selected stories of community members for each of the themes (Fig. 1). These oral histories were elicited through interviews with community members (Clement & Lelo, 2008). A specific effort was made to include a diverse range of participants for these interviews. The heritage content pages further include data directly transferred from the GIS maps. Using Flash, these maps were made interactive and were linked with the heritage inventory information (Fig. 2).

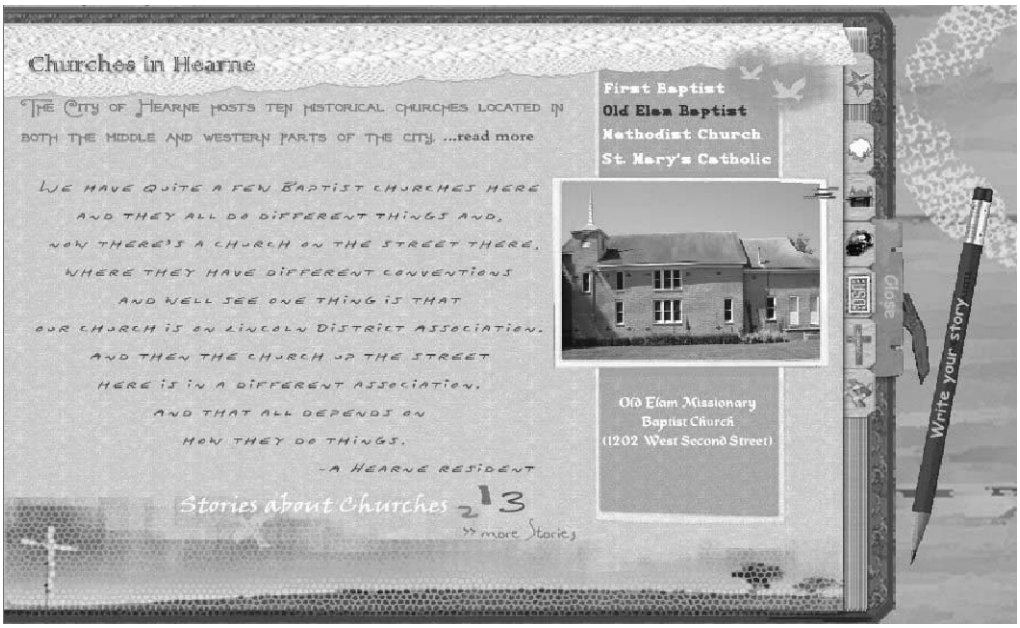

Fig. 1. Stories based on oral history interviews

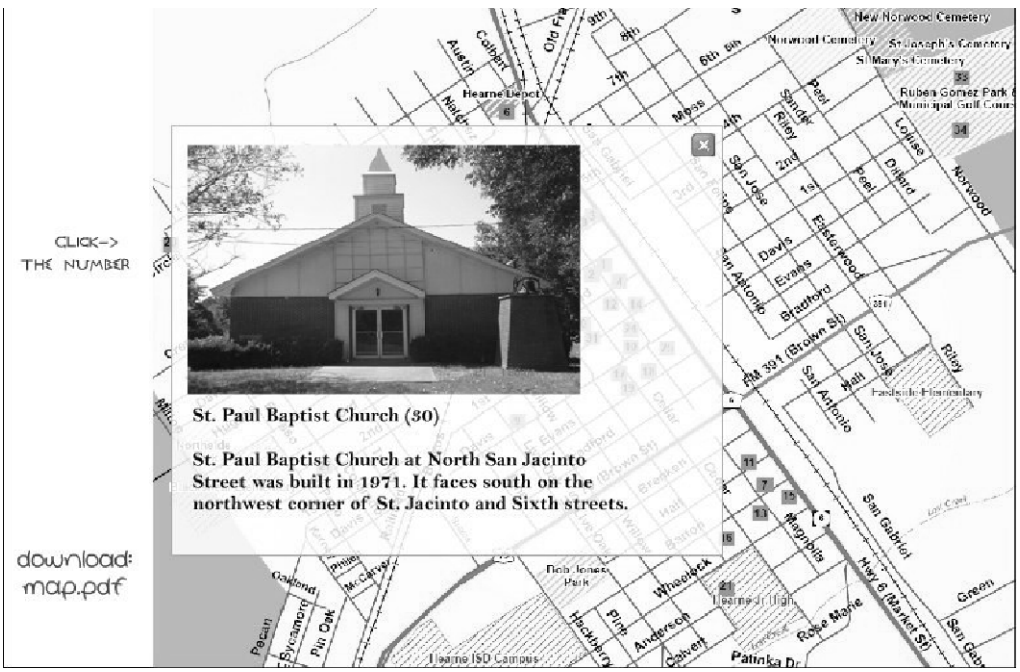

Fig. 2. Integration of the Heritage Inventory and GIS Map

As can be seen in Figure 1, every content page features a pencil on the side. Clicking on the pencil transfers the users to the blog application (Fig. 3). The story blog is powered by Wordpress. Wordpress is an open source software which provides web communities with a variety of applications for documentation and storage of

information. A ready-made blog solution was selected to ensure user-friendliness and easy editing and registration processes and to limit the cost of constructing the Storybook. The content themes appear again on the blog site, where community members are encouraged to submit their own stories or comment on others' contributions. To seed the blog, stories from the oral histories interviews that were not used on the actual content pages are displayed on the story blog pages as if they were actual blog entries.

The site also includes a photo gallery powered by Gallery 2.0. Like Wordpress, Gallery 2.0 is an open source software developed and maintained by a community of users; however, it only focuses on photo sharing applications. In the case of Hearne, community volunteers have scanned in a series of historic photographs which can now be shared through the gallery tool. It is hoped that the photo gallery encourages other community members to share their historic photos as well. Site visitors are given the alternative to simply email photos if they do not want to or do not know how to directly submit them to the website.

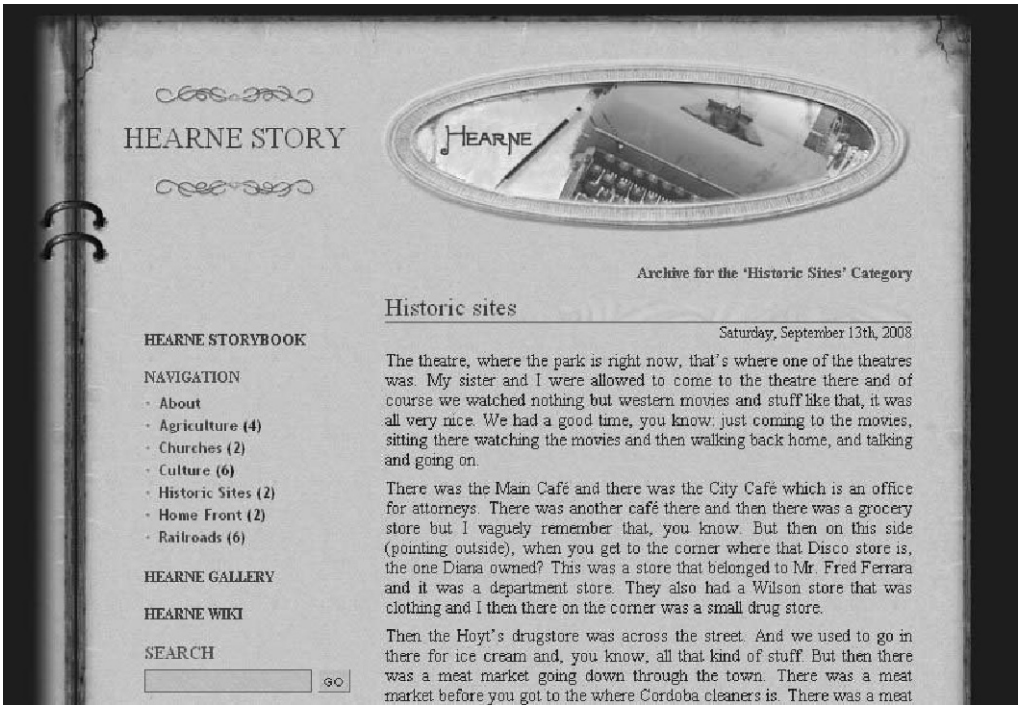

Fig. 3. Story Blog

4 Discussion

The Storybook presents an interesting case of a virtual community network as it is geared toward fostering common identity and sense of belonging among various subgroups within the rural community. It is different from other community networks

in that it reaches out to members outside of the physical community, specifically tourists and former residents. Thus, the system serves a community beyond the actual locale and potentially includes even the relatives of those who were prisoners of war in the community during World War II. As such, the Website represents a virtual community of users that is based on a territorial community but is not limited to its geographical boundaries.

As pointed out by Pitkin (2001), there is always some degree of representation and "speaking for others" in a community-based technology innovation. Even putting information in maps or providing it online involves a filtering process. Thus, it is critical that community input is sought in all phases of the project and representations are open to critique by the community. Community informatics projects need to be participatory in every stage (Pitkin, 2001). The application presented in this paper meets this criterion. Data were collected through community surveys and interviews. Design ideas were presented to community representatives and the storybook development phase was iterative, with feedback elicited on several occasions. Even the domain name was selected by community members. The next step in the process involves several initiatives to reach out to community members and encourage them to add contents to the site. Day (2004) argues that sustainability in CI projects can only be achieved through enabling meaningful engagement with local community groups and promoting universal participation. Thus, a specific implementation process was designed for the Storybook. First, through cooperation with the local school, children will be asked to film short videos of their community, with a specific focus on its culture and heritage. Second, high school reunion participants will be presented with an opportunity to contribute contents while visiting the school. Third, a townhall meeting will be held to increase community members' familiarity with the project and encourage active participation.

Developing a website for a small community is very different from web development for commercial purposes. Collins et al. (2004) stress the importance of content management, community ownership and low maintenance. Further, Romm and Taylor (2001) draw attention to the importance of "user friendliness" in the context of CI. User friendliness with respect to CI is much broader than user friendliness defined for individual Website usage. It could be described as "community friendliness" in that its focus is on assuring low cost, accessibility for all users in the community regardless of their technology skills, and easy maintenance. Thus, specific attention was paid to these aspects of system design. Rather than housing the Storybook on a maintenance-heavy Web server in the community, the system resides with the low-cost online Web services host GoDaddy.com. The system had to further take into account that many Internet connections in the community were dial-up connections. Most importantly, a local champion had to be found to serve as a contact person and assume administrative roles for the blog and gallery applications. This person had to be trained for these tasks. It is also important that system requirements and passwords are documented so that this knowledge can easily be transferred should somebody else have to take on the administrator role.

Based on the Hearne Storybook experience, challenges in designing a community-based heritage website can be summarized as involving not only the necessity of keeping cost as low as possible and addressing technical issues with respect to user friendliness and accessibility but also in making such a system appealing to a wide range of community members with different backgrounds and goals. Most importantly, the success of such a system is also based on finding champions within the local community who help with the organization of meetings and identification of content to be included.

While the Storybook has been implemented and has received positive feedback from those community members who have been actively involved in the design process, its performance has yet to be formally evaluated. The CI literature provides different indicators for gauging the success of CI projects (see for instance Cordell & Romanow, 2005). The ones most relevant for our case seem to be those related to community well-being. Specifically, sense of community, accepting of difference, and active participation should be measured. In addition, it will be important to examine whether the notion of community heritage changes and whether the system encourages true discussion of contested topics or fosters conflict (as manifested in blog postings and comments). Also, whether the system is actually used by all groups within the community has yet to be seen and will be an important measure to evaluate its performance in terms of uniting this fragmented community. In addition, since it is a heritage tourism-related site, perceptions of tourists and usefulness of the information presented on the site in terms of communicating local heritage and creating a sense of place have to be established. Last but not least, the evaluation of the system will have to involve a longitudinal study to capture changes in system use and impacts on the community as well as to assess its sustainability. Following CI principles, the evaluation of the system should be participatory as well, and should help the community benchmark their achievement of specific heritage tourism development goals.

5 Conclusion

The case study presented in this paper suggests that community informatics principles provide valuable guidance in the design of systems to support participatory heritage tourism development. The same principles should also inform evaluation processes after system implementation. Experiences and insights gained from the system development process and knowledge derived from the upcoming evaluation efforts can serve as a useful basis for other CI-related efforts in the context of heritage tourism development.

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Acknowledgements

The development of the digital storybook was funded through a National Endowment of the Humanities - Preserve America grant.

From Paradigmatic to Syntagmatic Communities: A Socio-Semiotic Approach to the Evolution Pattern of Online Travel Communities

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Abstract

This paper presents the results of an observatory research which explores the users' participation in three different travel related virtual communities. The behaviour of the first top ten users has been observed in three different timeframes recording both outcoming interactions (e.g. from the studied user to other users) and incoming ones (e.g. from other users to the studied one). Then, a socio-semiotic linguistic approach has been adopted to explain the users' behaviour and to hypothesize a possible evolution pattern for the communities.

Keywords: Web communities; Syntagmatic relationships; Top-Users; Top-User Generated Contents; Tourism communities; Web 2.0.

1 Introduction

The English word "community" derives from the Latin word *communitas/communitatis*, and literally means "people […] considered as a unit because of their common interests […]" (http://dictionary.cambridge.org). Communities, and more precisely online communities, have been studied by different scholars in different areas (e.g. McWilliam, 2000; Preece, 2000). In recent years, thanks to the so-called Web 2.0 (O'Reilly, 2005), new users are exploiting these web applications built for interest sharing purposes. The innovation introduced by Web 2.0 is not in the application itself (communities were used and studied also before the Web 2.0 rise), but in the easiness of use: few technical skills are now required to participate in online communities (Hotho et al., 2006). When it comes to travel and tourism, since they are experience-based activities (e.g. Tussyadiah and Fesenmaier, 2007), they have to be communicated as experiences. Communities, blogs, travel review websites and more in general the so-called "social media" are helping this kind of communication and information sharing among the users (Arsal et al., 2008).

Furthermore, communities are really important in this field as they are spreading within the web the so-called eWord of Mouth (e.g. Niininen et.al., 2007). Moving from a socio-semiotic viewpoint, communities can be seen both as being (i) a group of people who share certain characteristics (e.g.: age, interests, spending capacity, etc.) and (ii) a group of people who actually interact with each other. While (i) can be called paradigmatic communities, (ii) are syntagmatic ones. In fact, in order to have (i) and (ii), a common shared background is needed, which can involve different aspects, but always the cognitive domain. Communities of the (ii) type, in addition, actively negotiate, produce and refine that common ground. Hence, in order to build a community, one needs to offer both common experiences/cognitive references (type (i) community), and foster actual and active communication among members (type (ii) community). For this purpose, designers of tourism Web 2.0 applications may exploit, in different ways, a run-time access structure, labelled "top contents" or "top users". In this observatory research three significant applications have been selected, and the changes in their "top ten contents/users" have been studied along a two months period, to find different patterns and relevant effects in the evolution of these communities.

2 Theoretical background

2.1 A socio-semiotic and linguistic perspective on communities

The notion of 'community' has been defined as "the most fundamental and far-reaching of sociology's unit ideas" (Nisbet, 1966: 47). Nevertheless, it is not easy to define precisely what a community is: for this reason, in the sociological tradition this notion has often been banned or ignored as a scientific concept. A community can be defined as "a group of persons who share something more or less decisive for their life, and who are tied by more or less strong relationships" (Cantoni & Tardini 2006: 157). More specifically, the term 'community' can be used to refer to two different situations: (i) to a group of persons who interact with one another; (ii) to a set of people who have something in common but do not interact. Borrowing the linguistic terminology of structuralism, the two different typologies of communities can be named respectively 'syntagmatic' and 'paradigmatic'. The latter are characterized by similarity: in paradigmatic communities members have similar features (e.g. they share similar interests, have the same age, speak the same language, go to the same school, practise the same profession, and so on). The former are characterized by differences: syntagmatic communities are built up through the succession of concrete interactions among the members (Tardini & Cantoni, 2005). For instance, when one speaks of the community of tour operators, s/he is speaking of a paradigmatic community: the members of this community usually do not know each other, they do not communicate each with all the others, but they may have the perception of belonging to the community. All kinds of communities are defined by having a common ground. The common ground of two or more people is a set of information, knowledge, beliefs and suppositions they believe they share. Clark distinguishes two different types of common grounds: a communal common ground and a personal one. He defines the former as an expertise that "consists of facts,

beliefs, procedures, norms, and assumptions that members of the community assume they can take for granted in other members" (Clark 1996: 102). The latter is constituted by the joint personal experiences of two or more persons; these joint experiences can be joint perceptual experiences (e.g. both persons hear a loud noise or see the same scene while walking together) or previous joint (inter)actions (Clark 1996). The presence of a common ground (at least a communal one) is a necessary condition for the existence of a community: if a group of people does not have a common set of knowledge, beliefs, facts, procedures, etc., they cannot be considered a community. The distinction between the two types of common ground is pivotal with regard to communities: in paradigmatic communities "only" a communal common ground is shared, while in syntagmatic ones also the personal common ground is shared, which is constantly built and updated by all the interactions that take place among its members. The role of communal common ground is very important in order to create a common basis of meaning and understanding in a group of people. However, the importance of the personal common ground is even higher, since only real interactions can guarantee the survival of a community: as a matter of fact, the communal common ground can be created, maintained and updated only by means of real interactions. If no interactions take place, the community will soon or later become a "dead" community, i.e. a community that relies only on past experiences that are no longer able to activate actual interactions (in linguistic terms: the elements of a paradigm are created only in syntagms, i.e. only by means of concrete interactions). In the last two decades a new form of communities has re-proposed the discussion about them, namely online (virtual) communities. The term 'virtual community' is attributed to Howard Rheingold, who in the early Nineties gave rise to the discussion about this new form of social aggregations telling his experience in the WELL (Whole Earth 'Lectronic Link), an online community created in 1985 (Rheingold 1993a & 1993b). An online community can be defined "as a group of people to whom interactions and communications mediated by ICT [Information and Communication Technologies] play an important role in creating and maintaining significant social relations" (Tardini & Cantoni 2009: 350). ICT can play a twofold role with respect to social relations: they can either *create* social relations, by connecting persons who had no previous mutual relationships, or *facilitate* the communication processes in already existing groups, organizations or communities. In the former case the community is constituted by the use of ICT, in the latter ICT facilitate the activities of a community (Lechner & Schmid 2000). The expression 'virtual communities' in its original sense referred to the former situation.

The distinction between paradigmatic and syntagmatic communities can be effectively applied also to online communities. If proper virtual communities are to be intended as social relationships created by online interactions, then these are to be considered syntagmatic communities. However, in the virtual world paradigmatic communities play an important role as well: as a matter of fact, the visitors of a website (or the users of a web service) can be considered – in particular from the point of view of the web service managers – as a paradigmatic community: "this kind of online communities is mainly paradigmatic: users normally do not interact with each other, but share the fact that they interact with the same website; moreover, they

usually have no perception at all of being part of a community. This is another case of imagined communities" (Tardini & Cantoni 2005: 376).

2.2 Tourism

Tourism is an information-intensive activity (Werthner & Klein 1999; Gretzel et al. 2000). In few other areas the generation, gathering, processing, application and communication of information are as important for day-to-day operations as they are for travel and tourism industry (Poon, 1993). Furthermore, the continuous development of ICT during the last decades has had profound implications for the whole tourism industry (Buhalis 2003); as a noteworthy example, during the last few years both the way of purchasing tourism goods and the way of gathering information and commenting on travel experiences have changed dramatically. In general terms, we can argue that ICT are very important in the tourism industry with regard to the purchase process (Werthner and Klein, 1999). Tourism information has spread in a galaxy of different websites (Baggio et al., 2007) and beside the official ones a group of unofficial websites are competing to reach the travellers' attention on the Internet. Web2.0 (O'Reilly, 2005) and the so-called social media websites (the ones that publish User Generated Content - UGC) are now part of the so-called long tail (Anderson, 2006) and they are a valid source for information for the Internet users. These kinds of websites have gained popularity among the travellers who search for online information (Gretzel et al., 2006). As underlined by Henzinger (2007), the amount of information potentially available online is incredibly huge and diverse in nature, and the appearance and the rise of these websites in the tourism domain is dramatically changing the domain itself but also some of the related issues (e.g. information search and online marketing strategies). Tourism online communities or social networks (the Web 2.0 name for such a dynamics), together with blogs, wikis and other different websites, are populating the online tourism domain (Xiang et.al, 2008). All these web applications are helping more and more users in all three phases of the tourism goods consumption, namely (i) pre-consumption, (ii) consumption and (iii) post-consumption, suggesting places where to go, proposing hotel reviews and so on. A study by Wang and Fesenmaier (2004) has analyzed the level of participation (in terms of number of contributions) and of interaction (in terms of number of connections with other users and number of favorites – what in this research has also been called bookmarking – for every user and rank level) of users in online social networks in the tourism domain. The users, i.e. the community members, have been classified in terms of the contributions they give to the community. Four different types of users have been singled out: (i) *Tourists*: those who lack strong social ties with the rest of the group, and contribute seldom to the community. (ii) *Minglers*: those who maintain somewhat strong social ties with the group, and sometimes contribute to the community. (iii) *Devotees*: those who maintain strong social ties with the group, are enthusiastic about community activities and contribute often to the community. (iv) *Insiders*: those who maintain very strong social and personal ties with the group, and very actively contribute to the community.

3 Methodology

Starting from the study by Wang and Fesenmaier (2004) quoted above, the research has investigated the role of web communities' "top users" section as a tool for fostering the understanding of community activities. As a matter of fact, since online communities are groups of people who not only share certain characteristics, but also interact with each other, the main objective of the study was to establish the *paradigmaticity* or *syntagmaticity* of the online travel communities by observing the behaviour of their top users and analyzing their incoming and outcoming relationships. For this purpose, three main activities have been conducted, described in the following sections.

3.1 Benchmarking analysis

In order to better understand the positioning of each online travel community in the web arena, and the content and functionalities offered by them, a detailed benchmarking has been carried out following an indicator-based methodology (Cantoni et al., 2007). According to the Website Communication Model (Cantoni et al., 2006), a framework of contents and functionalities has been created for investigating the information market of the online tourism communities. This framework is a helpful tool for web analysts to understand the general context of a specific domain and the trends of the information market in that domain. Twenty-one English and Italian online communities in the tourism field have been identified, where tourists' experiences are shared in different forms, such as videos, photos, blogs/diaries of travel experiences and reviews. Some of these communities are entirely embedded into generalist sharing websites (e.g. Flickr and YouTube); in these cases, the section "Travel & tourism" has been considered. Besides, also the communities inserted into booking websites (e.g. Venere.com) have been considered. Out of the 21 initial communities, only five presented a top users / top contents section. These five communities are different with respect to the kind of contents and services they offer, and can be grouped in three categories: (i) Flickr: photo sharing; (ii) TravBuddy: sharing of travel experiences; (iii) YouTube, LonelyPlanet, Travelistic: video sharing.

3.2 Selection of sample communities

For this preliminary study three communities out of five have been selected, one per category: Flickr (photos), TravBuddy (travel experiences) and Travelistic (videos for travellers). In the category "Videos for travelers" Travelistic has been chosen, because YouTube is a general community and LonelyPlanet has not its core business in online communities/communication.

Flickr (www.flickr.com) is a website that helps community members to share their photos with other members. Pictures can be uploaded with different levels of copyrights protection. The label used by Flickr to identify top contents / top users is: "Most interesting". The tourism community can be reached by inserting the word "travel" into the search box in the homepage, and selecting then the "Most

interesting" view (www.flickr.com/search/?q=travel&w=all&s=int). In this way it is possible to find pictures, photos and comments about tourism and touristic places. TravBuddy (www.travbuddy.com) is a community for sharing travel experiences and tips in the form of travel blogs or reviews, and for finding travel buddies. In the TravBuddy community the top contents/users section can be found under the label: **"**Most Popular Blogs". (http://www.travbuddy.com/browse/blogs/popular). Travelistic (www.travelistic.com) is a website that helps users to share all kinds of travel videos, including user uploads, professional content, and tourist board videos. In Travelistic the top contents/users section can be found under the label: "All time, most viewed video" (http://www.travelistic.com/video/most_viewed/of-all_time).

3.3 Analysis

Top user" and "top content" have been considered in this study as synonymous, because in no one of the top sections any user with more than one top content could be found: in these communities one content always corresponds to one user. The following rules have been established for the data gathering. It has been decided to observe the users of the communities mentioned above three times in a period of two months from July to September 2007 (July 16th, August 17th and September 21st). The main task was to analyze the variation in the top contributors sections. During this period the users' participation and their changes within the first ten position of the community ranking have been observed, and data about the views, the comments and the bookmarking have been gathered.

4 Results

The three given communities have been observed and the behaviour of top users has been recorded three times in two months (figure 1). The first month has been used as the starting point for the observation. The study has recorded the changes in the ranking of the top ten users in the months of August and September. In figure 1 the users' ranking variations in that period are presented. In figure 1 each circle represents an active user within the community. The study considers only the first ten active top users in each observation (the dotted line separates the first ten positions from the others in the ranking). As it can be seen, during the different observations some users changed their ranking position, other users went out of the ranking. In figure 1, new entries are represented with capital letters. Generally speaking, it can be noticed that Flickr is the community with less variation, while Travelistic is the less stable community. As a matter of fact, in Travelistic the ranking of the first three users has changed in the three different time frames, and some new users entered the "top ten" and started to move up the ranking. In TravBuddy, only positions six to ten present changes, while in Flickr the first nine users have been stable: only the last position changed because of the entry of a new member. Within these three communities, top users have been almost stable during the three observations. Only a few variations in terms of ranking positions and new entries have been encountered. Having a core group of stable community champions, it was possible to study their relationships with other users. Going back to the distinction between paradigmatic

and syntagmatic relationships among the members of a community, three levels of syntagmaticity can be singled out: (i) Level 1: "I watch your content". This is the basic level of interaction: users get in contact with one another by means of a non-verbal interaction. This first level can be monitored through the indicator "contact views". (ii) Level 2: "I comment on your content". At this level the interaction becomes verbal, the relationship between users is made explicit. This level can be monitored through the indicator "comments". (iii) Level 3: "I add you to the list of my favourite users". This is the highest level of interaction, where the tie between the users is a strong tie. This third level can be monitored through the indicator "bookmarking". Not all data (views, comments and bookmarking) are present in all communities: table 1 shows which data are present in the considered communities.

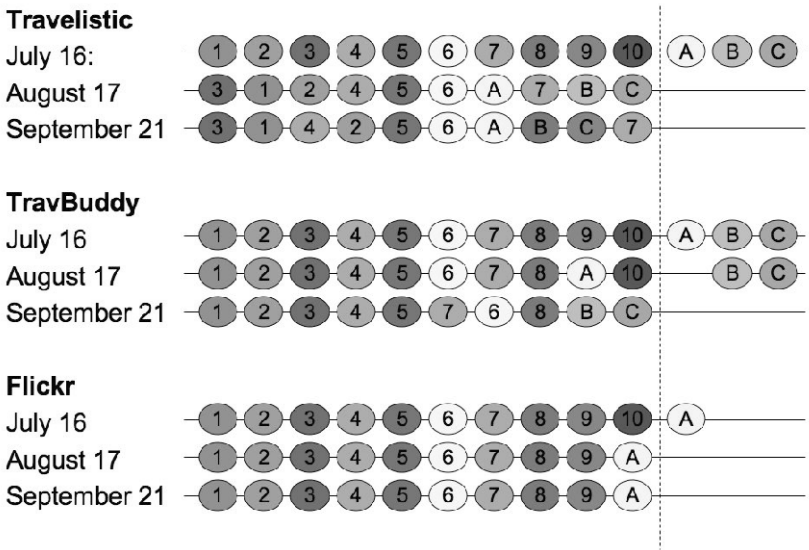

Fig. 1. Users' ranking variations in the three considered communities: Travelistic, TravBuddy and Flickr.

Table 1. Presence of the views, comments and favourites indicators in the communities.

	Views	Comments	Favorite
Flickr	X	X	X
TravBuddy		X	
Travelistic	X	X	

As it can be seen, Flickr is the most complete community, while TravBuddy provides only one indicator in the users' profile. This study considers all these data in order to observe if any trends can be recognized within the three communities. Where it was possible, the trends have been compared, while in the case of the "favorites" no comparison could be made.

Level 1. As the first level of syntagmaticity is the simple watching, the data available for Flickr and Travelistic have been compared (figures 2 and 3).

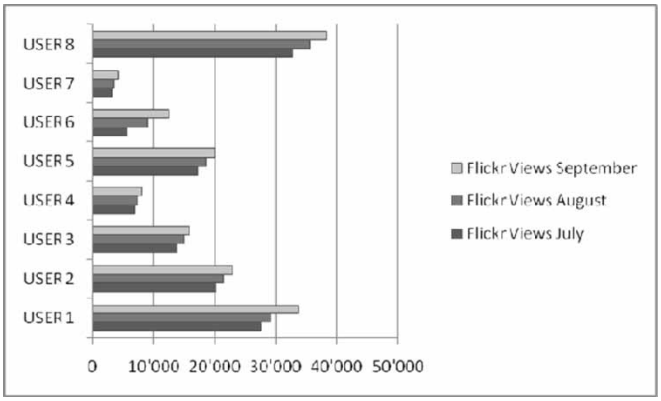

Fig. 2. Flickr top users views

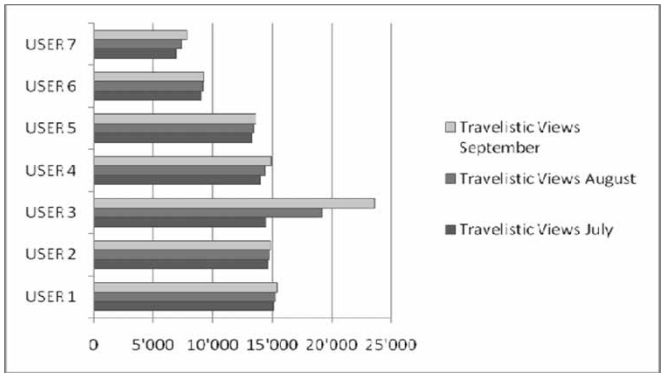

Fig. 3. Travelistic top users views

Figures 2 and 3 show that all top users have increased the number of views of their contents, as it could be easily expected. Even if this is quite obvious, however it shows that these community champions generate traffic within the website and their contents are constantly viewed.

Level 2. For this second level of syntagmaticity, the comments to top users' contents have been investigated in order to understand if they present the same increasing trend as the views.

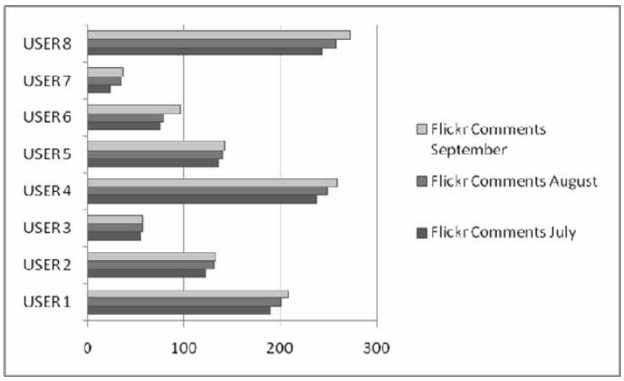

Fig. 4. Flickr top users comments

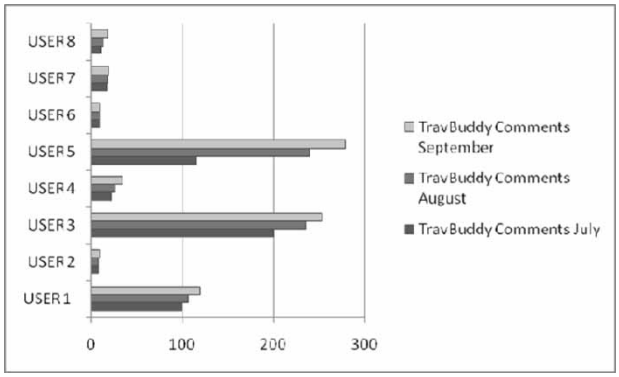

Fig. 5. TravBuddy top users comments

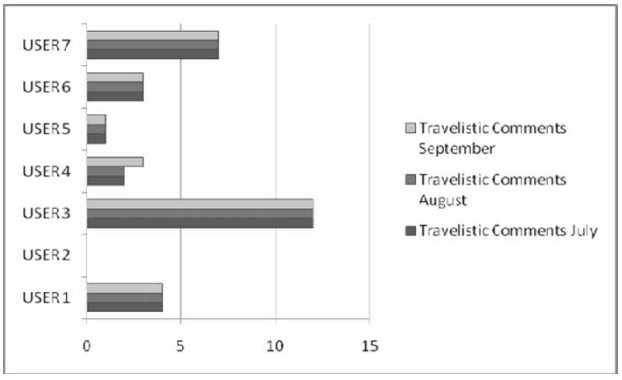

Fig. 6. Travelistic top users' comments

Figures 4 to 6 show the general trends of the comments growth from one observation to another. Comments follow the trend observed in the views (figures 1 and 2), except for the Travelistic community, where the number of comments is very low on the whole, and no significant increase has been observed. For Flickr and TravBuddy, on the contrary, the general rule is that comments on users' generated contents increase over time, with some exceptions (Flickr user 3, TravBuddy users 2, 6 and 7). In

Travelistic only one comment has been added in two months (to user 4): in this community the top user section has increased the community's syntagmaticity only at the first, basic level, while no changes have been observed in the second one.

Level 3. The last level, the most interesting in the proposed model, deals with stable connections among the members. As a matter of fact, bookmarking a user is like establishing a stable relationship, a kind of friendship: exactly like a link from a website to another website expands the website's network and creates a hypertext, bookmarking a user creates a "hyper-tie" between two persons, thus expanding one's network of relationships and increasing participation to the community.

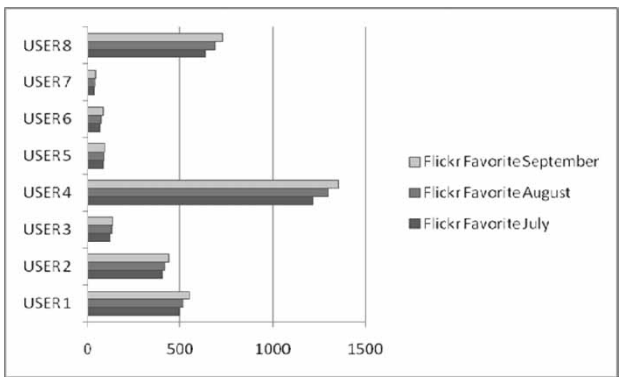

Fig. 7. Flickr favorite trends

This last chart (figure 7) represents the growth of the bookmarked contents in Flickr. Trends for all users are positive: this means that Flickr top-users have extended their network over time.

5 Discussion

Community websites propose "top content/users" as paradigmatic points of reference within the community itself; suggested users and contents become more and more a kind of fixed stars for the other members. These users and contents should be also useful as developers of relationships with other members, transforming the simple paradigmatic relationships into syntagmatic ones. The growth of syntagmatic relationships drives to the creation of a real community, which is based not only on some common features shared among its members, but also on interactions. The more the common ground among users grows, the more the nature of the relation among them changes from a paradigmatic perspective to a syntagmatic one.

The analysis of the three syntagmaticity levels has shown that, even if all communities have been designed to meet Web 2.0 requirements, in one case the syntagmatic growth of the community has been limited to the first level: in Travelistic no increasing trend can be identified at the second level, because no explicit verbal relationships with one of the community's champions have been established.

Even if this preliminary study has stopped before demonstrating the usefulness of top-users and top user-generated contents, it can be likely assumed that they are an added value for online communities, because they are a kind of preferred hub for new and old users. They have the function of creating the common ground of the community, thus promoting the interactions within it and turning paradigmatic communities into syntagmatic ones. The role and importance of top users, has also been recognized by Yahoo.com, describing its design pattern library. Actually, one of the design patterns regards the creation of a "group contributors, numerically, into "buckets" of performance, and acknowledge top performers for their superior achievements. Top 10, 50 and 100 are some commonly-used groupings". According to Yahoo designers the pattern should be used to (i) encourage top contributors to provide high quality contents and (ii) "motivate heavy (but not yet top) contributors to increase the quality and frequency of their contributions". (Yahoo developer web site, 2008)

6 Conclusions

In conclusion, this preliminary study shows the importance given by tourism online communities to the top contents/users sections as a strategic element for both design and promotion. Stressing this particular kind of contents in the access structures of the communities may enforce the role of top members as community builders. As a next step of this study, in order to have a more precise understanding of the role played by top users in online communities, the methodology will be refined, e.g. by analyzing the interactions promoted by top users compared with those promoted by other users, by selecting a more complete sample of online travel communities, and by comparing them with online communities in other domains.

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The Virtualization of Backpacker Culture

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Abstract

Backpacking is a culture symbolic of the increasingly mobile world. The purpose of this study is to develop an understanding of the stabilization and creation of the social structure of the backpacking culture that has resulted from the convergence of technology and ideology. Using theory from the field of evolutionary anthropology, the backpacker culture is examined as an integrated system composed of technological, sociological, and ideological subsystems. Age cohort analysis is used to examine the differences between age groups in terms of their online information search, participation in backpacker specific forums, usage of social networking sites, and the virtual connection to the backpacker culture. While previous studies have considered the mainstreaming of backpacking as the main barrier to examining backpacking as a culture, the results of this study suggest that the convergence of backpacker ideology with the advances in communications technologies have created the social structure to support the mainstream backpacker culture of today.

Keywords: mobility; virtual communities; systems theory; subculture.

1 Introduction

Backpacking is a culture symbolic of the increasingly mobile world. With cultural roots growing from the beatnik and hippie counterculture's of the 1950s-1970s, backpacking has been a mainstreaming phenomenon in tourism that has evolved and adapted to technological, social, political and economic trends in both the home and destination societies of backpackers. These global trends over the last 50 years have lead to a democratization of backpacking to a large, heterogeneous, and globally diverse group of people (Paris, 2008). The pillars of ideology of the backpacking subculture (Welk, 2003) have persevered over the last few decades, but the social cohesiveness, imparted early on by the close connection with the social countercultures of the time, arguably, has not. One of the largest constraints to depicting backpacking as a subculture is that it has become so mainstreamed (Scheyvens, 2002; Welk, 2003; O'Reily, 2006) it is difficult to illustrate clearly the boundaries between the backpacker community and other mainstreamed tourists.

Recent developments in information and communications technology have provided the basis for the backpacker culture to once again gain the cohesiveness without the temporal or spatial constraints of the 'backpacker trail.' These developments allow backpackers to be fully integrated and maintain a sustained state of co-presence between the backpacker culture and their home culture (Paris & Teye, 2008;

Mascheroni, 2007). The purpose of this study is to develop an understanding of the stabilization and creation of social structure of the backpacking culture that has resulted from the convergence of technology and ideology.

2 Theoretical Background

2.1 Culture

There is no definitive definition of 'culture'. This study uses a systems approach to examine culture. According to White (1949), culture can be conceptualized as an organized and integrated system that can be divided into three interrelated subsystems: technological, sociological, and ideological. The technological subsystem includes the instruments and techniques by which people negotiate their environment. The sociological subsystems of culture represent the interpersonal relations between people that are articulated through patterns of behaviour. This subsystem is made up of the multiple human systems, for example, social, recreational, political, economic, and ethical systems. The sociological subsystem can also be considered the organized human attempt at using the technological system. The ideological system represents the organization of beliefs about the human experience. Experiences and interpretations are influenced by technologies as well as the sociological systems. All three subsystems are interrelated and condition one another. (White, 1949) Keeping this in mind, the cultural system can be metaphorically approached as a layer cake. On the bottom layer as the base, is the technological system, on the top layer is the ideological system, and both are mediated by the social system. Overtime all three of these systems adapt and influence each other, thus evolving the entire system of culture.

Evolutionary and ecological theory has been applied to the examination of cultures as adaptive systems. Keesing (1974) summed up a broad assumption agreed upon by most 'cultural adaptationists': 'cultural change is primarily a process of adaptation, technology….and elements of social organization directly tied to production are the most adaptively central realms of culture (p.4)'. As a subsystem of culture changes, the other subsystems adaptively change. The following section will conceptualize the technological, social, and ideological subsystems of the backpacker subculture.

2.2 Backpacker Culture

Many researchers have been hesitant to examine backpacking in its entirety as a culture (Anderskov, 2002). Welk also argues that the backpacker community is not a real subculture, but it does take on some of the characteristics of one constrained by a constant assimilative pressure by mainstream tourism. Backpackers on the road are temporary members of the 'road culture'. The social interactions (Murphy, 2001) between backpackers revolve around the shared ideology, but are constrained to just the time spent while travelling.

Welk (2003) proposed that the backpacker community has evolved around a set of stable common symbolic lines of ideology. Five pillars of *backpacker ideology* include: to travel on a low budget, to meet different people, to be free, independent and open-minded, to organize ones journey individually and independently, and to travel as long as possible. While the current characteristics of backpackers differ, from those of early backpackers (Cohen, 1972), the backpacker ideology has persevered (Sorensen, 1992; 2003; Anderskov, 2002). Key elements of the backpacker culture, succinctly outlined by Welk's five pillars, were essentially the same in Sorensen's (1992) and Anderskov's (2002) studies. Anderskov (2002) concluded that the backpacker culture is hierarchically structured, with individual status connected to the values of freedom, independence, tolerance, low budget, interaction with locals, and the exchange of the most valuable object in the culture, information. While the ideology of the backpacker market is represented in the value system, there is a noticeable gap between the structure and the actual practice by backpackers (Anderskov, 2002; Richards & Wilson 2003). Referring back to the *layer cake* metaphor, the ideological layer has maintained its stability through time, while the social and technological layers have been in nearly constant modes of evolution and adaptation.

Technological innovations have contributed to evolutions and adaptations in the social systems of the backpacker culture. In the 1970s the increase of the number of young independent travellers led to the development of the early backpacker trails and enclaves, including the 'hippie trail'. After taking a long-term overland trip through Asia on the hippie trail, Tony Wheeler and his wife wrote the first Lonely Planet guidebook (Welk, 2008). Interdependently, the development of alternative guidebooks, and the evolution of the social systems of backpackers occurred. The guidebook represented a fixed structure of the backpacker culture that facilitated information and culture transfer between current backpackers, new backpackers, and from one generation to another (Sorensen, 2003). Guidebooks provided a common reference source for backpackers while solidifying the backpacker ideology of independent, free, and long-term travel, and they also reinforced the development of backpacker trails and enclaves. The expansion of the guidebooks contributed greatly to the mainstreaming of the backpacker culture by making backpacking easier. In addition to guidebooks, the development of an advanced infrastructure of backpacker accommodations, travel agencies, and transportation all contributed greatly, as did other global trends such as the increasing global middle class, increasing amounts of disposable income of younger people, increased social support for backpacking (O'Reily, 2006), and the increased representation of backpacking in pop culture (Richards & Wilson, 2003). For simplicity and to keep the argument presented in this study manageable, this study has used simple example presented above. As noted earlier, the mainstreaming of backpacking is considered the main barrier to examining backpacking as a culture, or in other words, backpacking culture had outgrown the social structure needed to support it.

The social system anchored by the guidebooks, backpacker trails and enclaves, and infrastructure, has also adapted. The social system has expanded into the virtual world. Several recent studies have examined the interaction of the backpackers and

the internet (Paris, 2008; Sorensen, 2003; Mascheroni, 2007). The internet has provided backpackers with just-in-time access to travel information, effortless booking of accommodations and transportation, increased mobility, and access to the backpacker culture through online communities (Paris, 2008; Paris & Teye, 2008; Mascheroni, 2007). Direct personal interactions occur between backpackers in online forums such as, Lonely Planet's Thorn Tree Forum and Boots'n'all and on Social Networking Sites (SNS). Interestingly, while many backpackers are suspected of using Facebook, Myspace, Bebo, and other SNS, Facebook appears to be the only one in which backpacker specific groups have appeared. The largest backpacker group on Facebook has nearly 20,000 members, and there are 500+ backpacker groups within Facebook. Indirect interactions take place as many backpackers visit fellow travellers blogs, personal websites, picture albums, and SNS profiles. Non-participation in online forums, or lurking, could also be considered a form of indirect interaction. Many businesses have started to adapt to the technological adoption of backpackers. Lonely Planet has recently started to offer downloadable versions of their guidebooks as they seek to compete with websites such as Travelfish.org are creating downloadable guidebooks that are consistently updated through contributions of backpackers on the road. The development of the internet, as well as online communities in the recent decade has created a new social structure on which the ever expanding backpacker culture can exist.

The purpose of this study is to examine the virtual structure of the backpacker culture particularly through virtual communities, as well as examine how particular types of online communities have been adopted by different age cohorts of the backpacking market. Through this examination of the virtualization of the backpacker culture, this study makes the argument that the recent innovations of the internet and communications technologies have provided the social structure that allows ideological system of the backpacker culture to be maintained on the road as well as at home.

3 Methodology

A self-administered online survey was used to collect the data for this study. Surveys were administered through backpacker specific groups on Facebook.com and on several threads of Lonely Planet's Thorn Tree Forum. A link to the survey and a short message explaining the purpose was posted on the discussion boards of 15 backpacker-specific groups on Facebook.com of which members had to choose to join. This methodology has proved to be effective alternative to hostel based surveys in overcoming some of the problems associated with targeting the inherently mobile backpackers (Paris, 2008). However, it must be noted that this study does use a self-selecting sample of backpackers online, the findings limited in terms of generalization without future validation.

The questionnaire was designed to measure the backpackers demographic information including; age, gender, education, employment status, nationality, and previous travel experience. The questionnaire also employed a set of questions developed by the

author from an analysis of the literature, previous research experience, and several informal interviews with backpackers about their online habits. The questionnaire measured how the internet was used, perceived, and represented by backpackers before during and after their trips. All the questions were answered concerning their most recent trip and therefore this was not a longitudinal study. The questionnaire used a 1-5 Likert type scale (1= strongly disagree to 5=strongly agree). The data used for this study was collected during the one month period of August 15 to September 15, 2008. The data analysis procedure included descriptive statistics, and Analysis of Variance (ANOVA) to examine the differences between the age cohorts.

4 Results

4.1 Sample profile

The sample profile is presented in Table 1. The gender break down is similar to that of the most recent quantitative studies on backpackers (Paris, 2008). While the majority of the sample was under 30 years old (65.5%), about a third of the sample was older than 30. As expected, most of the respondents are from North America (35.4%), Western Europe (41%), or Australia/New Zealand (13.3%). However, there is an increasing amount of backpackers from non-traditional source countries with about 8% of the respondents from Latin America, Malaysia, South Africa, or an other Asian country.

Table 1. Sample Profile

Attribute	Number	Percentage (%)	Attribute	Number	Percentage (%)
Gender			Education		
Male	94	43.3	High School (up to year 12)	25	11.5
Female	123	56.7	College (4 year)	96	60.8
Age			Graduate School (advanced degree)	119	27.6
18-24	67	30.9	Employment		
25-30	75	34.6	Student	45	20.7
31-40	33	15.2	Employed Full-time	120	55.3
40+	42	19.1	Employed Part-time	27	12.4
			Unemployed	25	11.5

Table 2. Respondents Travel Experience

Travel Experience	Number	Percentage (%)	Travel Experience	Number	Percentage (%)
Number of Countries Visited			Number of International Trips		
1-8	24	14.3	1-6	54	32.1
9-20	81	44.8	7-16	49	29.1
21-30	29	17.3	>16	65	38.7
>30	34	20.2			
Avg. Length of Prev. Trips					
0-2	20	11.9			
2-6	83	49.4			
6-11	28	16.7			
12-52	37	20.2			

Respondents previous travel experience is presented in Table 2. Respondents had varying levels of travel experience. The largest percentage of respondents' previous trip lengths was between 2 and 6 weeks, suggesting that because of external constraints many backpackers' trips are 'short-term' (Sorensen, 2003; Paris, 2008). Still, a fifth of the sample's previous trips lasted between 3 months and year.

4.2 Pre-trip results

Table 3. Comparison of Pre-Trip Questions Between Age Groups

Travel Behaviour	18-24	25-30	31-40	41+	F Value	Sig.
Have visited backpacker forums such as Lonely Planet's Thorn Tree Forums, or other online backpacker travel communities	3.89[1]	4.23[12]	4.39[12]	4.60[2]	4.709	.003
Have joined a backpacker specific group on a social networking site.	2.96[1]	3.09[1]	3.12[1]	1.74[2]	9.642	.000
Use the internet to search for information about the destinations you are visiting	4.48[1]	4.65[12]	4.85[2]	4.62[12]	2.371	.071
Visited other backpacker's blogs and websites	3.36	3.56	3.85	3.14	2.402	.069
Have sought out tips from friends, family and other travellers about your trip online	3.89[12]	4.00[1]	3.79[12]	3.31[12]	2.964	.033
Bought a guidebook like Lonely Planet, Let's Go, or Rough Guides to help plan your trip	4.41	4.28	4.39	4.43	.245	.865
Book travel online before leaving home	3.49	3.42	3.55	3.71	.511	.675
Have booked a hostel on a website like Hostelworld.com or hostelbookers.com prior to leaving home	3.18	3.21	3.06	2.83	.594	.619

Note: Different numbers (1,2,3) denote significant difference between means at $p<.05$). Tukey's HSD was used. Likert scale used (1=low, 5=high)

Table 3 presents composite scores and the results of the ANOVA for the pre-trip questions between the four age cohorts. The results suggest that online forums provide a strong source of both information and interaction between backpackers of all ages. Interestingly, the participation in online forums increased as age increased. While the 41+ age cohort was the most likely to have visited online forums, they were by far the least likely to join a backpacker specific group on a social networking site (SNS). The two age cohorts representing people between 25 and 40 were the most likely to join backpacker groups on SNS. The pre-trip information search questions suggest that guidebooks are still very important for backpackers of all ages. The use of the internet for pre-trip information searches, however, seems to be more important, as the scores for all age cohorts were greater for the use of internet for obtaining information than for the use of guidebooks. The 25-40 age cohorts were the most likely to visit other backpackers blogs. Blogs provide backpackers with information, as well as provide a medium for individuals to assert their own 'traveller' status. The 18-30 cohorts were most likely to seek out tips from friends, family, and other travellers online, which suggest that younger people are regularly connected to their virtual networks. The results also show that backpackers of all ages book travel prior to departure. The older cohorts tend to book hostels less prior to departure, likely a result of the accommodation choice of many older backpacker (Paris, 2008).

4.3 During-trip results

Table 4. Comparison of During-Trip Questions between Age Groups

Travel Behaviour	18-24	25-30	31-40	41+	F Value	Sig.
Use email to stay in contact with friends and relatives back home	4.68[1]	4.52[12]	4.47[12]	4.21[2]	2.932	.035
Use social networking site to stay in contact with friends and family back home	4.18[1]	4.07[1]	3.60[1]	1.91[2]	28.866	.000
Added friends met during your trip to Facebook, Myspace, Bebo, etc.	4.32[1]	4.04[1]	3.80[1]	2.09[2]	28.729	.000
Posted pictures online during your trip	3.71[1]	3.59[1]	3.27[12]	2.56[2]	5.641	.001
Used online backpacker forum to find information for the rest of your trip	2.97[1]	3.65[2]	3.57[12]	3.39[2]	3.855	.011
Prefer to stay at hostels with free internet or Wi-Fi access	4.00	3.89	3.43	3.38	2.924	.035
Made a post to online forum or hostel review site to share your experiences	2.85	3.43	3.40	3.56	3.230	.024
While travelling your email address and/or social networking profile is your only real address	4.18[1]	3.91[12]	3.93[12]	3.26[2]	4.615	.004

Note: Different numbers (1,2,3) denote significant difference between means at $p<.05$). Tukey's HSD was used. Likert scale used (1=low, 5=high)

Table 4 presents the composite scores and the results of ANOVA for during-trip questions for the four age cohorts. All respondents stayed in contact with home using email. The use of SNS to stay in contact with home networks however was greater for the younger cohorts with the 18-24 using SNS the most. The 40+ cohort was not likely to use SNS. SNS were also used to add friends met while travelling by all the

cohorts except the 40+ group. Online backpacker forums were used by the older cohorts 25-40+ to find information while travelling. Similarly, the sharing of information and experiences by posting to an online backpacker forums or hostel review sites was greatest for the 25-40+ cohorts. The posting of pictures while travelling to share experiences was greatest for the 18-24 cohort. The perception that an email address or SNS profile is a backpacker's only real address is greatest for the 18-24 cohort and decreases for each older cohort. Correspondently, there was a preference for hostels that offer free internet or Wi-Fi access, as respondents want to be connected to their networks.

4.4 Post-trip results

Table 5. Comparison of Post-Trip Questions between Age Groups

Travel Behaviour	18-24	25-30	31-40	41+	F Value	Sig.
Use email to stay in contact with friends and fellow travellers met during trip	3.86	4.09	3.96	3.81	.696	.556
Use SNS to stay in contact with friends and fellow travellers met during trip	4.20[1]	4.04[1]	3.70[1]	2.06[2]	27.164	.000
Uploaded pictures to share with friends, family and fellow travellers	4.45[1]	4.47[1]	4.00[12]	3.69[2]	5.874	.001
Viewed pictures/videos posted online by other travellers met during trip	4.41[1]	4.36[1]	3.85[12]	3.31[2]	10.532	.000
Contributed to online backpacker forum	2.84[1]	3.91[2]	3.70[2]	4.44[2]	15.539	.000
You joined a backpacker group on SNS after returning home.	3.16	3.27	3.00	2.06	5.824	.001
You reviewed a hostel you stayed at on a hostel booking website	2.86	3.22	3.26	2.78	1.304	.275
More fulfilling and/or easier to share experience with other travellers virtually then friends and family at home	3.63	3.69	3.44	3.28	.904	.440
Online travel communities provide direct access to the backpacker travel community	3.44	3.73	3.63	3.38	.988	.400
You stay connected to backpacker culture online while at home	3.23	3.73	3.56	3.31	1.699	.169
Other backpacker's experiences shared online will entice you to travel more	3.67	3.87	3.78	3.38	1.230	.301

Note: Different numbers (1,2,3) denote significant difference between means at $p<.05$). Tukey's HSD was used. Likert scale used (1=low, 5=high)

Table 5 presents the composite scores and the results of the ANOVA for the post-trip questions. The youngest cohort was more likely to use SNS to stay in contact with travellers met on the road, and the oldest cohort was not likely to use SNS. All four scores for uploading pictures to share with friends, family and fellow travellers were high. Similarly, the two youngest cohorts were the most likely to view other travellers pictures online. Staying connected to the backpacker culture after the trip occurred through participation in online communities as well. Backpacker forums were contributed to the most by the oldest cohort. The results also suggest that many people, with the exception of the oldest cohort, joined backpacker specific groups within SNS. All the cohorts agreed to an extent with the statement that it is more

fulfilling and/or easier to share experiences with other travellers virtually than with friends and family at home. Further, the virtual connection to the backpacker culture is supported by the responses of all four cohorts to the statements that 'online travel communities provide direct access to the backpacker travel community' and that 'you stay connected to backpacker culture online while at home.' The sustained connection to the backpacker culture can entice backpackers to travel more as they experience other backpacker's experiences online.

5 Discussion

This study sought to examine the virtualization of the backpacker culture. The evolution of the culture's social structure is a result of a combination of several factors including and adaptation to the recent innovations of the internet and communications technologies, the overall mainstreaming of the backpacking, and the stability of the backpacker ideology. The results of the study support the argument that advances in the internet and communications technologies, particularly online communities have indeed created the social structure that has allowed backpackers to maintain a constant connection to the backpacker culture.

Backpacker ideology (Welk, 2003) has remained stable over the last few decades. The findings of this study suggest that the virtualization of the backpacker culture has allowed backpackers to fulfil the actual practice of the five pillars of backpacker ideology to a greater extent. The ease of booking hostels and transportation online, especially through online booking agents like hostelworld.com or hostelbookers.com and Kayak.com, have allowed backpackers to find the best deal by comparing many options, both prior to departure and while on the road. The availability of just-in-time information has increased backpacker use of the internet for pre-trip internet searches, as well as supported increased independence and mobility while on the road. Individual backpacker's freedom and individual identity are enhanced through the ability to gain this information anywhere anytime, as well as to represent themselves how they want to be represented on social networking sites and personal blogs. A large part of the appeal of backpacking is the freedom to be whoever one wants to be, this ideal is also has contributed to the adoption of SNS and blogs by many backpackers. The often fleeting and temporally constrained interactions that occur on the road can now be maintained through online communities and other forms of internet based communications. The convergence of the backpacker ideology with communications technologies has created a stable structure for the social systems of the backpacker culture.

This study also incorporated an age-cohort analysis to examine differences between backpackers of different ages. This was conducted primarily to show how backpackers of different ages used the different types of communications technologies. Also, it can be assumed that many of the older backpackers, first 'became backpackers' when they were younger. The older cohort represents backpackers, who as younger travellers travelled on the hippie trail and have sustained the backpacker ideology. The virtual communities allow them now to

reconnect to that culture. While they maintain some of the backpacker ideology and still have a personal connection to the backpacker culture, their actual connection on the road with backpackers maybe minimal.

The older cohorts were more likely to take part in online backpacker forums, like Lonely Planet's Thorn Tree Forum. The 40+ cohort contribute greatly to the forums, suggesting that they maintain their connection to backpacker culture by passing on the knowledge gained through their extensive previous experience to younger cohorts. This is similar to the role that guidebooks, and prior to that word of mouth, have played in the past transferring knowledge to new cohorts. Backpackers in the youngest cohort are not as likely to actively participate in online forums; however they are very likely to use the social networking sites to maintain their connections to the backpacker culture. This connection via SNS results in the centralization of the younger backpackers various networks into one place. SNS provide the platform for people to maintain a constant state of co-presence with all of their networks. Further connections to the backpacker culture are represented by the viewing and sharing for personal photos and personal blogs online. These in a sense play the role of maintaining the social status of the backpacker in the hierarchy of the backpacker culture. This is similar to the 'road status' that backpacker seek to maintain that is based on the level that the individual fulfils the classic backpacker ideology.

6 Conclusion

This study conceptualized the backpacker culture using a dynamic systems approach from evolutionary anthropology. The backpacker culture was metaphorically represented as a layer cake composed of the technological subsystem and ideological subsystem mediated by the social subsystem. The results of this study suggest that the convergence of the ideology of backpacker with the advances in communications technologies have created the social structure to support the mainstream backpacker culture of today. This study only took a limited look at the complex relationships between these subsystems as well as external global trends. Backpackers were only targeted online, in order to strengthen the results this study should be repeated through a traditional hostel based administration of the survey. It is hoped that this study will provide further support for more theoretical examinations of backpacking. The analysis of individual cultures can create greater comprehension of the interactions between the human, social, and technological systems of tourism. This understanding will be beneficial for both academics and practitioners as it can contribute to the grasp of the complex interactions in the world today.

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Comparison of Deceptive and Truthful Travel Reviews

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Abstract

As the use of online reviews grows, so does the risk of providers trying to influence review postings through the submission of false reviews. It is difficult for users of online review platforms to detect deception as important cues are missing in online environments. Automatic screening technologies promise a reduction in the risk but need to be informed by research as to how to classify reviews as suspicious. Using findings from deception theory, a study was conducted to compare the language structure of deceptive and truthful hotel reviews. The results show that deceptive and truthful reviews are different in terms of lexical complexity, the use of first person pronouns, the inclusion of brand names, and their sentiment. However, the results suggest that it might be difficult to distinguish between deceptive and truthful reviews based on structural properties.

Keywords: hotel reviews; deception; false; truthful; detection.

1 Introduction

It is increasingly common for individuals to read about product experiences of other consumers on the Internet (Schlosser, 2005), and also to write and share their own experiences. According to eMarketer (2007), about 75.2 million online users use CGC today in the US, and this number is expected to grow to 101 million by 2011. These online consumer-generated opinions are especially important for hospitality and tourism, whose intangible products are difficult to evaluate prior to their consumption and whose consumers thus rely heavily on word of mouth (Litvin et al., 2008). Recent reports found that nearly 50% of travel purchasers visited a message board, forum, or online community for their online travel purchasing (Compete, Inc 2006).

While growing numbers of consumers take advantage of online opinions generated by experienced other consumers, these new communication venues also create new opportunities for deception. Popular press articles have identified deception as a real risk for travel Websites and their users (Elliott, 2006). There are clear incentives for businesses, especially small providers, to influence consumer-generated reviews as they can have great impacts on the success of an establishment (Bhatnagar, 2006). While consumers appear to be rather sophisticated in their ways of trying to identify false reviews through judging the level of detail and polarity (Gretzel, Yoo & Purifoy, 2007), travel review providers see a great need to monitor reviews submitted to their

sites (Reiter, 2007). Their techniques range from labour-intensive detection by human editors and reliance of consumers to spot suspicious reviews to automatic scanning of reviews, applying allegedly sophisticated algorithms (Elliott, 2006).

Deception is defined as "a message knowingly transmitted by a sender to foster a false belief or conclusion by the receiver" (Buller and Burgoon, 1996, pg. 205). Traditional deception research has taken place in face-to-face communication settings where deception receivers have access to both verbal and non-verbal cues to evaluate a potential deceiver. Contrary, in online environments, it is difficult to identify and access a rich set of cues in order to detect deception and, consequently, mechanisms used in face-to-face communication do not apply or only to a limited extent (Zhou & Sung, 2008). The restricted access to deceptor cues makes online deception easier to accomplish and more challenging to detect. Especially, online product reviews provide an easy setting to create deceptive messages since most review sites do not have specific restrictions on posting reviews and require little additional information. Accordingly, review readers often appear to be concerned with untrustworthy or biased information when they receive other consumers' opinions online (Schindler & Bickart, 2005).

Online deception has been studied for a variety of online communication types, including emails and online communities (Zhou & Sung, 2008; Hancock et al., 2005). However, online reviews are different from previously examined types of eWOM communication since they represent one-to-many communication (Litvin et al., 2008) and typically one-way information flows (Schindler & Bickart, 2005). The specific characteristics of consumer reviews, in particular travel reviews, need to be taken into account in order to better understand deception and the potential for its detection. Consequently, a study was conducted to investigate the differences between deceptive hotel reviews and truthful hotel reviews.

2 Background

2.1 Online Consumer Reviews

Online consumer reviews are an independent information resource with growing popularity and importance, especially in the context of travel (Yoo & Gretzel, 2008). Chatterjee (2001) noted that consumer reviews and ratings are the most accessible and prevalent form of eWOM. Over 30 percent of Internet users have rated products online (Pew Internet & American Life Project, 2006) and 70 percent of US adults currently use consumer product ratings and reviews (Forrester, 2006). According to the typology of eWOM channels provided by Litvin et al. (2008), consumer reviews have characteristics in terms of communication scope and level of interactivity that are different from other forms of online communication. Consumer reviews are asynchronous while instant messaging is synchronous and consumer reviews constitute one-to-many communication while emails and instant messaging are most often one-to-one or one-to-few types of communication. In addition, information flow

is often one-way in online review sites since many sites do not allow interaction between writers and readers (Schindler & Bickart, 2005).

Consumer reviews are perceived as particularly influential because they are written from a consumer's perspective and, thus, provide an opportunity for indirect experience (Bickart & Schindler, 2001). They are also perceived as more credible than information provided by marketers (Smith, Menon & Sivakumar, 2005). However, at the same time, online consumer reviews also provide an opportunity for deception since they can be generated without specific author information such as a real name or photo (Fogg et al., 2001) and are submitted by a source that has little or no relationship with the message receivers (Schindler & Bickart, 2005). This absence of source cues (Jin et al., 2002; Smith et al., 2005) challenges review readers in their effort to detect and distinguish deceptive reviews from truthful reviews.

In addition, while online travel agencies can make sure that only customers with actual booking records can submit reviews (Reiter, 2007), it is often the case on travel review sites like TripAdvisor that consumers booked the hotel somewhere else but then leave comments on the review site (O'Conner, 2008). For those providers who do not have the luxury of backing reviews up with transactional data, detecting deception has become an important necessity in order to maintain usefulness and credibility of the content provided on their sites.

2.2 Deception in Online Environments

Online environments are usually not capable of supporting high-bandwidth interactions and the majority of online communication technologies are only text-based messages which filter out certain informational cues such as nonverbal cues, which are particularly important in the context of deception (Carlson et al., 2004). Indeed, past research has found that humans are less able to detect deception in visible lies compared to audible lies (Bond & DePaulo, 2006). Reduced cues in online communication may actually provide a fertile venue for deception (Donath, 1999) and deception detection in online environments is more challenging than in other settings (Zhou & Sung, 2008). Difficulties in detecting deception in online environments have been discussed quite extensively in the literature (Jin et al., 2002; Smith, Menon & Sivakumar, 2005; Dellarocas, 2006). On the other hand, deception detection can potentially be easier as technology can be used to automatically scan contributions and detect irregularities. Consequently, identifying cues embedded in deceptive text is critical for successful deception detection (Zhou & Sung, 2008).

2.3 Detecting Deception in Online Communication

A number of studies have tried to investigate the differences between deceptive messages and truthful messages for the purpose of successful deception detection (Zhou et al., 2004; Zhou & Sung, 2008; Burgoon et al., 2003; Hancock et al., 2005). Zhou et al. (2004) compared deceptive emails with truthful emails and found significant differences in the language structure of the emails. Hancock et al. (2005) compared messages from liars to those from truth tellers and suggested that the

messages are different in terms of number of words, use of pronouns and use of terms that described the senses. Burgoon et al. (2003) suggest that deceptive senders of messages display higher 1) quantity, 2) nonimmediacy, 3) expressiveness, 4) informality, and 5) affect; and less 6) complexity, 7) diversity, and 8) specificity of language in their messages. Similarly, a recent study by Zhou and Sung (2008) suggested major categories of verbal cues to deception. Those are quantity, language complexity, language diversity and non-immediacy. While these studies were focused on text-based verbal cues, Zhou (2005) broadened knowledge of deceptive behavioural cues to nonverbal indicators, namely keyboard-related, participatory and sequential behaviours. For example, instant messaging participation behaviour was measured by number of turns, average pause intervals and response latency.

Findings in online deception studies are contrary in some aspects but similar in others to findings from face-to-face communication research. Interpersonal deception theory (Buller and Burgoon, 1996) argues that deceivers generally use fewer words and sentences also give less detail in their message to avoid being caught. Contrary to this, the study by Zhou et al. (2004) found that deceptive email senders created longer messages than truth-tellers. But similar to traditional deception studies, they found that deceivers provided less complex and less diverse messages. In addition, Hancock et al. (2005) found that liars produced more words, used more "other" pronouns like he, she or they and used more terms that described the senses such as "see", "hear" and "feel". Thus, general communication and deception theories seem to apply to online deception, at least as far as verbal cues are concerned. While these studies extend our general knowledge regarding online deception, travel review-specific research is needed to better inform the providers of travel review sites.

2.4 Deceptive Travel Reviews

Bhatnagar (2006) reports that ratings that look too good to be true are suspicious; in addition, reviews that note a negative aspect but mitigate the negative experience and indicate repurchase desire raise red flags. Keates (2007) suggests that fake travel reviews are likely those for which ratings differ greatly from the average rating, which mention nearby properties as superior, and which are submitted by a user who has written about only one hotel and visited the site once, on the date the review was posted. Based on Dellarocas' (2003) assumption that source credibility is a function of the number of reviews posted, O'Connor (2008) shows that single review postings on TripAdvisor.com are indeed doubtful in that they are more likely to contain extreme ratings. While O'Connor's study provides an important insight in detecting deceptive travel reviews, other deception cues have yet to be tested in the context of travel reviews. Especially cues related to the text structure could be easily identified by automatic scanning programs. Therefore, a study was conducted to test structural cues previously identified for deception in online communication.

3 Methodology

Following definitions of deception that emphasize "intention to deceive" as a critical element (Masip, Garrido & Herrero, 2004), a deceptive review was defined as a review that was written with the intent to mislead its readers. Thus, reviews that contain false information caused by the ignorance or misinformation of a reviewer do not count as deceptive reviews, although they may be false reviews. For the context of the study, deceptive reviews were further defined as being written by the individual hotel provider for the purpose of promoting their business. Negative reviews written by competitors or positive reviews written by consumers who were provided with specific incentives to engage in this behaviour were not taken into account as it was not possible to simulate these behaviours in the context of the experiment. On the other hand, truthful reviews were defined as reviews that were posted on the review platform. While there is of course no guarantee that those reviews were indeed truthful, they had gone through a screening process and were perceived as being truthful by the site editors. The study was conducted in the context of hotel reviews, as they are the most prominent review category in travel and are perceived as having the greatest impact by travellers (Gretzel, Yoo & Purifoy, 2007). Specifically, the study focused on TripAdvisor.com, as it is the most prominent online hotel review platform currently available (Yoo & Gretzel, 2008).

3.1 Hypotheses

Based on Zhou and Sung's (2008) study, structure was defined as encompassing 1) quantity; 2) complexity; 3) diversity; and 4) non-immediacy. Quantity refers to the total number of words included in the review. Since the findings from the literature are contradictory with respect to quantity, it was assumed that hotel providers would try to write more to be more convincing and promote more aspects of their hotel. Complexity was operationalized as lexical complexity, i.e. the average word length. Diversity refers to the ratio of the total number of unique words to the total number of words in the review. Last, non-immediacy involves self-reference and, thus, was measured as the total number of first person singular and plural pronouns used in a review (i.e. I, me, my, mine, myself, we, us, our, and ourselves) divided by the total number of words. The following hypotheses were formulated for these structural properties:

H1: Deceptive reviews contain more words.
H2: Deceptive reviews are less complex.
H3: Deceptive reviews are less diverse.
H4: Deceptive reviews contain less self-references.

Also, it was assumed that hotel reviewers would be particularly concerned with identifying their property and engaging in branding. Branding effort was defined as the number of times the hotel brand was mentioned. The following hypothesis was developed to test this assumption:

H5: Deceptive reviews contain a greater number of references to the hotel brand.

In addition, previous studies indicate that deceptive messages differ from truthful messages in terms of their sentiment. Newman et al. (2003) argued that deception should be characterized by more words reflecting negative emotion while Zhou et al. (2004) found that deceivers display more positive affect in order to mislead. Since in this study, fake reviews are intended to position a hotel positively, the following hypotheses were developed:

H6: Deceptive reviews contain a greater percentage of positive words.
H7: Deceptive reviews contain a smaller percentage of negative words

3.2 Data Collection

Deceptive hotel reviews were collected from a group of tourism marketing students at a University in the United States. Most students had taken several marketing-related courses and many had real-world work and particularly marketing experience in hotels. The students were instructed to write a hotel review for a specific property from the perspective of a hotel manager who wanted to promote the hotel. They were told that the review needed to be convincing and realistic. They were not informed about the goal of their assignment. The reviews were written for a Marriott hotel next to an airport. This hotel was selected as none of the students had actually stayed there but they knew the destination and the hotel brand well enough to fake a review. Also, this specific property had a significant amount of reviews posted on TripAdvisor.com. The text of these truthful reviews was extracted from the TripAdvisor.com Website since Tripadvisor employs a team trained in fraud detection to monitor fake reviews and also has software which continually tracks the reviews for anomalies (Fearis, 2007; Reiter, 2007). Reviews were coded as either deceptive or truthful based on their origin (student-derived or from TripAdvisor.com). Data collection occurred in April 2008. A total of 42 deceptive and 40 truthful reviews were collected and analysed.

3.3 Analysis

The unit of analysis was a single hotel review. Quantity and complexity were measured using the word count tool in Microsoft Word. The frequencies of unique words, of pronouns, and of references to the brand were established using CATPAC (Woelfel & Stoyanoff, 1993). One of the major limitations of CATPAC is that it is limited to detecting 160 unique words. In a small number of cases, this word limit was exceeded. Since the hypotheses assumed that the deceptive reviews would be longer, there was a concern of under-representing those. However, only two deceptive reviews were affected and the difference between 160 and counts of the real amount of unique words was very small. The percentages of positive and negative words were measured using *General Inquirer*, a computer assisted tool for content analysis (Stone et al., 1966). An inherent problem in computer-assisted content analysis is that high-frequency words have different meanings in different contexts and thus may belong to several tag categories (Scharl, Pollach & Bauer, 2003; Stone et al., 1966). To avoid this potential problem, analysed positive and negative words were carefully rechecked in the original review context. Differences between deceptive and truthful reviews were tested using independent sample t-test statistics.

4 Results

Descriptive statistics for the various structural properties of reviews are presented in Table 1. They show that reviews come in various forms and shapes, especially as far as length is concerned. Deceptive reviews were between 45 and 374 words long, while truthful reviews ranged from 46 to 595 words.

Hypothesis 1 tested for differences in the length of the review based on quantity, i.e. the total number of words. The t-test showed that there was no significant difference between deceptive and truthful reviews with respect to quantity (Table 2). Hypothesis 2 assumed less complexity in deceptive reviews. A significant difference was found, but the results showed greater complexity in the writing of deceptive reviews. Hypothesis 3 tested for differences in diversity as the ratio of unique words to total words. No significant difference was found. Hypothesis 4 tested the immediacy hypothesis using a ratio of number of first person pronouns to total words. The results were significantly different; however, the results indicate that deceptive reviews are more likely to include self-references.

Table 1. Descriptive Statistics

Structural Property	Mean		Std. Dev.		Minimum		Maximum	
	D	T	D	T	D	T	D	T
Quantity	164.24	202.3	72.77	143.63	45.00	46.00	374.00	595.00
Complexity	4.63	4.43	.32	.30	4.10	3.94	5.55	5.19
Diversity	62.76	61.02	9.0	15.8	42.78	10.59	83.33	84.62
Immediacy	6.49	4.73	3.20	2.60	.00	.00	13.33	14.29
Branding	1.83	1.00	1.75	1.09	.00	.00	11.00	4.00
Positive Sentiment	8.57	4.66	3.17	2.07	2.50	1.06	22.22	9.80
Negative Sentiment	1.53	2.96	1.21	1.86	.00	.00	5.48	9.61

D=Deceptive; T=Truthful

A big difference was found regarding the use of the brand name. Almost all (90.5%) of the deceptive reviews mentioned the brand name while only 62.5 percent of the real reviews included a reference to the brand. Only 22.5 percent of the truthful reviews mention the brand more often than once while 47.6 percent of the deceptive reviews mention the brand at least twice. This difference was significant, therefore Hypothesis 5 was supported. Hypotheses 6 and 7 were tested using a ratio of number of positive and negative words to total words. Deceptive reviews contain on average 8.6 percent of positive words while truthful reviews include only 4.7 percent. Contrary, deceptive reviews have on average only 1.5 percent of negative words while truthful reviews contain 3 percent of negative words. The t-test results

confirmed the differences were highly significant, thus Hypothesis 6 and 7 were supported. Overall, the findings provide greater support for the hypotheses that were concerned with content rather than actual structural properties, except for complexity.

Table 2. T-Test Results

Structural Property	Mean Difference	Std. Error Difference	p-value	Hypothesis
Quantity	-38.06	24.97	.131	Not supported.
Complexity	.20	.07	.005	Supported, but reverse
Diversity	1.74	2.82	.539	Not supported
Immediacy	1.76	.65	.008	Supported, but reverse
Branding	.83	.32	.012	Supported
Positive Sentiment	3.91	.59	.000	Supported
Negative Sentiment	-1.42	.35	.000	Supported

5 Conclusions

All marketers are liars (Godin, 2005). The findings of the study presented in this paper suggest that marketers are indeed pretty good liars. No differences were found regarding the quantity and lexical diversity of the reviews while greater lexical complexity, the mentioning of brand names, the more frequent use of first person pronouns as well as positive sentiment revealed the deceptive reviews. While text data can be easily parsed to analyze structural properties, content analysis is far more complex. Especially identifying brand names would be a daunting task for a platform like TripAdvisor that, according to its Website, at present features reviews for over 230,000 hotels. Sentiment analysis is also a challenge but research has made progress in terms of sentiment classification and more automated approaches have evolved.

The findings stand somewhat in contrast to previous findings regarding deception, especially as far as the directionality of the relationships is concerned. It seems that deception is different in the case of reviews, where communication happens in an asynchronous manner and liars can actually review real comments, extensively deliberate on their writing, can model their writing after reviews posted by others, and are likely professionals with copy writing experience. This suggests that it is indeed necessary to study deception specifically in the context of reviews.

While this study tested several aspects of reviews, there are clearly more properties of reviews that could be analyzed regarding the source as well as the text of the review. Also, the properties were tested in isolation. Algorithms could be developed to red flag reviews which score suspiciously on a number of the features. Each one of the

indicators might not be alarming by itself, but the sum of such indicators might be. More research is needed to identify additional properties and their interrelationships before the automation of deception detection can be truly supported.

While the subjects who wrote the deceptive reviews had marketing experience and some also hotel management experience, the reviews they wrote were not for a property they worked for. Thus, the deception condition was artificial. However, one can expect that those who work for the hotel would be even better liars about the property, making it even more difficult to detect their submissions based on the structural criteria identified in the literature. In addition, although a major metropolitan city was chosen as the setting for the research, none of the hotels had a substantial number of reviews. This clearly limited the sample size. Additional studies are needed to confirm the specific study findings. In particular, other hotel properties and other types of hotels need to be included to be able to generalize the findings.

With the growing popularity of online consumer reviews, it will become ever more important to ensure that contents posted are credible. While it is valuable to detect deception on such sites that is initiated by marketers, it is also important to encourage consumers to provide accurate information. In the end, it seems that it is equally important to educate hoteliers that they hurt their business if they lure in customers and then cannot deliver to meet the expectations of these people. By posting deceptive reviews, hoteliers seek to attract consumers that would not have been attracted otherwise. However, this could also mean that consumers who should not be attracted might become patrons.

Online deception is a complex topic and should be expanded to all kinds of communication methods available, including avatars. As social networking sites increasingly merge with virtual worlds, users might eventually be able to provide reviews in a virtual environment that can support different forms of source cues and make the detection of deception easier.

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Trust in Travel-Related Consumer Generated Media

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Abstract

This study investigated the factors influencing trust in travel-related CGM and, in turn, the degree to which trust affects the benefits and impacts of using CGM in the course of planning pleasure trips. An online survey of US Internet users was conducted with a total of 1170 individuals responding to questions regarding their perceptions and use of CGM for travel planning. The findings show that CGM use is widespread and that trust depends on the type of Website on which the CGM is posted and perceptions of other CGM creators. Also, those who have greater trust in CGM report greater impacts and derive greater benefits from their CGM use.

Keywords: online trust; consumer generated media (CGM); trip planning; impacts of trust

1 Introduction

Online consumer-generated media (CGM) have become an important information source for Internet users. The estimated number of CGM users was about 94 million in 2007 and is expected to grow to 130 million by 2012 (eMarketer, 2008a). Further, more than 70 percent of US Internet users use CGM when they buy a new product or service (eMarketer, 2008b). For travel-related decisions, CGM is especially important since trip planners often rely on others' experiences for their decision making due to the experiential nature of tourism products (Litvin, Goldsmith & Pan, 2008; Yoo, Lee & Gretzel, 2007). Indeed, eMarketer (2008c) found that 82 percent of US online consumers have checked online reviews, blogs and other online forms of feedback for their travel-related purchasing decisions.

Even though rising numbers of online travelers use CGM for their decision making, consumers often perceive online CGM as less trustworthy than traditional word-of-mouth. A number of studies (Smith, Menon & Sivakumar, 2005; Jin, Bloch & Cameron, 2002) suggest that a main reason for these perceptions is the difficulty of identifying the message source, as CGM is often created anonymously. In addition,

Mack, Blose & Pan (2007) noted that the quality of the information and the expertise of these sources vary tremendously.

Several studies have examined the topic of online trust (e.g. Fogg, Lee & Marshall, 2002; Fogg, 2003; Flavián, Guinalíu & Gurrea, 2006; Briggs et al., 2002). However, most previous studies focused on investigating trust in websites (e.g. Fogg et al., 2002; Flavián, Guinalíu & Gurrea, 2006) or e-commerce vendors (e.g. Bart et al., 2005; Ba, Whinston & Zhang, 1999; Hoffman, Novak & Peralta, 1999; Jarvenpaa, Tractinsky & Vitale, 2000) and little attention has been paid to trust concerns regarding CGM, although interest in the topic is growing (Mack et al., 2007). Given the important role of CGM in travel information search and decision-making (Gretzel & Yoo, 2008), understanding the nature and role of trust in CGM is definitely needed. Consequently, this study investigated the factors that drive online trust in travel-related CGM and examined the extent to which these trust perceptions influence the perceived impacts and benefits of CGM use.

2 Background

2.1 CGM in Travel

According to a Pew Internet & American life project study (2006), one of the most popular online activities is to search for travel-related information. Many people use online travel referrals for their travel planning (Bonn, Furr & Susskind, 1999; Mackay, McVetty & Vogt, 2005; Litvin et al., 2008). For example, more than 5 million travellers regularly visit Virtualtourist.com to search for travel reviews and tips (Lee & Gretzel, 2006) and about 20 million people visit Tripadvisor to utilize other travellers' reviews every month (Ricci & Wietsma, 2006; Yoo et al., 2007). Recommendations of other consumers who have prior experience with a tourism product are not only the most preferred sources, but also the most influential sources for travel decision making (Pan, MacLaurin & Crotts, 2007).

2.2 Online Trust

Many researchers have investigated the issue of online trust (e.g., Bart et al., 2005; Jarvenpaa et al., 2000; Gefen, 2000; Egger, 2001; Wang & Emurian, 2004; McKnight & Chervany, 2001; Mishra, 1996). Egger's model (2001) and the Cheskin/Sapient Report (1999) have been repeatedly cited and considered foundational (Wang & Emurian, 2005). While Egger's Model of Trust covers the consumer-vendor interaction in e-commerce settings, the Cheskin/Sapient Report focused on Web site interface cues that influence online trust. Other online trust studies provide important insights regarding trust in digital environments and stress its importance. For example, McKnight and Chervany (2001) defined trust as an individual's belief regarding various attributes of the other party involved in an e-commerce relationship and could measured through the attributes of fairness, goodness, strength, ability, benevolence, honesty and predictability. Similarly, Jarvenpaa et al. (2000) conceptualized trust as a

belief in integrity, benevolence, and ability while Gefen (2002) suggests beliefs of integrity, ability and benevolence should be seen as components of overall trust.

2.3 Factors Affecting Online Trust

A number of studies have identified several factors that influence online trust. Bart et al. (2005) argued that both website and consumer characteristics are important antecedents of online trust. Their study found that privacy and order fulfilment were the most influential website characteristics that determine trust for travel websites while prior online shopping experience, familiarity with the sites, online skills and online entertainment experiences were identified as important consumer characteristics. Similarly, Corbitt, Thanasankit and Yi (2003) argued that customers' trust levels are likely to be influenced by the level of perceived market orientation, site quality, technical trustworthiness, and the web experience of the user. Hoffman et al. (1999) also found that web users' online skills are an important factor that determines consumers' trust in website security. In addition, some studies found influences of brand image on website trust (Yoon, 2002).

Consistent with the findings of studies of traditional media, perceived source credibility was also found to be a very influential factor for trust in online advice (Briggs et al., 2002). Menon et al. (2002) found that trust in information from traditional media sources transferred to trust in information online. Further, the influence of information seekers' demographic characteristics was also reported. There is some evidence indicating that females assess news and political websites as more credible than males (Johnson & Kaye, 1998). Flanagin and Metzger (2003) found that males rated personal websites as more credible. Age differences were also found in a number of studies. Younger internet users rate online news to be more trustworthy than older users (Johnson & Kaye, 2002; Online News Association, 2001) and older users are generally more sceptical of the Internet as a whole (Metzger et al., 2003). The GomdaWeb survey (1998) found that education and income negatively influence people's trust in online information, but many other studies found no significant relationship (Johnson & Kaye, 1998; 2000; 2002; Menon et al., 2002). Further, Walczuch and Lundgren (2004) found that experience and product knowledge are important consumer characteristics that can influence online trust. As indicated by these previous studies, online advice seekers' characteristics and perceptions are important drivers of trust in online advice.

2.4 Impacts of Online Trust

Online trust has been shown to significantly influence web user behaviors (e.g. Jarvenpaa & Tractinsky, 1999; Gefen, Rao & Tractinsky, 2003). More recently, Bart et al. (2005) found online trust to impact web shoppers' behavioral intentions to purchase. A number of other studies also pointed out that online trust is a critical factor in stimulating purchase (Quelch & Klein, 1996; Jarvenpaa et al., 2000). Similarly, Corbitt et al. (2003) found that trust in e-commerce websites is positively associated with e-commerce participation, and it has also been found that greater website trust leads to greater consumer loyalty to that website (Flavián, Guinalíu &

Gurrea, 2006). In addition, Menon et al., (2002) found that trust in online information influences online information search behaviors. Clearly, these findings demonstrate that online trust plays an important role in that increased trust leads to greater use and benefits derived from the website. Thus, it is posited in this study that this relationship also holds for CGM.

3 Methodology

3.1 Data Collection

This study examined the factors affecting trust and its influence on the perceived impacts and the benefits of CGM use within the context of trip planning. An online survey was conducted in July 2008 using an online consumer panel. The survey invitation was sent to 59,186 panelists residing in the United States, with the goal to receive at least 1000 qualified responses to ensure that all data cells would have a sufficient number of responses. A total of 3109 panelists responded to the survey invitation but only 2671 indicated they were active Internet users. Further, 1682 had travelled for pleasure within the 12 months prior to the study. Of those, 1235 had used the Internet for their pleasure travel planning. However, only 1170 individuals responded to the question about trust in CGM and, thus, form the actual sample for this study.

3.2 Measures

Trust in travel-related CGM was measured using a single question: “In general, how much do you trust comments/materials posted by other travellers?” where responses ranged from 1 (I do not trust at all) to 5 (I trust very much). Perceived trustworthiness and expertise of travel-related CGM creators were measured using 7 and 3 item scales, respectively. Factor analyses were conducted to evaluate the uni-dimensionality of the scales while the internal consistency of the scales was measured using Cronbach’s coefficient alpha. As can be seen in Table 1, the results of the analyses confirm uni-dimensionality and the alpha values are above the recommended level of 0.7 (trustworthiness=.89 and expertise=.76).

The dimensionality and reliability of the scales used to measure the perceived impacts of CGM use were also evaluated using factor analyses and Cronbach’s alpha. While the generally agreed upon lower limit of Cronbach’s alpha is .70, Hair et al. (1998) suggest that “it may decrease to .60 in exploratory research” (p.118). Thus, the results confirmed the uni-dimensionality of the scales as well as their reliability (Table 2). No scale was created for perceived benefits of CGM use in order to be able to look at specific benefits.

Table 1. Scales for Perceived Credibility of Travel-related CGM Creators

Construct Name & Items	Mean	Factor Loadings	Eigen Value	% of Variance	α
Perceived trustworthiness	**3.25**		**4.27**	**61.0**	**.89**
- Are honest	3.43	.83			
- Are sincere	3.50	.82			
- Have the intention to help others	3.62	.80			
- Do not make false statements	3.03	.78			
- Provide unbiased product recommendations	3.02	.78			
- Consider others interests when posting	3.20	.76			
- Would not post anything intentionally that would prejudice others	2.98	.71			
Perceived expertise	**3.27**		**2.02**	**67.3**	**.76**
- Have the necessary expertise to evaluate travel-related products	3.09	.85			
- Know the travel-related products better than a marketer/business owner would	3.10	.83			
- Provide valuable information about travel-related products	3.61	.78			

Table 2. Impacts of CGM Use

Construct Name & Items	Mean	Factor Loading	Eigen Value	% of Variance	α
Other info sources used	**3.02**		**3.00**	**60.0**	**.83**
Number of travel brochures ordered	2.92	.84			
Buying travel guidebooks/maps	2.98	.84			
Stops at visitor information centers	3.05	.79			
Amount of print-outs taken on trips	3.19	.72			
Use of ads in TV; radio or press	2.97	.68			
Extent of advance planning	**3.30**		**4.27**	**61.0**	**.77**
Number of info. sources used for planning	3.39	.87			
Amount of time spent on advance planning	3.28	.85			
Number of places/destinations considered	3.22	.76			
Actual travel behaviours	**3.14**		**1.53**	**76.3**	**.68**
Number of places/destinations visited	3.17	.87			
Amount of money spent on travel	3.10	.87			

3.3 Analysis

Descriptive analyses were conducted to describe the participant profile as well as their general internet use and social media use behaviours. Multiple regression analysis was then used to assess the influence of consumer characteristics and perceptions on trust in travel-related CGM. Last, a series of linear regression analyses were conducted to examine the influence of trust in travel-related CGM on trip planners' perceived impacts and benefits of CGM use for their trip planning.

4 Results

4.1 Profile of Sample

An almost equal number of females (50.3%) and males (49.7%) participated in the survey. More than half of the respondents (51.1%) reported being married while about 69 percent of respondents said they do not have children under 18 living in their household. The largest age group was comprised of those who are between 35 and 54 years old (42.9%). Over 61.6 percent of the respondents reported that they completed a college (27.9%) or had some college experience (33.7%). All income groups were almost equally represented.

Internet familiarity was measured by asking respondents to rate their use skills. About 38 percent of respondents reported being an intermediate Internet user, 35.7 percent advanced user, 12.7 percent novice, and 13.4 percent expert user. About 67 percent of respondents reported that they look at photographs posted by others, with 22.2 percent saying that they do so once a month or less frequently and 44.8 percent at least several times a month. The second most frequent online activity that respondents engage in is reading reviews posted by other consumers (64.5%), with 26.3 percent reporting that they do so once a month or less and 38.3 percent reading reviews more often. 56.7 percent of respondents reported that they watch or download videos, 49.6 percent read blogs, 49.5% rate products or post reviews, 48 percent post photographs, and 37.8 percent use a social networking site. Over half (52.8%) indicated that they had used the Internet for planning their most recent pleasure trip.

4.2 Social Media Use Behaviours and Perceptions in the Context of Travel

More than half (50.5%) of respondents indicated that they read online comments or materials posted by other travellers when planning their most recent overnight pleasure trip. Of these travel-related CGM users, the majority (80.5%) reported that they looked at travel reviews, half (50.6%) looked at photos, 21.8 percent read blogs, 23.6 percent read comments on blogs, 22.4 percent read postings in discussion forums, 4.2 percent viewed videos, and only 3.8 percent listened to audio files. The most frequently used travel-related CGM website was Yahoo! Travel (visited by

40.8% of travel CGM users), followed by TripAdvisor (29%). Also, 16 percent of travel CGM users reported that they visited Citysearch to find travel-related CGM.

Travel-related CGM users indicated that CGM is most credible when posted on official tourism bureau websites (41.2% think CGM posted on tourism bureau websites is very or extremely credible), followed by travel agency websites (36.8%), thirdparty websites such as TripAdvisor (33.5%), travel company sites (31.2%), personal blogs (18.1%), and personal websites (16.1%), social networking sites (13.2%) and sharing sites such as YouTube (10.7%). Most respondents reported no changes in current travel planning behaviours due to their use of CGM. However, about a third reported that CGM use has led to more information sources being used (36.1%), more time spent planning (30.3%) and more print-outs taken on trips (28.2%). Last, 2.7 percent indicated that they do not trust CGM at all, while 15.6 percent of the respondents do not trust it very much, 56.3 percent trust it somewhat, 21.7 percent trust it, and 3.6 percent trust it very much.

4.3 Determinants of Trust in Travel-Related CGM

Multiple regression analysis was conducted to assess the relationship between trust in travel-related CGM (the dependent variable) and the socio-demographic characteristics and perceptions of CGM readers (age, gender, education, travel frequency, familiarity with the Internet, and perceived expertise & trustworthiness of travel-related CGM creators).

Table 3. Factors of Trust in Travel-related CGM

Independent Variables	Beta	P value
Perceived expertise of travellers who post materials online	.267	.000
Perceived trustworthiness of travellers who post materials online	.347	.000
Gender	-.025	.320
Age	-.075	.005
Education Level	.022	.398
Travel Frequency	.056	.029
Knowledge & Familiarity with Internet	.039	.134

R Square = 0.386; Adjusted R Square = 0.382; $F_{(7, 1010)} = 90.16$ ($p<0.000$)

The regression model (Table 3) was statistically significant and explained almost 40 % of the variance of trust in travel-related CGM. The results indicate that perceived expertise and trustworthiness (source credibility) of travel-related CGM creators are significant predictors of trust in travel-related CGM with high beta values (.27 and .35 respectively). Travel frequency (beta=.06) and age (beta=-.08) were also found to be significant predictors of trust in travel-related CGM but the relationships are rather weak. However, in contrast to the results of previous studies, familiarity with the

Internet, gender and education level did not significantly influence trust in travel-related CGM.

4.4 Impacts of Trust in Travel-Related CGM

A series of linear regression analyses were conducted to investigate whether trust in travel-related CGM plays a significant role in determining trip planners' perceived benefits and impacts of CGM use. The results are presented in Tables 4 and 5 and show that the trip planners with greater trust in travel-related CGM are more likely to perceive impacts of CGM. In particular, the more they trust travel-related CGM, the more impacts they perceive in terms of their actual travel behaviours (number of places visited and amount of money spent on travel), extent of advance trip planning, as well as other information sources used (see Table 4).

Table 4. Influence of Trust on Perceived Impacts of CGM Use

Impacts of CGM Use	Beta	P value
Change in actual travel behaviours	.251	.000
Change in extent of advance trip planning	.288	.000
Change in other information sources used	.137	.000

Table 5. Influence of Trust on Perceived Benefits of CGM Use

Benefits of CGM Use	Beta	P value
By using travel -related CGM, …		
I can find more information about a destination	.371	.000
I can get more involved in planning my trip	.333	.000
I can better evaluate where to go and what to do	.353	.000
I can better imagine what the destination is like	.378	.000
I can save time planning my trip	.329	.000
I am more confident that my trip will be successful	.374	.000
I get a feeling of accomplishment and satisfaction	.353	.000
I can more easily share the information I find	.348	.000
I have a clearer idea of what to expect from the trip	.362	.000
I can get better value for my money	.341	.000
I do not have to waste time looking for information during the trip/at the destination	.299	.000

Similarly, the trip planners with greater trust in travel-related CGM were more likely to perceive benefits. Specifically, the more they trust online travel-related materials, the more they agree that those materials help them to find more information, get

involved in trip planning, better evaluate alternatives, better imagine the places, save planning time, have more confidence in the success of their trips, have feelings of accomplishment, share information, have clear expectation for the trip and get better value for money (Table 5).

5 Conclusions

The results suggest that travel-related CGM, particularly travel reviews and photographs posted by other travellers, are used extensively in the course of planning pleasure trips. Most respondents indicated that they trust the comments/materials posted by other travellers, especially when posted on official tourism bureau websites. Believing in the good intentions and honesty of travel-related CGM creators, and believing that they know what they are writing about, fosters trust in CGM. Trust in travel CGM is important as it increases the benefits travellers derive from its use in the course of planning pleasure trips and has real behavioural implications.

The study findings clearly demonstrate that it is important to increase trust in travel-related CGM. Since source credibility is a very important factor, CGM creators should be encouraged to provide enough information about themselves to make it easy for others to assess their expertise and trustworthiness. The descriptive results also suggest that the type of website on which the CGM is posted matters. Destination websites in the US are typically non-commercial and thus might win the trust of users. While many tourism bureaus still shy away from offering CGM on their websites, the study findings show that they would benefit greatly by supporting a venue for such contents. Also, travellers should be encouraged to post CGM on official tourism bureau, travel agency, company or third party websites rather than their personal blogs or social networking sites in order to make this information most useful for others. Thus, the study provides some important insights into the drivers as well as impacts of trust in travel-related CGM. However, more research is needed to determine other cues that travel planners use when evaluating such contents. In addition, it would be interesting to examine if impacts of trust in CGM vary depending on different types of travel-related decisions.

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What is Told in Travel Blogs? Exploring Travel Blogs for Consumer Narrative Analysis

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Abstract

Blogging activity among tourists is increasing and represents an important new aspect of marketing communication in tourism. Millions of individuals have joined travel blog websites, to share their travel experiences online, and blogging has become an aspect of the tourist production and consumption process. The limited extant research on travel blogs focuses on tourists' behaviour patterns and descriptions of destinations. In contrast, this paper examines travel blogs as textual artefacts to gain insights into how tourists construct order and make meaning from their experiences as part of the process of identity management. A narrative analysis of blogs from the three most visited travel blog websites was conducted. Tourists' identity and sense-making were revealed by the stories that were told, the way in which they were recounted and how they were link to aspects of self-concept including values, preferences, skills, social roles and relationships.

Keywords: travel blogs, tourists' narratives, consumer narrative analysis

1 Introduction

Blogging activity is one of the latest trends in web technology that has captured the interest of the public worldwide. The 2008 Technocrati's Report, "State of the Blogosphere" confirmed that blogging has become a global phenomenon; 184 million people worldwide have written blogs and 346 million people have read blogs (Universal McCann, March 2008) [www. Technocrati.com, October 10, 2008]. Growth of blogs has been rapid and is prominent in business, journalism, education and politics, to name a few. Similar growth has also been observed in travel and tourism. Among the top 18 topics monitored by Technorati.com, travel is ranked 9th, which is equivalent to 28% of the total number blogs monitored by the website. Millions of individuals have joined travel blog websites that enable them to post stories, pictures and videos of their travel experiences. Travel blogs can be considered

expressions of tourism consumption. Indeed, many travel blogs are rich narratives that contain details of experiences and have a great deal of potential to inform research into tourism consumption, with clear implications for tourism marketing management.

Consumption is conceptualised as part of the on-going productive and creative process of identity management which characterizes the 21st century consumer (Shankar, Elliot and Goulding, 2001). Marketing scholars recognise that a narrative perspective has much to offer consumer researchers seeking to interpret consumption experiences (Shankar and Goulding, 2001) and can provide a deeper understanding of their consumer behaviour (Stern, Thompson and Arnould, 1998). Narrative constructions have diverse functions such as sense-making and reinforcement of self-perceptions (Gergen, 1988). Travel blogs appear to embody the narrative nature of tourist consumption and an examination of how travel blogs were written by tourists promises to provide insights to their self-perceptions and also an understanding of how tourists construct order and make meaning from their experiences.

This paper suggests that travel blogs can be considered as a new tool for consumer narrative analysis. The few existing studies on travel blogs have highlighted the potential of travel blogs as sources of information regarding tourist experiences (Carson, 2008; Kurashima et al, 2005, 2006; Mena and Bosangit, 2007; Pan, MacLaurin and Crotts, 2007; Puhringer and Taylor, 2008; Wenger, 2008). Most of the extant research has concentrated on extracting data from travel blogs on destination image, evaluation of destinations and tourist behaviour. However, prior research has not examined the context, structure and meanings of travel blogs, which has the potential to provide a deeper understanding of bloggers behaviour and the production and consumption of tourism more generally. Thus, this paper aims to demonstrate how travel blogs can be used to inform consumer research in tourism through an analysis of their social aspect, structure and meaning. To meet this aim, the paper starts with an overview of travel blogs as narratives and considers their potential for consumer narrative analysis. It then describes the methodology, presents the results of the narrative analysis and advances conclusion and directions for future research.

2 Travel blogs

Weblogs (blogs) are frequently modified web pages in which dated entries are listed in reverse chronological sequence (Herring et al, 2004). This is reflected in definitions of blogs, in which they are simply described as a sequence of posts that are arranged chronologically (Villoria, Anzuola and Diaz, 2006). Arnold et al. (2007) used a dictionary definition (from Merriam–Webster Online), describing a blog as a website that contains an online personal journal with reflections, comments and often hyperlinks provided by the writer.

Blogs of travel experiences are called travel blogs. Travel blogs are generally online diaries that describe tourists' experiences of their travel. This may include narratives, photos and video files of the trip. The most obvious form of blogs in tourism appears to be blog from travellers who publish their personal stories and recommendations

online in the form of travel diaries or product reviews (Schmallegger and Carson, 2008). Travel blogs written in the form of travel diaries are more chronological and descriptive records of their travel experiences. Schmallegger and Carson (2008) identified the following websites as the most prominent ones among public travel blog sites: travelblog.org, travelpod.com, blog.realtravel.com, yourtraveljournal.com or travelpost.com. An alternative set of travel blogs are those within virtual travel communities such as igougo.com, travelpod.com and virtualtourist.com. Tripadvisor.com, holidaycheck.com and cosmotourist.de are popular as specialized customer review sites.

Travel blogs and narrative analysis

Research on travel blog content has been limited to using quantitative content analysis to extract common themes related to destination image, tourists' assessment of the destination and actual tourist behaviour (see work of Carson, 2008; Kurashima et al, 2005, 2006; Mena and Bosangit, 2007; Pan, MacLaurin and Crotts, 2007; Puhringer and Taylor, 2008; Wenger, 2008). There is a growing interest in travel blogs from academic researchers, as evidenced by a recent special issue of the Journal of Vacation Marketing 2008 (Volume 14, No. 2) on the topic. However, travel blogs have yet to be examined as textual artefacts to gain insights into how tourists construct order and make meaning from their experiences as part of the process of identity management.

Ricoeur (1996) argued that identity is constituted narratively; it is mingled with stories told to the narrator and the stories told by the narrator him or herself. Indeed, one reason why people share stories is because it allows them to convey and negotiate their identities with others (Linde, 1993; Woodside et al., 2008). Story telling also enables people to revise and deepen sense-making about events in the story. Personalized meanings are constructed based on their cultural background, which includes social categories, common sense beliefs, folk knowledge and interpretive frames of reference (Thompson, 1997). Travel blogs, as narratives, provide textual artefacts of consumer identity and sense-making and narrative analysis of these texts offers a commonsense approach to developing a deeper and more meaningful understanding of tourists' experiences and behaviour (McCabe and Foster 2006).

3 Methodology

Over the years, a multitude of different techniques and approaches to narrative analysis have evolved. Most popular among them are Labov and Waletzky's (1967) structural method of narrative and Lieblich et al's (1998) holistic and categorical analysis. Mishler (1995) adapted Labov and Waletzky's (1967) approach, proposing a framework based on different functions of language, including social context. Elliot (2005) emphasised that the content, structure and performance of narratives are of interest to consumer researchers. The social context of narratives, which is key to their performance, is of particular interest for travel blogs analysis given that blogging

technology allows readers to post their comments on blogs. Therefore, Mishler's (1995) framework was adopted for this investigation.

To select a sample of travel blogs for the analysis we first identified the most visited travel blog websites and, subsequently, selected a sample of travel blogs from these sites. Using Google search engine, a list of travel blog websites was generated with the keyword "travel blogs". The use of search engines has become an accepted technique for generating travel blog sites (see works of Carson, 2008; Pan, MacLaurin and Crotts; 2007; Mena and Bosangit, 2007 and Wenger, 2008). The first five results were: a. travelblog.org, b. travelpod.com, c. travbuddy.com, d. realtravel.com and e. travelblog.com. Visitor traffic to these websites was checked with www.alexa.com, a traffic monitoring website to identify the top three websites. Alexa's ranking is considered to be a measurement of websites' relative popularity among the internet community. This measurement is based on data from more than 10 million Alexa toolbar users (www.homebizpal.com, October 10, 2008). Travelpod.com ranked highest with the number of users in the first quarter of 2008, followed by travelblog.org and travbuddy.com. These top three websites were selected as sources of travel blogs to be used for the analysis.

The 10 most recent travel blog entries on each of the three websites (on February 21, 2008) were selected, downloaded and printed for the analysis. If an entry contained only a few lines (less than 5 sentences, which were deemed insufficient to describe a trip) it was excluded and replaced by the next most recent blog entry from the same site. A total of 30 travel blogs, produced by bloggers of varying profiles and featuring many different destinations, were selected for the study. Common themes and patterns were derived from analysis of these 30 blogs. However, specimen extracts from four travel blogs are included in the findings section to illustrate how tourists construct order and make meaning from their experiences as part of the process of identity management.

Out of the 30 sample blogs, 13 were joint authored (one male, one female author) and the remaining 17 were single authored (10 female bloggers, 7 male bloggers). Europeans and North Americans accounted for majority (24) of bloggers, which reflects the fact that English speaking nationalities (e.g. British, Americans, Canadians) are the top three groups of bloggers. Most of the bloggers (26) had joined the travel blog websites in 2006 or 2007. Over half of the bloggers had posted more than 25 blogs and had blogged about trips to more than 5 countries.

4 Findings and Discussion

4.1 Social aspect of narratives

The social dimension in Mishler's (1995) framework refers to the interactional and institutional contexts in which narratives are produced, recounted and consumed. Mishler highlighted that when narratives are constructed within dynamic (face-to-face), interactional contexts all of the interlocutors influence how the narratives are

formed. The role of the listener(s) is similarly emphasised by researchers concerned with consumer narratives (Elliot, 2005). The style of writing in most travel blogs in our sample implied that bloggers prepared their blogs to be read by the public or, at least, a select small group. This is evident in the following extract:

Extract 1

Anyone who knows me knows two things. That is that I am well known for being a glutton (see A Day Dedicated to Food if you don't believe me) and that I am absolutely and completely obsessed with curries. Therefore, you would have been expecting my journals from India to be completely filled with food critiques and descriptions of the most overly unnecessary details of my eating habits while in India. Well I do apologise for not including such details up until now but I thought it better to save it all up for one single occasion: this one. This means that you can enjoy my dissection of Indian cuisine in one easy to swallow packet. Also, it means that you can skip, right over it if you so wish

Most bloggers used terms such as "you", which Goffman (1973) called 'footings', to refer to their audience. In the blog cited above, the blogger acknowledges that his audience will include both people who know him well and people who do not. The blogger's gluttony and appreciation of food (and curries in particular) is an important aspect of his identity that is reinforced by this tale. He asserts that he is well known for being a glutton, that readers would 'expect' his journal to focus on food, reaffirming his gluttonous self for readers who know him. Those who are unfamiliar with this aspect of his identity are directed to another of his blogs for evidence. He demonstrates that he is sensitive to his readers' interest in his stories about Indian cuisine and the ability to interpret his account, when he suggests that they can enjoy it at one go or skip right over it. The personal meanings in this extract are strongly grounded in the blogger's historical social relationships with readers who are known to him. It confirms Linde's (1993) claim that narratives are means by which sense of self with others are conveyed and negotiated but, further, it demonstrates that in blogs narratives created in collaboration with known others can be harnessed to convey self identity to a wider audience.

However, the desire to communicate with a wider audience was not evident in all blogs. There were several blogs in our sample in which bloggers adopt a letter-writing style. The blogs began "hi to all" and ends with "take care, love xxxx", which indicated a specific rather than generic and unknown audience.

The technological feature of blogging which allows readers to post comments to blog entries is an additional manifestation of the interactional context in narratives. Table 1 provides a few examples of comments posted in some of the travel blogs used for the analysis. These comments are diverse and varied but nonetheless represent reactions of audiences to blogs. Statements in Comments 1 and 2 confirm the identity being expressed by the blogger. Some comments also indicate the relationship between the blogger and the audience like Comments 1 and 4.

Table 1. Sample comments posted on travel blogs

"Juanita!!! Oh my gosh you and Arnaud look like you are having the most amazing trip!!! Dana and I are both soooooo envious!!! You two are quite the treckers! I'm so impressed! I can't believe Bolivia! Crazy! How are you doing? Where are you off to after South America? Dana and I will be leaving SK at the end of April and heading to SE Asia. Where will you be? Take care my little chalupa! Continue making me jealous (www.travbuddy.com, February 21, 2008)
As a Malaysian, I am honoured and happy you like Malaysia and that you had a great time here. Tips – If you like sun and beach – head to the east coast of peninsular from Apr-Sep. There are many islands there awaiting you to explore. Check out Redang Island, Perhentian Island (www.travbuddy.com, February 21, 2008)
I'm going to Kailua in 3 weeks. Can't wait now after reading your blog. The flowers are so beautiful! (www.travelpod.com, February 21, 2008)
We all hoped your trip would be this way! It sounds like we will have to start saving up to visit you. Have fun with your new travelling partner (what up Young!) Can't wait to hear more! (www.travelpod.com, February 21, 2008)

The institutional context of narratives refers to the social worlds of the narrator. McCabe and Foster (2006) pointed out that tourists' narratives are not only about themselves but also of their world. Indeed, travel blogs are not merely descriptions of tourist attractions and activities of tourists. In telling their stories, bloggers may consciously and unconsciously reveal what they see of the world and how they see it. The following extract is a blogger's entry about his visit to a village in Laos:

Extract 2

The place was beautiful. Apart from the simple bungalows (US$1 a night) it was completely old school Laos village. Pigs, chicken, water buffalo, manky dogs, people planting rice paddies with buffalo, kids jumping into the river. It was such a great atmosphere that I took a bicycle out for three days in a row just to cruise around soaking it all up (I wish they would stock a Mathew version of a bicycle though. I can't really remember all the little instances that made the place special but it was. The animals here and also around many other parts of Asia) would make great film candidates. They are totally bullet-proof. Dogs lie on the road while traffic swerves around them, you have to push the buffalo off a dirt part to get past and you can step over cats without moving. Apart from the lack of parasite control, dermatological problems and a probably a reduced life expectancy, I think a lot of dogs have a better life in parts of Asia than in western countries. They cruise around, are not subjected to too much human interference, seem to get enough to eat (not too many are fat though) get to socialize with other dogs all day, and understand the few basic rules that exist with humans. I would probably rather be a manky dog cruising around in Asia than a fat NZ dog waiting in the back yard for its owners to get back from work at 6pm. They are also not subjected to genetic selection for human-imposed physical characteristics and as a result seem to have a far healthier conformation (I bet they would suffer less from skeleto- muscular disorders and other health

2.22 issues if brought to NZ and compared with the show breeds there). Go the
2.23 dodgy mongrel!

The blogger emphasises the beauty that he sees in a simple countryside life which, for some, may represent poverty or the hard life endured by the locals. The world in which he resides, from which he had temporarily escaped, is possibly different from what he described as a great place. From the story, one can pick up that the blogger is from New Zealand (NZ). He draws comparisons between Asia and NZ using an animal (dog) to concretize the differences between the two worlds. It is also discernible that he prefers to be in the world he has seen in Laos compared to his "everyday world" of NZ which, he implies, is boring and monotonous with his story of NZ dogs. This extract illustrates how the identity of a blogger, explicitly or implicitly expressed, is shaped by his/her cultural background. The comparison of NZ and Laos also shows how bloggers invest effort in making sense of their experiences, to build understanding of themselves and their environment; the attributions that they make as they make sense of their lives and their position within society (McCabe and Foster, 2006).

The social aspect of narratives reveals identity and sense-making efforts of tourists. The narratives contribute to the on-going productive and creative processes of identity management of the 21st century consumer (Shankar, Elliot and Goulding, 2001). These insights on the self-perceptions of tourists as well as how they make meaning of their experiences can be translated to consumer needs and wants which have marketing and management implications.

4.2 Narrative Structure

Labov and Waletzky (1967) argued that narratives have formal structural properties and that the patterns recurring in narratives can be identified and used to analyze each element of the account (Elliot, 2005). Using Labov and Waletzky's structural model of narrative form which has the six elements *abstract*, *orientation*, *complicating action*, *evaluation*, *resolution* and *coda*, may produce meaningful information on how tourists put their stories together. The table below describes the different elements of this model:

Table 2. Labov and Waletzky's Structural model of narrative form

Abstract	Summary of the subject matter
Orientation	Information about the setting: time, place, situation, participants
Complicating action	What actually happened, what happened next
Evaluation	What the events mean to the narrator
Resolution	How it all ended
Coda	Returns the perspective to the present

Source: Elliot, 2005

Bloggers' narratives had common patterns that followed Labov and Waletzky's narrative structure. Although some bloggers did not start off their narratives with an abstract and end with a coda, their stories always included an orientation, where

bloggers provide information of the place, time, and people involved in their stories. Complicating action would be the largest portion of the narrative and usually ended with a resolution showing how the blogger resolved complications. Evaluations of events were usually found at the end of the story. The extract below is a brief example of such structure:

Extract 3

Up early for the mining tour, got to the office just before 9am, but should have not to rush as we didn't leave for a least another 20 mins! We set off to a place first to get us all kitted out in a mining gear – very sexy! There are only 5 in our group so it is pretty nice. Then we headed up to the mining area. Our first stop was at a store to buy gifts for the miners.

We then made our way even higher in the mines where it got really hard to breathe at some points. We met 2 miners carrying their equipment up the mine, it weighed 80 kilos and we were exhausted just getting ourselves up there!!! You had to maneuver over wooden planks and up and down tiny stairs, through tunnels not big enough to stand in (not even for me!) and get around tiny corners without falling down holes!

I have to say I and my lungs were very happy to see daylight again. We headed back and got out of the miners gear and back to our hostel, pretty exhausted by the whole thing and in awe of the guys who do it 7 days a week for a pittance. Spent the rest of the day looking around the town and in the internet cafe writing all this up!!!!! Hope you enjoy reading it all! The tour was $60 BI, well worth it, but our tour guide was not that good so I would advise trying another company.

This extract is a typical structure used by bloggers. Most bloggers told their stories chronologically: their narratives started from the beginning of their trip, when they left their home, included their travel towards the destination, their various activities in the destination and finished with the end of their trip. The narrative structure reveals how stories are told but also how much effort the blogger put in his blog. This kind of blog reflects the journalistic skills of the tourist, which can be related to the identity of the blogger. Desforges (2000) stated that tourists are aware of the problem of being a "travel bore" who goes too far in impressing their experiences onto other people. Hence, tourists have to select certain parts of their experiences, cutting them up, exaggerating for effect, making connections among different places: in short, using a whole host of narrative devices to communicate some kind of story to others. Extract 1 is from a blog with such structure. The blogger did not chronologically tell his experience but created sections or themes in his blogs: the story of the Taj Mahal, a detailed description of the beauty of the Taj, an account of his efforts to capture the Taj in pictures, and the different curries he tried. From a marketing point of view, narrative structure reveals more than the way they tell their stories. Some narratives may be structured in such a way to express their identity or skills, some narratives may be structured with identity mentioned within their story.

4.3 Meaning of Narratives

According to Elliot (2005), the evaluation of events conveys to an audience how individuals are to understand the meaning of the events that constitute the narrative, and simultaneously indicates what type of response is required. Gergen and Gergen (cited in Shankar and Goulding, 2001) pointed out that every story must have a "point" to make and more importantly the point must be valued, negatively or positively, by the people involved in the narrative process. Elliot (2005) argued that narrators communicate evaluations more implicitly while Tannen (1980) had stated that evaluation are explicit but may be done in more subtle ways. Blogs examined showed that bloggers may explicitly and implicitly express their evaluations.

Extract 4

4.1 I really enjoyed my weekend in Mexico City - more than I thought would
4.2 ever be possible. I've seen enough of the world to fall in love with various
4.3 bits and pieces of it, whilst ignoring most inconveniences that would
4.4 inevitably make an extended stay less than ideal. For example, I love
4.5 Tanzania, but how happy would I be living there with the inevitable malarial
4.6 bite? I love Geneva, but am I really able to live on a ration of 20 liters of
4.7 garbage per week (I think you get a fine for anything more than that) or be
4.8 able to stand a ban on airconditioning? But Mexico City.. my god it was
4.9 wonderful. All the conveniences of the US, an amazingly hospitable city, all
4.10 the warmth and love and kindness from a socialized society.

The blogger drew from her past experiences to give meaning to her experience of the city. By pointing out contrasts of Mexico City with other places visited her description of Mexico City as a wonderful place was justified. Lines 4.1 to 4.3 might also be the motivation of the blogger for writing a blog of her trip to the city. She might have wanted to share with her reader how wrong she was in her expectation that Mexico City may not have much to offer as a destination as she has seen enough of the world. In the process of giving meaning to her experience, the identity of the blogger as a well-travelled person is implied. The blogger's mention of her previous experience and her trip to Mexico City can also be motivated by attributions. This Mexico trip blog was a part of her complete story about herself and her world as Woodside, Sood and Miller (2008) would describe it. This extract also exhibited self-concept of the blogger showing the three identities enumerated by Higgins: "actual", "ideal" and "ought to" (as cited in Markus and Wurf, 1987).

5 Conclusions

In recognition of the rising popularity of blogging among tourists and the role it might have in the consumption process of tourists, this paper has demonstrated the potential of travel blogs for consumer narrative analysis. The findings show that travel blogs can provide information on tourists' identity and sense-making through an examination of its narrative elements: social aspect, narrative structure and meaning. Tourists' identity and sense-making were reflected by what stories were told, the way

in which they were recounted and how they were link to aspects of self-concept including values, preferences, skills, social roles and relationships. Indeed, travel blogs can contribute to the process of identity management of the 21st century consumers.

Future research needs to explore other frameworks that will be appropriate in maximizing the usefulness of travel blogs to the academe and the industry. Researchers are also encouraged to identify more possible uses of travel blogs in understanding the rapid and continuously changing tourist consumption. Identity of tourists and sense-making represents only one aspect of the blogging activity among tourists. To explore this blogging activity of tourists, it is suggested that researchers follow how blogs in general have been examined. To date, the blogging phenomenon has rich literature examining multiple functions of blogging such as social networking, knowledge/information sharing, life-documenting, communication and identity construction. An in-depth examination of this phenomenon may identify new trends in tourist consumption that may have marketing and management implications.

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Complaints on the Online Environment – The Case of Hong Kong Hotels

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Abstract

Rapid advancement of web technology enabled hotel customers to increasingly use the Internet as a channel for reporting negative service experiences. Prior studies on hospitality complaints on the web are scarce. Through a content analysis of 453 individual complaint cases reported on one of the largest and most popular travel review websites (tripadvisor.com) for Hong Kong hotels, nine e-complaints categories were firstly identified. These nine complaint categories were then examined across different origins of the complaints. The results of a two-way contingency table analysis further revealed that although no significant relationship was found between e-complaint categories and hotel class, the age group of reviewers was significantly associated with specific types of complaints made online. Various kinds of management responses were also explored against each e-complaint category to identify possible managerial reactions. Lastly the paper explores the implications of the findings and makes suggestions for future e-complaint research for the hospitality industry.

Keywords: e-complaints, complaints, Hong Kong, hotels, management response, service recovery.

1 Introduction

At present, managing customer complaints through organized service recovery policies and programs are the important approaches for firms in their efforts to maintain satisfied and loyal customers (Holloway and Beatty, 2003). Firms adopt these approaches because the cost of attracting new customers is five to ten times higher than retaining current customers (Shea, Enghagen and Khullar, 2004). Complaints are usually raised when there is a service failure or when promises are not met. Service failure involves activities that occur as a result of customer perceptions of initial service delivery behavior that fall below the customer's expectations or "zone of tolerance" (Zeithaml, Berry and Parasuraman, 1993). If not handled properly by the organization concerned, such failure can easily cause customers to lose faith in the product, reduce their patronage and create negative word-of-month. Yet service failure cannot be totally avoided in hotels due to the heterogeneity nature of service and

clientele. Hence the ability to promptly identify the cause of customer dissatisfaction and effectively address complaints regarding a service failure is a challenge but also an opportunity for building customer trust and relationships over time. Indeed, previous research suggested that satisfaction with complaint handling is strongly associated with both customer trust and commitment with the organization (Kelley and Davis, 1994).

Using the Internet as a channel for reporting positive and negative service experiences is getting very popular nowadays due to rapid technological development. Many online feedback/review forums emerged as a result of word-of-month communications regarding experienced products or services. Prior studies (Houser and Wooders, 2006; Melnik and Alm, 2002) showed that buyers seriously consider online feedback when making purchasing decisions, and may even be willing to pay more for products with good reputations.

To date, online complaint management has received limited attention from both scholars and practitioners (Zaugg, 2007). Despite a growing amount of e-complaints from hotel customers, the response rate from hotels to address these online complaints remains low (Harrison-Walker, 2001). Indeed, studies on hospitality complaint behavior on the web are scarce and there has been little understanding on the relationships between types of e-complaints and other variables such as hotel class, location of customers who voiced out the complaint and their age groups. Using content analysis on one of the most popular travel review websites (TripAdvisor), the main objectives of this paper are to identify the kinds of complaints raised through e-channels, using Hong Kong hotels as a case, and to explore if there are relationships between the types of e-complaints and these previously mentioned variables. Hong Kong was chosen for her world-class hotel service in a popular travel destination in Asia.

2 Literature Review

Customers have several choices of responses when they experience a service failure. They can choose switching to a competitor, complaining to the organization, complaining to the third party, using negative word-of-month or simply do nothing (Huppertz, 2003). Albrecht and Zemke (1996) stated that only 5% of dissatisfied customers actually voice their complaints. This is because few customers would take the time and trouble to complain. Negative word-of-mouth affected the immediate circle of the dissatisfied customer. However this situation is likely to change now as a range of e-channels provide a fast and easy method/platform to express one's negative experiences (i.e. complaints) than before. The word-of-mouth is also influencing a much wider audience. Current Internet technology also provides effective tools for an organization to handle complaint management (Mattila and Mount, 2003). This implies valuable information about service encounters as well as customers' perception on service failure is more readily accessible than if customers chooses to complain to an independent third party as happened often in the past. Many customers nowadays seem to consider online communications as a substitute or complementary

for written communication. In addition, the Web 2.0 phenomenon means that consumers trust better the experiences of other consumers.

The primary motivations that lead to online complains or complements have been identified as consumers desire social interaction, economic incentives and the potential to enhance their own worthiness within a virtual world (Hennig-Thurau, Gwinner, Walsh and Gremler, 2004). As far as the propensity to complain online is concerned, technology and media competence are decisive for choosing a specific channel. The more efficient the technology is available, the more likely is that the customer would choose e-channels. The complexity of the problem and the magnitude of failure may also be some other considerations. Zaugg (2007) indicated there are several major benefits of using an e-channel to complain. First, it is the convenience of lodging a complaint anytime and anywhere provided that the problem can be formulated in a few sentences. Second, the customer does not have to wait especially when the person in charged cannot be reached at the very moment of the complainant's call. Lastly the customer can report the experience on the public domain, so as to fulfill the social motivations as mentioned above.

There has been a growing popularity of complaint sites directed at specific companies such as www.united.com, a complaint website for United Airlines. However, the development of Web 2.0 allows customers to use hotel review sites, such as tripadvisor.com, holidays-uncovered.co.uk, hotelchatter.com, and HolidayCheck to express their feelings publicly with no previous knowledge of computer programming. Hence complaints are now found on public sites and are read globally and therefore companies need to understand how to deal with these complaints effectively or to risk their reputation being damaged (Tyrrell and Woods, 2004). Shea, Enghagen and Khullar (2004), for example, presented a content analysis of 1,000 responses to one customer complaint of a hotel titled "Yours is a very bad hotel" that was posted in the form of an e-mail over the Internet. Such a case illustrates that customer complaints over the e-channels can cause catastrophic damage to a company image and brand.

Prior studies on hospitality complaint behavior on the web are limited. Lee and Hu (2004) conducted a content analysis on 222 self-selected hotel customers recorded on a specialized complaint forum named eComplaints.com. It was found that 75% of the failure fell into five categories (service provided not agreed upon, service declined in quality, rude customer service representatives, service never provided, and overcharged) and all were related to service delivery failure. However, the categories of hotel problems were pre-identified by the web forum. No attempt, however, was made on exploring the relationship between categories of complaints and other variables. In a recent study, Vermeulen and Seegers (2008) explored the effects of online hotel reviews on consumer choice and found that positive online reviews do have a significant impact on travelers' decision making in particular for lesser-known hotels. However, it is apparent that most tourism and hospitality firms have not taken notice of the online e-complaints trend and they fail to respond actively on e-complaints made (Harrison-Walker, 2001). This is because some managers believed that they cannot justify the expenses associated with answering all e-complaints about the company (Adams, 2000). Others may worry it takes too much time and effort to

have their questions answered whilst others lack the customer care and marketing expertise to perform this task.

For the organizations which determine to address the complaints, there are several commonly adopted service recovery strategies. Davidow (2003) categorized these responses into six dimensions namely timeliness, facilitation, redress, apology, creditability, and attentiveness. Based on a study from Mattila and Mount (2003) on 446 hotel guests who had complained through e-mails, findings suggested that satisfaction with problem handling by staff and repurchase intention are directly related to the time taken to respond. Clearly, poor complaint handling results in business lost and negative word-of-month. It is further discovered that technology enthusiasts were less tolerant for delayed responses to their electronic complaints than their counterparts. If customers made a complaint online, customers expect a well-grounded reply to their emails but not only an automated generated confirmation (Zaugg, 2007). Still, the lack of knowledge of how hotel managers respond to e-complaints and how customers would perceive complaint handling process in the online world is bothersome. This study contributes to the knowledge by serving as an initial step to explore this issue.

3 Research Methods

The dataset for this paper included hotel reviews that were collected from the popular travel review website, TripAdvisor (www.tripadvisor.com), from February 1, 2007 until July 31, 2008. TripAdvisor was founded in early 2000 as an operating company of Expedia. Tripadvisor.com was selected because it is the largest and most popular websites for travel destinations and accommodation reviews (Law, 2006). Each year more than 20 millions of potential hotel visitors consult such review sites before making their hotel selection decision for their trips (Tripadvisor.com, 2008). The website aims at providing unbiased recommendations for hotels and other travel related information to users. TripAdvisor indexes hotels from cities across the world, along with reviews written by travelers. Hotels in Hong Kong were selected in this study. There were a total of 152 hotels stored in its database and they can be sorted by popularity, price, and class. For each hotel, the reviews were sorted from the lowest member rating to the highest member rating. A maximum of 10 reviews (with complaints) per hotel were extracted for analysis. This is to ensure the information collected is representative enough for the kind of e-complaints of Hong Kong hotels using the selected channel. A total of 453 individual valid reviews (complaints) on 56 different Hong Kong hotels were thus collected and analyzed.

A content analysis method was used in this study. Based on the complaints reported from each customer, they were classified into nine broad different complaint categories including space, bedding, décor, cleanliness, utilities/amenities, provision of amenities, service, price, and others. In addition, information regarding the age and origin of complainant, rates and class of a hotel, as well as management responses to complains were captured for further analysis using two-way contingency table analysis where appropriate.

4 Results and Discussions

4.1 Lodging Cases of e-Complaint Categories

The frequencies of complaint cases under nine different categories are presented in Table 1. These nine categories are Service, Space, Cleanliness, Utilities / Amenities, Bedding, Price, Provision of Amenities, Décor, and Miscellaneous. Consistent with the findings from Lee and Hu's (2004) study, the overall service delivery failure represents 54% (245 cases) of all reported complaint cases, the highest among all categories. Examples of the failures include staff are too slow or rude in response to guest requests for a wake up call service; or show signs of language incompetence by keep using the standard replies of "I am happy to hear that and I look forward to see you again" when the guests were furiously making a complaint. Complaints regarding small space of guestroom, bathroom or hotel in general (e.g. guest lift and corridor) are another major complaint category reported (47%). This is not surprising as the price of land in Hong Kong is very high comparing to many other tourism destinations. Many hotel developers thus need to maximize space utilization in hotel design. Hence, spacious rooms and public places are usually not a major emphasis of many hotels in Hong Kong.

The other three reported complaint categories are cleanliness, functionality, and provision of room's utilities, representing 33.8%, 32.9% and 23.8% of the cases respectively. Examples of these complaints include dirty carpets and greasy windows in the room, hair found in the bath, mini-bar and toilet flush are not functioning properly, and missing TV remote control or glasses. The commonality on these three categories is that the problems can be avoided by better trained employees. If problems are consistently found in the same hotel, this may indicate that the hotel is likely to have quality control problems. A comfortable bed is often regarded as the core product provided to hotel customers. Complaints related to bedding though are relatively few (25.2%) but still need serious attention from the management to rectify the issue. Some of the problems are hardware-related such as lumps in mattress, mattress is too soft, or missing pillow cases. Complaints on high hotel prices represent 24.3% of the total cases. It is likely that the higher the rate of the room, the higher the expectation will be on what is offered. When a product or service is not up to the expected standard, it can easily result in "poor value for money" in a customer's mind. Décor is the least frequently mentioned complaint category (16.1%). This is subjective in nature but hotels still need to ensure the design and fittings of their hotels do not look dated. This is particular the case for boutique hotels in which an innovative design theme should clearly be demonstrated in order to remain competitive. Lastly, a relatively large percentage of miscellaneous complaints (51.9%) were reported. These ranged from examples such as luggage or wallet was being stolen from a guest room to a spider found in the bathroom. While these may be just some odd cases, they should be treated cautiously as these could lead to possible deterioration of overall service quality.

Table 1. Cases of E-Complaints in nine Complaint Categories

Complaint Category	**Sub-category**	**Cases**	**% of Total (n = 453)**
Service	General service	50	11
	Courtesy	34	7.5
	Responsiveness	35	7.7
	Competency	60	13.2
	Personal interaction	41	9.1
	Others	25	5.5
Total		245	54.1
Miscellaneous	Others	65	14.3
	Location	39	8.6
	Noise	38	8.4
	Smell	45	9.9
	Food	19	4.2
	Pest	29	6.4
Total		235	51.9
Space	Space in general	50	11
	Guest room	135	29.8
	Bathroom	28	6.2
Total		213	47.0
Cleanliness	General cleanliness	43	9.5
	Guest Room	60	13.2
	Public areas	11	2.4
	Toilet	22	4.9
	Others	17	3.8
Total		153	33.8
Utilities / Amenities		149	32.9
Bedding		114	25.2
Price		110	24.3
Provision of Amenities		108	23.8
Décor		73	16.1

4.2 Origin of Complainant and Categories of e-Complaint

Table 2 shows a breakdown of the nine categories of e-complaints across different origins of the complainants.

Table 2. Nationality and Categories of e-Complaint

Nationality of Complainant	Space	Bedding	Décor	Cleanliness	Utilities/Amenities	Provision of Amenities	Service	Price	Miscellaneous	Total
Argentina	0	0	4	4	0	0	4	4	0	16
Australia	31	9	8	29	19	14	34	13	40	197
Belgium	2	0	0	0	1	0	2	2	0	7
Brazil	0	2	0	2	2	0	2	0	2	10
Canada	13	3	1	5	8	8	6	10	11	65
China	4	9	3	5	18	0	8	17	7	71
Cyprus	3	1	0	0	0	2	3	2	1	12
Denmark	4	0	0	0	0	0	0	4	0	8
Finland	0	3	0	0	0	1	0	1	3	8
France	4	5	0	4	0	0	1	0	1	15
Germany	2	4	0	2	4	0	6	0	6	24
Hawaii	0	5	0	0	4	1	0	0	5	15
India	6	8	0	4	10	2	7	6	10	53
Indonesia	8	0	0	0	4	0	4	0	4	20
Ireland	4	0	4	1	0	0	3	0	3	15
Israel	3	2	1	2	0	1	0	0	2	11
Italy	0	0	0	0	0	2	0	0	2	4
Japan	5	10	4	5	3	0	9	1	9	46
Korea	2	4	1	12	0	3	4	2	1	29
Malaysia	1	1	0	4	1	4	0	4	0	15
New Zealand	10	0	0	4	10	0	4	0	2	30
Parkistan	0	2	0	2	0	2	0	2	0	8
Philippines	0	1	4	3	2	3	6	5	4	28
Romania	0	1	1	1	0	1	0	0	1	5
Russia	5	4	0	0	8	1	13	0	9	40
Scotland	0	0	0	4	0	0	4	0	4	12
Singapore	9	3	4	14	4	14	20	7	16	91
Sweden	0	0	2	0	0	2	2	0	2	8
Thailand	14	0	2	2	8	4	12	4	10	56
UAE	6	0	5	1	0	5	1	0	6	24
UK	27	5	12	9	13	12	27	5	27	137
USA	50	32	17	34	30	26	63	21	47	320
Total	213	114	73	153	149	108	245	110	235	1400

Among different origins, travelers from the U.S.A. have the highest number of reported complain cases (320 cases), which is followed by the Australian (197 cases), and the U.K. (137 cases). It is interesting to see the complaints were spread in all categories. This could indicate that not only the travelers from these developed origins represent the major source of hotel customers in Hong Kong, but they also have higher expectations on the standard of hotel products. In addition, they are more willing to express their views and take actions to make a complaint when dissatisfactions occur. In examining specific categories of e-complaints, it appears that most of the complaints posted by guests from these three countries were related to space (108), cleanliness (72) and service (124), although U.K. customers also made considerable number of complaints on décor, functionality, and provision of amenities. If these countries are hotels' major source markets, management should then consider the necessity for implementing improvement actions.

On the other hand, customers from Mainland China are one of the most important market segments for many 2-3 stars hotels in Hong Kong. The functioning of utilities in rooms and the high rates charged by hotels are what they were not happy about the most. This phenomenon seems to correspond to the behaviour of visitors from Mainland China who are more willing to spend on shopping than on hotel accommodation. While keeping room utilities functioning properly and user-friendliness are considered as important, managers also need to be aware that Mainland Chinese are in general price sensitive. Hotels could distinguish themselves by offering good value-for-money accommodation instead of exotic product features and uniqueness. As regarding bedding and décor, the U.S.A. has the highest number e-complaint cases reported as compared to other countries.

4.3 Significant Relationships between Categories of E-Complaint and Hotel Class or Age of E-Complainants

A two-way contingency table analysis was conducted using SPSS software (v. 12.0) to evaluate whether different categories of e-complaints are related to hotel classes. The findings indicated that no significant relationship existed between them. This implies that different classes of hotels are not prone to any specific types of complaints. The same analysis was also conducted to evaluate whether the age groups of e-complainants have relationships with their tendency to complain online across various complaint categories. The results as depicted in Table 3 showed that a total of three categories namely space, décor, and price were found to have significant associations. Based on the results of Chi-square tests, the Chi-square values for space, décor, and price were 33.12, 43.94, and 21.76 respectively with their p-values = 0.000 (4, N = 318). For space, there is evidence to suggest that the youngest group aged 18-24 has the highest tendency to complain (32 cases out of a total of 42) than the oldest group aged 55-64 (only 7 cases out of a total of 29).

In examining the total number of complaint cases, it can be seen that older aged customers tend to be more tolerant than younger aged customers on smaller space of hotel hardware. However, this pattern is not the same for complaints on décor. Both the youngest aged (16 cases out from a total of 42) and the oldest aged groups (10

cases out from a total of 29) had relatively higher percentages of making complaints than other age groups. These two groups also represent the highest number of total complaints made. Perhaps, customers in these two age groups are mainly leisure travelers, and they, therefore, may tend to pay more attention on the surroundings during their stay. Interestingly, the customers who made the most complaints on price were in the ages of 55 to 64 (9 cases out from a total of 20), though in terms of total number of complaints is not the highest; whereas the group with the least percentage of complaints was aged between 35 to 44 (only 8 cases out from a total of 86). Perhaps older aged customers tend to be more price sensitive with decreasing earning power in general. Different pricing strategies from hotels would be desirable when targeting different age group segments.

Table 3. Significant Relationships between Age of Complainant and Tendency to Complain across Different Complaint Categories

	Reported Cases by Complaint Categories			**Total**
Age of Reviewers	Space (Not Complained)	Decor (Not Complained)	Price (Not Complained)	Complained (Not Complained)
18-24	32 (10)	16 (26)	10 (32)	58 (68)
25-34	38 (72)	7 (103)	33 (77)	78 (252)
35-44	43 (43)	6 (80)	8 (78)	57 (201)
45-54	14 (37)	3 (48)	22 (29)	39 (114)
55-64	7 (22)	10 (19)	9 (20)	26 (61)
Total Cases	318	318	318	954
Chi-Square	33.121	43.940	21.758	
p-value	.000*	.000*	.000*	
df	4	4	4	

4.4 Management Responses and Other Variables

Management or organizational responses to customer complaints is an important topic in the consumer complaint behavior literature. Although organizational responses to service failures may vary from company to company and from incident to incident, a review of related literature highlighted some common attributes. These are apology, promptness, explanation, attentiveness, redress, and facilitation (Blodgett et al., 1997; Davidow, 2003; Lee and Hu, 2004; Yavas et al., 2004). Two-way contingency table analyses were conducted and no significant relationships were found between the class of hotel and whether the management has taken responding actions or not. In addition, the age group of complainants has had no significant impact in responding actions undertaken by management. Therefore there is no evidence to suggest that managers in higher class hotels are more astute to take recovery actions towards customer complaints as one would assume nor does the age group of complainants really make a difference.

Table 4 shows a detailed breakdown on the kind of recovery actions or responses taken by management, if any, against each individual complaint category.

Table 4. Management Responses and Categories of Complaint

Complaint Categories	**Management Action**						
	Apology	Promptness	Explanation	Attentiveness	Redress	Effort	No Action (% of total)
Space	19	2	4	9	4	2	172 (81)
Bedding	12	2	0	8	4	0	88 (77)
Décor	13	0	0	0	0	0	60 (82)
Cleanliness	21	3	0	1	4	6	118 (77)
Utilities/ Amenities	7	0	0	1	0	4	137 (92)
Provision of Amenities	10	0	0	0	8	2	88 (82)
Service	16	2	4	6	4	10	203 (83)
Prices	4	0	0	0	4	2	100 (91)
Miscellan-eous	23	0	8	10	4	8	182 (77)
Total	125	9	16	35	32	34	1148
% of Total	8.9	0.6	1.1	2.5	2.3	2.4	82

Consistent with previous research such as Harrison-Walker (2001), the overall response rate by management as revealed in this study remained very low. The results indicated that 82% (1148 cases) of the total cases have received no recovery actions from the organization. It is surprising to see 92% of all complaint cases were related to malfunctioning of utilities or amenities that have received no apparent follow-up recovery actions. This is also the case for complaints that were related to service failure (83%) and cleanliness (77%) where the problems should be relatively easy to rectify on the spot. Even if some of these complaints were only reported online after the customers had already left the premises, hotels can still make an online reply to the customers concerned. It is believed that such an attempt would reduce customer dissatisfaction and negative word-of-month, generating a snowball effect on a hotel's overall image and reputation whilst deterring future prospective customers.

Of those remaining cases where management responses were made, it can be clearly observed that *apology* was the most common and dominant remedial actions taken (125 cases). However, sometimes this may not be the most appropriate response for complaints that are related to prices, as also reflected in the relatively few cases (four cases). Apology is an acknowledgement by the organization of the complainant's distress (Davidow, 2003). Depending on the severity of failure, a word of apology would be the minimum requirement that an organization should do. Further remedial actions should be expected to follow within a reasonable timeframe.

Yet the results show that promptness in management response has the least reported cases (nine cases). Apparently, there are certain types of complaints where a quick solution is often unrealistic. Under most situations, a clear explanation by attentive staff with great efforts to redress the failure would be most welcome by complainants. Redress is defined as "a fair settlement or fix of the problems that arise between the company and the customer" (Diener and Greyser, 1978, p.28). From Table 4, it can be seen that such actions were applied in many different complaint categories especially in the provision of amenities. For service and cleanliness recovery, customers can easily identify if the staff is making sufficient efforts to rectify the problem or not, as reflected in relatively more cases in these two aspects.

5 Conclusions

This study has offered a better understanding and useful insights on e-complaints made about Hong Kong hotels and their relationships with hotel class, origin of complainants, age group of complainants, and management's responding actions. The classification of e-complaints into nine categories should provide more detailed information on what customers were not satisfied. The high percentage of complaints on service failure indicates that customers were not happy with some fundamental services such as service delivery and inappropriate employee behavior. Yet, it is clear from the results that both hardware (e.g. space and design) and software (e.g. service and cleanliness) are equally important in ensuring customer satisfaction. The provision of good training and quality control schemes for hotel employees will thus play a critical role in minimizing complaints raised. On the other hand, knowing the preferences of customers from different origins has implications on the formulation of appropriate hotel marketing strategies, as well as the pricing and product mix that should be offered. Those countries which have more reported e-complain cases do not necessarily mean they are the groups with a higher dissatisfaction rate. It may simply be due to their cultures where people are more readily to voice out their opinions and have easy Internet access and usage in their homeland. If a hotel's main target market is Mainland China, for example, more care should be made to ensure traditional means of complaint handling channels are provided to better facilitate communications.

Although there is no evidence to suggest that hotel class is more prone to specific types of complaints, expectations of product quality standards are likely to be positively correlated with the class of hotel. It is important that there is a right match between the two as perceived by customers, especially under various age groups. It is interesting to see there are variations in their complaint behavior, which has not been explored in the past. Such information is likely to be valuable in product design for specific market segments.

It appears that low response rate and poor recovery actions towards e-complaints remain an issue to be dealt with by hotel companies. There is little doubt that e-channel will become a major alternative channel for communications between hotel companies and customers. More importantly, communications with consumers are now becoming public for the whole world to see. As such, hotels need to be committed to establish an effective communication strategy and to streamline their electronic complaint

management systems. They must avoid seeing recovery as a cost or waste of time. Instead, speedy resolution of customer e-complaints can provide an opportunity to regain customers' trust and return businesses. Additionally, knowledge of identifying the most appropriate management responses to specific complaint issues will be needed. After all, it is how the customer perceived the management response that matters most for service recovery.

Conducting research based on information provided on the Internet has its own limitations. First, Internet users are likely to be associated with higher income group/s and higher education level/s, as their usage and knowledge of IT service implies. Hence, complaints from certain customers are inevitably excluded in this study. Second, it is difficult, if not impossible, to verify complaints made by hotel customers are accurate and reliable whilst the management actions are also seen through the perception of consumers. Furthermore, in this study, only complaints reported on Tripadvisor.com for Hong Kong hotels were analyzed. Future research can identify demographic variables that might correlate with technology users. This research can further be extended by studying motivation and obstacles for using e-channels to complain in the tourism and hospitality industries. By expanding the sample size to include e-complaints reported on other complaint websites, models could be developed to identify patterns on e-complaint behavior for hotel customers. This will assist hotel managers to better understand the process of e-complaining and develop better complaint resolutions in the virtual world.

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The Impact of Online Reviews on the Choice of Holiday Accommodations

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Abstract

In order to reduce information asymmetries in the tourist industry, consumers refer to multiple information sources. Among these, e-reviews are supposed to better reflect quality of information because they are based on consumers' past experiences. The first purpose of this study is therefore to test within an experimental design whether e-reviews have a predominant or a complementary role on consumer behaviour in comparison with other sources of information (hotel rating system, travel guides and recommendations of travel agents). As expected, e-reviews are the most referential information source. We further use a causal model in order to detect the determinants of trust in e-reviews, and we can show that perceived expertness of e-reviews, credibility of the e-platform and brand familiarity explain more than 60% of trust in e-reviews. The final part of the analysis is dedicated to our third research purpose which is the measurement of the impact of trust in e-reviews on choice of accommodations. A significant and positive influence can be demonstrated. Hence, scientific and managerial implications are discussed.

Keywords: e-reviews, experimental design, e-WOM, information asymmetry, trust.

1 Introduction and objectives

With the advancement of information technologies, increasing numbers of travellers are using the Internet to seek destination information (Litvin, Goldsmith, & Pan, 2008). Each time consumers articulate themselves on the Web their output is referred to as electronic word of mouth (e-WOM). Many authors agree that e-WOM "has empowered the consumers" (Niininen, Buhalis, & March, 2007) by allowing them to access "more accurate, up-to-date information about products" (Kucuk & Krishnamurthy, 2007). Thus, e-WOM has entered into the array of quality information sources.

Nevertheless, research on the impact of e-WOM on consumer behaviour has only recently begun. An important contribution is the study of Hennig-Thurau (2005) who points out that behavioural relevance of customer articulations very much depends on the motives of readers. Furthermore, Nikolaeva and Sriram (2006) state that the influence of e-WOM on behaviour varies according to the purchased product as well as to the number of available alternatives. The impact of e-WOM is shown by Litvin, Goldsmith and Pan (2008) on the creation of destination images; whereas the study of

Harris Interactive & Fleishman demonstrates that for the purchase of electronic flight tickets, other online information sources (i.e. search engines for price comparison) display the strongest influence (www.harrisinteractive.de [July 5, 2008]).

This study focuses on e-reviews (a subset of e-WOM) which are online consumers' product-related articulations. According to many authors e-reviews have a high information content. However, an issue which has not yet received enough attention in the literature is whether they have a predominant or a complementary role on consumers' behaviour in comparison with other information sources. Accordingly, the first purpose of our analysis is to detect, within an experimental design, whether e-reviews are more frequently chosen as a quality criterion for choosing a hotel than other information sources such as hotel rating system, reviews in travel guides and travel agency recommendation. Furthermore, our second aim is to analyze the structure of e-reviews. Here the focus is to understand what turns e-reviews into a trustworthy information source. Hence, the determinants of trust in e-reviews are explored. The third purpose of our analysis is to measure the impact of e-reviews on the decision of booking an accommodation. Both the second and the third purposes are reached through the development of a causal model.

2 Literature review and conceptual framework

As mentioned above, the first aim of this study is to empirically determine which information sources are preferred by consumers in order to book a hotel in an environment with multiple sources of quality information.

In order to develop an appropriate experimental design, the information theories have been reviewed. These are generally developed to better understand and explain information flows on the market as well as to detect asymmetric information. The latter implies that customers cannot precisely assess a product's quality before purchasing it (Clerides, Nearchou, & Pashardes, 2003), which causes market inefficiencies (Akerlof, 1970).

Since the tourism industry is characterized by a large degree of asymmetric information, many scholars have explored ways in which the market environments can sustain equilibria. Clerides, Nearchou and Pashardes (2003) studied the case of tour operators who attempt to signal quality by providing a self-developed hotel rating scale. In this way, customers are provided with the possibility of comparing the conventional hotel rating with the one constructed by tour operators. Other mechanisms which rectify information asymmetries on the market embrace the screening of consumers toward other consumers' activities, i.e. suggestions by friends/relatives or reading e-reviews are an extremely useful benchmark for information search and purchase of products (Kucuk and Krishnamurthy, 2007).

According to the existent literature, the more reliable sources of information are advice from friends and relatives, tourist guides, professional or specialized consultants, radio, television, etc. (Gittelson & Crompton, 1983; Nolan, 1976). More

recent studies point out that e-reviews are considered reliable sources of information by consumers (Hennig-Thurau, 2005), although their impact on behaviour has not yet been acutely analyzed. Studies have shown that while individuals acquire information from multiple sources, the number of sources actually referred to in the product selection process is limited (Hato et al., 1999). Furthermore, since different quality information sources convey different vacation expectations, it is important for marketers to know which mode of processing is dominant in the choice decisions of target groups (Molina & Esteban, 2006).

These conceptual and empirical perspectives lead us to test within an experimental design which sources of information among the following are preferred by consumers for the booking of an accommodation: e-reviews, hotel rating system, recommendation of travel agents, travel guides. Accordingly, our first hypothesis is the following:

Hypothesis 1: For booking a hotel in an environment with multiple sources of information, e-reviews are chosen more frequently than hotel rating systems, recommendations of travel agents and travel guides.

Many scholars affirm that e-reviews are considered trustworthy information by consumers (Gretzel, 2007, www.tripadvisor.com/ [May 2, 2008]; Hennig-Thurau, 2005). In situations of asymmetric information, trust is considered as an important mechanism to sustain equilibrium, because it reduces risk perception and transactional costs (Ebert, 2006). Since the second purpose of this study is to detect the determinants of trust in e-reviews, trust theories have been explored.

In their reviews on the literature concerning trust, Raimondo (2000) and Ebert (2006) agree that the most used dimensions for defining trust are competence (also referred to as expertness and dynamism), benevolence (goodwill, responsiveness) and integrity (credibility, morality, reliability), although they are not always combined together (compare Ganesan, 1994; McKnight, 2002). Whereas the first dimension identifies consumer's belief that the counterpart has the required expertise, benevolence is based on consumer's perception that the other person acts at his/her best and in the interest of the consumer. Finally, integrity refers to the common values between trustor and trustee (compare Raimondo, 2005).

The current literature on e-reviews seems to endorse these dimensions. In her study on impact of online travel reviews, Gretzel (2007, www.tripadvisor.com/ [May 2, 2008]) identifies perceived expertness and a friendly communicative style as important dimensions of e-reviews. However, in their study on the impact of WOM on brand evaluations, Sundaram and Webster (1999) discovered that evaluation of a familiar brand is less susceptible to influence by opinions of other consumers. Furthermore, e-reviews do not stand alone on the Web, but they are generated by different media which can be company controlled (such as guest books or consumer chat rooms), consumer controlled (such as boycott sites) or third party controlled (such as newsgroups or virtual opinion platforms) (compare Hennig-Thurau, 2005). It

is therefore important that the source of the e-review is also perceived as credible. We therefore formulated the following hypotheses:

Hypothesis 2: The perceived expertness of e-reviews positively influences trust in e-reviews.

Hypothesis 3: A friendly style of e-review positively influences trust in e-reviews.

Hypothesis 4: Consumer's familiarity with a hotel brand negatively influences trust in e-reviews.

Hypothesis 5: The perceived credibility of the source of e-reviews positively influences trust in e-reviews.

As we mentioned above, our third purpose is to analyse the impact of trust in e-reviews on the decision of booking an accommodation. Thus, in the same way as offline WOM is supposed to affect the purchase behaviour of consumers (Arndt, 1967), we hypothesize that e-reviews influence consumers' behaviour to book a hotel. Accordingly, our next hypothesis is:

Hypothesis 6: Trust in e-reviews positively influences choice behaviour.

3 Procedures

3.1 Data collection and questionnaire design

Data for this study were collected in several German cities via administrated questionnaires during the first two weeks of May 2008. The data collection took place within the frame of an academic marketing research course during which each student interviewed 10 people using common demographic criteria as a guideline (gender, profession, age, etc.). Because of time and financial restraints, the sample was not intended to be representative. The final number of available responses was 216.

The questionnaire embraced a set of items regarding information searching behaviour, two measurement components concerning "trust in e-reviews" and "trust in the source of e-reviews", a set of socio demographic data and an experimental design.

Based on the review of Molina et al. (2008) on the literature concerning information sources, the following sources of information were included in the set of items concerning the information searching behaviour: advice given by relatives/friends, reviews in travel guides and recommendation of travel agents. To these, e-reviews and hotel rating system were added because of their accessibility to a greater percentage of consumers (Molina & Esteban, 2006; Engel et al. 1978).

Trust in e-reviews referred to perceived trustworthiness of consumers' articulations on the Web. It was based on the three dimensions of trust reviewed by Raimondo

(2000) of ability, benevolence and integrity to which the construct of a product's familiarity was added as a control variable with a disincentive function. Since we were not aware of any established scales for trust in e-reviews, we constructed items based on the findings of Gretzel (2007) (perceived expertness and style), Brown, Broderick and Lee (2007) (credibility of e-review source) and Sundaram and Webster (1999) (brand familiarity). We then discussed the items with a pool of experts who gave us feedback on their readability and their collocation in the categories discussed above (expert validity). A pretest was provided by the marketing course students which led to the modification of some statements. Similar processes of item generation for new constructs are not uncommon in the literature and can be seen as an indicator of criterion validity (compare Hennig-Thurau, 2005). An overview of the items can be inferred by table 1.

Table 1. Representation of the items developed for each construct

Construct	Indicator[1]
Trust in e-reviews	Before booking a hotel I read other e-users' experiences
	E-reviews help me to make the right buying decision
	In comparison to catalogues I trust e-reviews more
	I think that e-reviews are trustworthy
	If a hotel is promoted by tourists, I am more willing to book it
	To me positive e-reviews are very important
Expertness	The number of posted e-reviews is very important to me
	I trust e-reviews written by people who travel a lot
	The more detailed an e-review the more I trust it
	I only trust e-reviews which have received high ratings
Style	I trust more e-reviews written in a friendly manner
	I especially trust e-reviews posted by people similar to me
Brand familiarity	If a hotel is well known, reviews by others are not very important
	If a hotel has a high rating, reviews by others are not very important
Credibility of e-platform	Travel opinion platforms are trustworthy to me

[1]Five point rating scale (-2= totally disagree to +2=totally agree)
Source: Authors' representation

3.2 Experimental design

The experiment replicated the Internet-based environment of an online travel platform (such as Holidaychek, Tripadvisor, etc.) and had the following structure: at the beginning respondents could read a text about definition and function of online travel platforms and e-reviews. Afterwards, four dichotomous statements concerning the choice of different types of accommodation were introduced. Respondents were asked to choose either the accommodation promoted by e-reviews (option 1) or the one promoted by another different quality criterion (conventional hotel rating system, review in a travel guide, recommendation of a travel agent) (option 0). Some important considerations concerning the experiment are necessary, such as:

- the logo of a travel opinion platform was placed in the background of each experiment in order to truly replicate an Internet based environment.

According to Hennig-Thurau (2005) such platforms can be seen as objective quality assessors which interact with companies (here: hotel chains) on behalf of consumers;

- a high degree of similarity with the Web environment permits attraction of the opinion of potential respondents (who had not read e-reviews, but are interested in doing so).

As mentioned before, in each experiment two accommodations are promoted by different quality criteria. This design aims to replicate a real life situation, where ordinary individuals have the capability to choose among different online and offline information sources available at the same time.

3.3 Data analysis

In order to examine the dimensionality of the entire set of items, a principal component analysis (PCA) using VARIMAX rotation and Kaiser's eigenvalue-greater-than-one-criterion was performed. Only items with factor loadings of at least 0.40 were retained. Based on the results of the PCA, a confirmatory analysis was then performed. The final number of factors with eigenvalue greater than one was nine. As expected there were no discrepancies between the output of the PCA and those of the confirmatory analysis. The results of the confirmatory analysis were kept for the structural equation model (SEM) to which a behavioural variable (choice of accommodation) was added. The latter was derived by the results of the experimental design which was conveyed in an index. The data were analysed using the SmartPLS 2.01 software for the structural equation model based on the Partial Least Squares.

4 Findings

4.1 Sample and descriptive statistics

Respondents are on average 39 years old. With a percentage of 53%, women are slightly overrepresented. As far as tourist behaviour is concerned, the average propensity to go on holiday is once to twice yearly; and the average duration is one to two weeks. All in all, the experience in reading e-reviews is lower: 40% of respondents have never read e-reviews, followed by 40% who only sporadically do so (rarely to sometimes). Only 20% of respondents do it on a regular basis. Even lower is the experience in posting e-reviews: 29.5% of respondents have articulated themselves on the Web once, followed by 13% who rarely to sometimes do and 1.5% who do it very often. Almost 56% have not yet done it. Maybe this is due to the fact that in Germany online travel platforms are still fairly unknown; only 3 out of 10 were recognized by the majority of respondents.

By means of five point rating scale questions (+2=very important to -2=not important at all), we directly asked the respondents which sources they *recognized as important* for booking an accommodation. Advice of friends/relatives (1.00) scores the highest

value, followed by the hotel rating system (0.63), e-reviews (0.53), and travel agency recommendations (0.07). Hence, despite the lower experience in reading/posting e-reviews, the latter are perceived as important sources of information after personal suggestions of friends/relatives and the hotel rating system (see table 2).

In order to detect which information sources are more frequently chosen by the respondents of our sample, we need to focus on the output of the experiment mentioned above: all in all, 82% of respondents chose accommodation promoted by e-reviews two or three times, followed by 14% who chose it once and 4% who never chose it. Hence, e-reviews were the most *used* sources of information followed by travel guides, travel agents' recommendations and the hotel rating system (see table 2).

Table 2. Stated importance of information sources and output of the experiment

Most important information sources (stated by respondents)		Most used information sources (experiment's output)	
1	Advice of friends/relatives	1	e-review
2	Hotel rating system	2	Travel guides
3	e-reviews	3	Travel agents' recommendation
4	Travel agents' recommendations	4	Hotel rating system

Source: Authors' representation

Based on the previous results we can therefore accept hypothesis 1, as in the experimental design e-reviews were the most frequently chosen information source by respondents in comparison to travel guides, travel agency recommendations and hotel rating systems.

4.2 Findings of the structural equation model

In order to detect the determinants of trust in e-reviews (second research purpose) as well as its impact on behaviour (third research purpose) we developed a SEM, whose reliability and validity were ensured through the application of a set of second generation tests (Homburg & Giering, 1996).

Regarding the indicator reliability, construct loadings were examined by using t-test. In order to measure the construct reliability and validity, the composite reliability (CR) and the average variance extracted (AVE) were respectively employed. Whereas for the former, the current literature estimates a threshold of 0.7 (Dibbern & Chin, 2005; Götz & Gobbers 2004); it is expected that the AVE should not be lower than 0.5 (Homburg & Giering, 1996) meaning that at least 50 percent of measurement variance is captured by the construct (Chin, 1998). In our model all constructs show values greater than or nearly approaching the thresholds suggested by the literature which lead to the next step. The results of the SEM allow us to test the remaining hypotheses (see figure 1).

Table 3. Operationalisation of constructs

Construct	Indicator[1]	T-Value	IR	AVE	CR
Trust in e-reviews	Before booking a hotel I read other e-users' experiences	15.36	0.78	0.49	0.87
	E-reviews help me to make the right buying decision	23.62	0.81		
	In comparison to catalogues, I trust e-reviews more	7.73	0.58		
	I think that e-reviews are trustworthy	7.01	0.60		
	If a hotel is promoted by tourists, I am more willing to book it	9.42	0.64		
	To me positive e-reviews are very important	10.13	0.67		
Expertness	The number of posted e-reviews is very important to me	16.23	0.80	0.52	0.81
	I trust e-reviews written by people who travel a lot	15.87	0.80		
	The more detailed an e-review the more I trust it	5.64	0.67		
	I only trust e-reviews which have received high ratings	9.18	0.80		
Style	I trust more e-reviews written in a friendly manner	4.76	0.84	0.70	0.83
	I especially trust e-reviews posted by people similar to me	6.15	0.83		
Brand familiarity	If a hotel is well known, reviews by others are not very important	3.03	0.70	0.66	0.79
	If a hotel has a high rating, reviews by others are not very important	5.96	0.91		
Trust in platform	I trust online travel opinion platforms[2]	-	-	-	-
Choice	Index[2]	-	-	-	-

[1] Five point rating scale, IR = Indicator Reliability, AVE = Average Variance Extracted, CR = Composite Reliability [2]= tests not possible for one-item constructs

Perceived expertness is the strongest component of trust in e-review, twice as strong as familiarity with hotel brand which, as expected, displays a negative influence towards trust in e-review. A nonsignificant influence is displayed by friendly style. As a consequence, both H2 and H4 can be accepted, whereas H3 is rejected. Trust in an online opinion platform, which is the information source of e-reviews, has also a highly significant influence towards trust in online review. As a consequence, H5 can be accepted. All in all, three out of four variables explain 61% of trust in online reviews of which a considerable part can be attributed to expertness and credibility of an e-platform. Next, the impact of trust in e-review on choice is presented. As expected, trust in e-review displays a significant and positive influence on the choice of the accommodation (H6= accepted). Here, however, only 9% of the behavioural variable can be explained by trust in e-review, which leads to the conclusion that other factors should also be included in the model in order to explain what influences choice of accommodation.

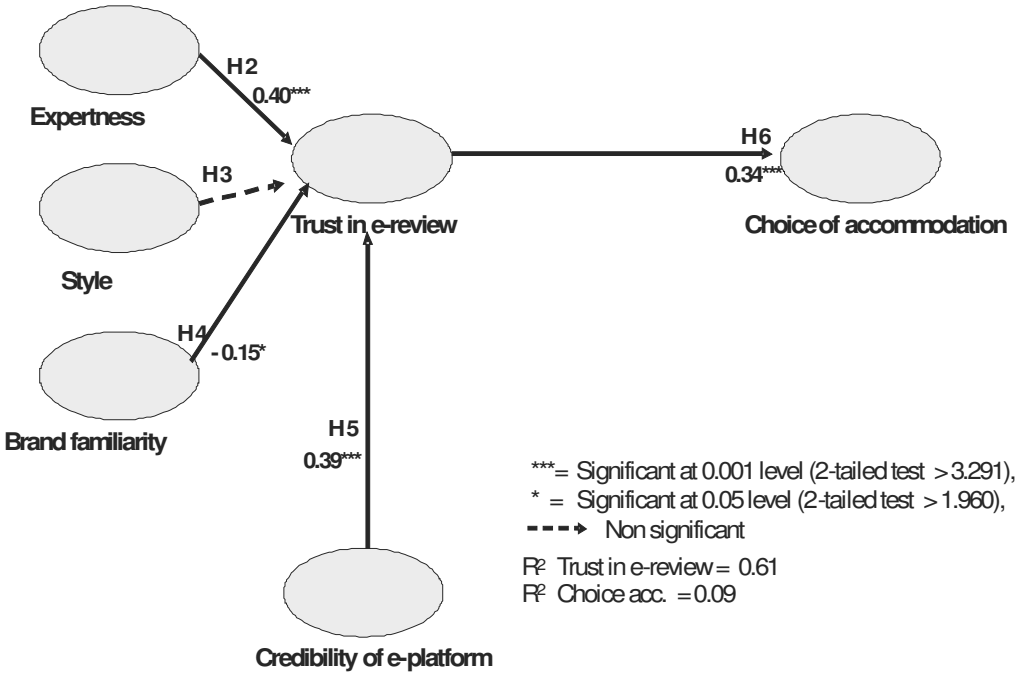

Fig. 1. Results of the structural equation model

5 Conclusions

5.1 Scientific relevance of the study

The objective of this study is to contribute to the existent literature on e-WOM. The first purpose of our research was to analyze which sources of information individuals choose in an environment with multiple information sources. Within an experimental design we have shown that more than 80% of respondents opted for the accommodations promoted by e-reviews although almost 40% had never read e-reviews before.

It seems that e-reviews have a greater potential to "persuade" consumers than other information sources. A possible explanation is that e-reviews, as well as offline WOM, are affective sources of information (Molina & Esteban, 2006; Ratchford, Talukdar & Lee, 2001). Thus, they convey more attractive vacation expectations than others – more objective information sources (such as the hotel rating system).

The second purpose of our study was to detect the determinants of "trust" in e-reviews. The findings of the SEM show that an e-review must be perceived as "expert" in order to be trusted. This can be explained by individuals' "social orientation" (Hennig-Thurau & Walsh, 2004) or even by their need of "some kind of authority" (Brown, Broderick, & Lee 2007). Furthermore, there should not be any discrepancies between the perceived trustworthiness of e-reviews and its source.

Finally, brand familiarity can also be considered a competitor of e-reviews among other product related quality signals. These variables can explain 61% of trust in e-reviews.

Even though the majority of e-reviews are anonymously posted (Hennig-Thurau, 2005), consumers consider this source of information as highly reliable. This can be explained in different ways. First of all, the more people have access to a source of information, the more important the source is perceived (Engel, Kollat, & Blackwell, 1978). Furthermore, except in their anonymous nature, e-reviews resemble offline WOM. As the latter is considered a reliable source of information, it is plausible to maintain that e-WOM also enjoys a similar level of trustworthiness.

The third objective of our study was to measure the impact of trust in e-reviews on behaviour. If we focus on the findings of the SEM, we discover that trust in e-reviews displayed a significant and positive influence on the choice of an accommodation.

Hence, e-WOM conveyed through e-reviews should be taken into account when promoting products on the Web. However, due to the reduced quantity of variance explained, also other factors such as Internet literacy and consumer involvement are supposed to influence behaviour. Further studies could replicate the model by including a greater variety of exogenous variables.

All in all, our findings confirm that consumers seek to gain more bargaining power on the market both by screening product based information and by signalling it to others. However, as far as Germany is concerned, this study shows that such measures have only recently begun to be adopted by consumers, as neither e-reviews nor travel platforms were known by the majority of the respondents of our sample.

5.2 Relevance for the market

The results of our study have shown a significant impact of “trust in e-reviews” on the “choice of a set of accommodations”. The latter are experiential goods whose choice is considered in the literature as highly risky. Thus, companies which deal with this sort of commodity could offer their Web visitors the ability to access other consumers’ opinions on their Web sites (i.e. by hosting a product review site). From a managerial point of view, such a strategy would offer opportunities as well as risks (Hennig-Thurau & Walsh, 2004). Among the former, the harvested information gives the company important feedback about its visitors, which otherwise would be very costly to achieve with standardized market screening procedures (Kaas, 1991). Furthermore, the introduction of such a review site would clearly signal consumers of the company’s willingness to reduce information asymmetries which would increase its reputation.

On the other hand, if a company decides to host e-reviews, negative feedback also has to be taken into account; otherwise, the information will not be perceived as authentic (Reinecke, 2008). In the case of negative online reviews, these would be spread to a “virtually unlimited number of people” (Hennig-Thurau & Walsh, 2004) for an

unlimited period of time, as information disseminated on the Internet cannot be cancelled. To face such problems, it is important to create "a true dialogue" between the company and its Web visitors (Reinecke, 2008), which could be achieved in different ways such as through the integration of consumer opinions with company comments (Hennig-Thurau & Walsh 2004) or by providing extra options to potential visitors (travel suggestions, free travel related services, etc.). All in all, higher online-marketing investments are urgently needed in order to further develop the e-WOM market in favour of both the demand and the supply (Harris Interactive & Fleishman, at: www.harrisinteractive.de [July 5, 2008]).

5.3 Limitations and further research

The first objective of this study was to test how often e-reviews are chosen for the booking of an accommodation in comparison with other sources of information. For this purpose we designed an experiment which replicated the Web environment. Although expected, the respondents of the sample showed a scarce knowledge of both e-reviews and travel platforms which could lead to a distortion in the evaluation of this source (Brown, Broderick, & Lee 2007). Another limitation concerns the third purpose of our study. In fact, the reduced variance of choice of the SEM indicates that other variables should also have been included in the model in order to better explain the behavioural variable. Finally, due to the convenience sample, the findings of this study should be treated as possible areas that need maintenance and/or improvement. Thus, further studies could attempt to replicate these results by a broader and representative group of respondents in order to better highlight the real potential of e-WOM.

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The Importance and Use of Weblogs for Backpackers

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Abstract

The term Web 2.0 is currently on everyone's lips and the phenomena and concepts surrounding the new interactive web also present the tourism industry with new challenges. Over the past years, weblogs have become firmly established, especially on the subject of travel. For backpackers in particular – according to the authors' hypothesis – weblogs could offer an attractive alternative to traditional information media because backpackers depend on ad-hoc information along with authentic reports from other travellers due to their relatively long travel times and often spontaneously chosen stopovers. This paper examines the question of how suitable weblogs are as an alternative source of information for backpackers, the associations that exist vis-à-vis the various blog typologies and to what extent these are already being used today.

Keywords: Backpacker, Weblog, Web 2.0, Travel Guides

1 Introduction

For a long time, the tourism industry neglected the market for young vacationers and students. Only in recent years have these companies begun to realise the true potential behind this segment. According to the European Travel Commission, around one fifth of all international tourists belongs to this group of guests. (ETC 2006 [onl.]; Richards/Wilson 2003, p. 6). As a sub-market, backpacking tourism is characterised by budget-conscious and flexible persons who primarily travel alone or in small groups, are often educateds and usually come from Western middle class families. (Scheyvens 2002, p. 145; Riley 1988, p. 313) Backpackers associate their wanderlust with concepts like freedom, independence and adventure. Many view this period as part of their education or as a rite-of-passage, marked by fun and independence, before assuming the role of the responsible "adult". (O'Reilly 2006, p. 998) However, this freedom requires a high level of flexibility. Depending on the situation and the travel circumstances, travel plans may change at a moment's notice. (Uriely et al. 2002, p. 522; 534) Consequently, a need arises for ad-hoc information on accommodations, means of transportation or activities at the respective destination. In the process, however, backpackers are often confronted with numerous obstacles. These primarily include linguistic and/or cultural barriers as well as the limited

availability of information media, all of which make the information and coordination process more difficult. (cf. Prestipino 2006 [onl.])

Backpackers have access to internal and external information, which they can absorb either consciously or unconsciously. (Jarvis 1994, p. 168; Crotts 2000, p. 149; Pikkemaat 2002, p. 25; Kim et al. 2007, p. 424) According to Jarvis (1994), backpackers first search for information internally (stories from friends, personal travel experiences, etc.) before they begin looking for external sources of information. The following sources of information are available to them during their travels:

- Offline media: Personal recommendations, travel guides, travel agencies, tourist information
- Online media: Travel websites and portals, weblogs, podcasts, communities/forums

In their study, Kain und King (2004, p. 207) examined the influence of individual sources of information on the decision to buy a variety of Australian backpacking products and services while travelling. This study showed that regardless of the product, personal recommendation (word-of-mouth advertising) plays the most important role for backpackers. Besides recommendations as the most popular source (Jarvis 1994, p. 96), travel guidebooks are also a primary source of information for backpackers once their journeys are underway. (Newlands 2004, p. 227; Prestipino 2006 [onl.]; Richards/Wilson 2004, p. 23)

The desire to hold on to the experiences and impressions gained comes naturally to the seasoned traveller (Axup 2006, p. 34), so privately run weblogs have also been enjoying increasing popularity within the backpacking community for a number of years. Generally, backpackers use one of the blogger services that are available free of charge (such as Blogger.com) in order to keep family, friends and acquaintances informed as well as to document their experiences.

2 Weblogs as a Media Format in Web 2.0

If the term Web 2.0 reached the “peak of inflated expectations” of the Gartner Hype Cycle in 2006, a year later it is already in the middle of the disillusionment stage. This is less due to the fact that the expectations placed on Web 2.0 were not fulfilled, and has much more to do with the fact that today the term represents a new self image and increased self-assurance on the part of the makers and users of the Internet. (Beck 2007, p. 5-17) In the broadest sense, the “interactive web” comprises Internet applications and platforms in which users become active voluntarily by creating their own content, managing and commenting on existing content and using their virtual presence for networking activities with other users. (Kilian et. al 2008, p. 3-22)

The now inflationary use of catch phrases surrounding the “interactive web” has also had an enormous impact on the tourism industry. This is not surprising as social activity and thus interaction and communication with members of a social system are

inherent to travel, making tourism especially suited for Web 2.0 approaches along the entire customer buying cycle. Web 2.0 is often used in conjunction with the term "Social Software" (SSW); in some cases authors even use the phrases synonymously. However, for the purpose of this discussion, Social Software is considered to be a subdivision of Web 2.0. Hippner (2006) defines Social Software as "web-based applications that facilitate the exchange of information, the establishment of relationships and communication for human beings in a social context and are guided by specific principles." Here, the focus lies less on the actual information and more on the structure that grows from linking the information together. SSW is based on the fundamental concept of self-organisation, whereby the individual or the group is the focal point and a social reaction (social feedback) is facilitated by means of social ratings (comments on weblogs, assigning points, etc.). (ibid)

The resounding success of SSW over the past years can be attributed in large part to weblogs. These are simple-to-create, up-to-date websites that consist of contributions presented in reverse chronological order. (cf. Przepiorka 2006, p. 14; Schmidt 2007, p. 13) Normally, weblogs combine text, images and links to other weblogs and/or websites. These electronic diaries have virtually no limits with regard to their content. They are used both in a tourism context as personal travel journals and journalist publications just as they are for internal and external business communications or as a tool for knowledge management or project management. (Picot/Fischer 2006, p. 3)

In the last few years the number of travel and tourism blogs within the blogosphere has risen dramatically. According to one study by Blogjungle, the topics "travel and tourism" are the most important blog topics among German Internet users. (Blogjungle.de 2007)

According to an international survey of bloggers, 73 percent of the blogs can be classified as "personal" (e.g. online diaries) and the remaining 27 percent as "non-personal" blogs (with a focus on specific topics and content that are generally targeted at a larger readership). (Koh et al. 2005)

From a communications-sociological perspective, customer-to-customer blogs (C2C blogs) focus primarily on self-presentation and identity management (Schmidt 2006, p. 70). Backpackers can reach a very large and specific audience with relatively little effort, while their objective is to present themselves in an authentic manner. In the case of weblogs, self-presentation and the identity construct derived from it make reference to the reader because readers are able to comment on articles, thereby giving the authors feedback on their own personal narrations. (ibid) In the case of online journals written by backpackers, readers tend to deem the content as trustworthy, since backpackers have similar personal interests and personalities and resemble one another in their temporary living conditions. News on accommodations, tour operators, destinations, means of transportation that are recommended or to be avoided are typical for travel blogs, along with a number of other topics. (Axup 2006 [onl.])

Corporate blogs or B2C blogs are an extraordinarily difficult subject (Bauhuber 2007, p. 4). The trouble lies in the controversial discussions on whether the corporate blogs can be considered a part of the blogosphere or not. Pivotal here is the fulfilment of the essential characteristics in question such as the authenticity and credibility of corporate blogs. (Alby 2007, p. 41) In practice, corporate blogs often exist in a blended form that consists of service blogs, product blogs, customer relationship blogs and crisis blogs, and are mainly used for image, discussion and information purposes (Röttger/Zielmann 2006, p. 39). Business are able to make tourism products and services popular through "web-based word-of-mouth advertising" (Du/Wagner 2006, p. 789) on the Internet and establish close customer relationships with backpackers.

Moreover, Welker (2006, p. 158) notes the obvious link between weblogs and journalism. The fact that postings are always written by an author, generally contain non-fictional content and often include a date – sometimes even with the name of a place – clearly demonstrates this connection. Since late 2006, the Lonely Planet Travel Guide, also known as "The Backpacker's Bible" (Axup 2006, p. 101; Richards/Wilson 2003, p. 20; Sørensen 2003, p. 860), has had its own "Travel Blog" on which 326 professional travel journalists post entries on over 173 countries (Piquepaille 2006 [onl.]).

Weblogs seem naturally suited as a media format for backpackers because they support simple location and time-independent creation of web content that can include both multimedia functionality and interaction with other users. But what significance do blogs actually have for backpackers during their travels and to what extent are weblogs used compared to traditional Internet pages (websites and portals) and offline sources of information (travel guides, personal recommendations, travel agencies)?

3 Methods

Backpackers are generally well educated and are thus highly skilled in using media like the Internet. It therefore seemed appropriate to develop an online survey for the test subjects to fill out (backpackers during their trips). The survey was placed on the homepages of Internet terminals in selected hostels so that backpackers who use the Internet in the hostel would be a part of the sample. The survey was created with "UCCASS" software and stored on a server. This enabled test subjects to complete the survey online during a specified period of time. Electronic data generation facilitated the export of the data into SPSS, where they were analysed.

While developing the survey, the authors used insight gained from Richards/Wilson (2003) who are considered to be pioneers in the field of backpacker typology. The semantic differential method was used to determine the associations with weblogs. Research results were lacking for the European backpacker market. This is why the authors interviewed selected experts for quality assurance purposes during the first phase in order to present realistic response options. In the selection of these experts, the authors made sure to take as many industry-related aspects as possible into

consideration (travel journalism, backpacker hostels, tour operators and backpackers). The authors enlisted the help of the editors of "Packed Magazine" in order to find suitable hostels where the online survey was conducted. The selection criteria included a high frequency of backpackers en route, the presence of an Internet terminal on site, willingness to cooperate without compensation and easy accessibility for the survey manager to perform control visits. Taking these criteria into consideration, the authors were able to find five hostels in Vienna willing to participate as partners in the study.

The preliminary questionnaire was then examined in a pre-test. Here, close attention was paid to the quality criteria, the intelligibility of the wording (Atteslander 2006, p. 277 et seq.; Burzan 2005, p. 106) along with the functionality (technical errors) (Welker et al. 2005, p. 97) of the online survey. The pre-test was conducted with a bug tracking software that enabled online communication between the programmers and test subjects. This made it possible to divide the error reports into various types (feature, usability, cross-browser ability, bugs). The final online survey was created as a result of this feedback. After the pre-test, the field time was set at a minimum of four and a maximum of ten minutes. This would prevent lurkers "clicking through" the survey. (Welker et al. 2005, p. 78)

Criticism of Methodology

Online surveys are often criticised due to the fact that they do not reach the majority of the population, but rather solely address active Internet users. It is extremely difficult to determine a statistical population dependent on the research question due to the expansive nature of the Internet. The statistical population (N) comprises all backpackers who use the Internet during their trip. Since no exact number can be determined, or rather the individual test subjects who belong to the population are not uniquely identifiable, a random sample was avoided in favour of an ad-hoc test in a predefined market.

The issue with ad-hoc tests is the problematic generalisation of the results (Bortz/Döring 2006, p. 401). In this project the sample was taken in five hostels in Vienna, where international backpackers were indeed present at the time the survey was conducted, but the results in this constellation were only possible under the prevailing conditions. The answers regarding the daily expenses at the holiday destination, e.g. in Southeast Asia or South America would vary significantly due to the much lower price levels, particularly with respect to the information included in the first part of the survey (Backpacking). The same applies to the length of stay. This is generally shorter in Europe than in backpacking destinations like Australia or New Zealand.

4 Results

According to the log file analysis conducted, 247 different visitors accessed the survey homepage during the survey period and 121 test subjects actually took part in

the survey. This yields a participation rate of 49 percent. The figure below illustrates the number of visitors during the survey period. It is evident that the number of visitors is higher on certain days. This can be attributed to the fact the survey manager asked the hostel directors to inform the backpackers about the survey when they checked in.

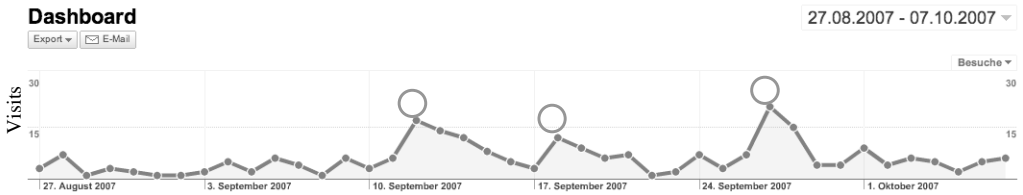


Fig. 1. Visitor statistics for the online survey

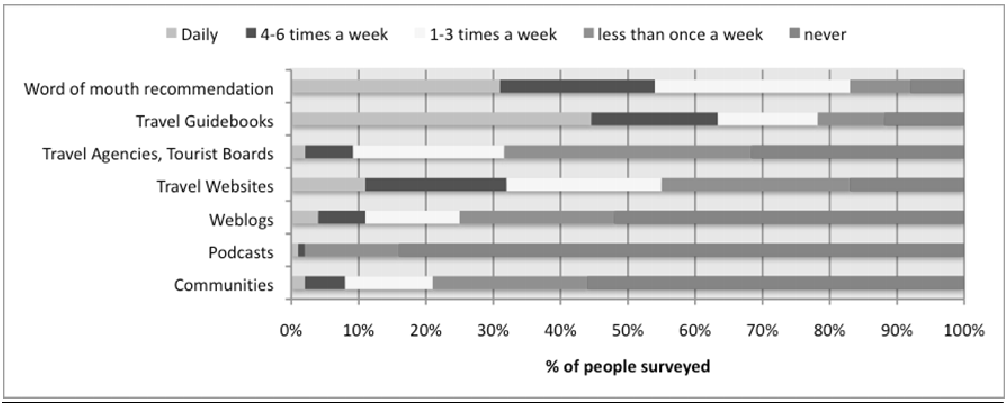
4.1 Sample Profile

An equal number of male and female subjects took part in the survey. The majority of those surveyed (55%) indicated that they are younger than 26 years of age and another 33 percent stated that they are between 26 and 30. The fact that only 12 percent of the backpackers are over 30 years old lends credibility to the assumption that backpackers represent a young type of vacationer. According to survey results, more than half (56%) have an academic degree and 13 percent of that number are post graduates. Almost a third (31%) of those surveyed come from Australia and New Zealand; together with backpackers from the USA (20%) and Canada (4%) they comprise the majority of backpackers in Austria. It is interesting to note the small number of backpackers from typical backpacker nations like Israel, Japan or South Korea. Almost a third of those surveyed (31%) take advantage of the individual and flexible travel route planning options available to them as single travellers. Almost half (49%) of those questioned travel in pairs, although this information gives no clues as to what the relationship between the two travel partners may be. Particularly noticeable here is the fact that women are more likely to travel in groups than men. Most test subjects travel for a period of 2 weeks to 3 months (47%); although even in Europe there are "long-term travellers" en route with their backpacks for periods exceeding one year (7%).

4.2 What Sources of Information do Backpackers Use?

To enquire into the frequency with which backpackers use the various sources of information during their travels, the authors used the classification presented by Prestipino (2006) as a guideline. This took into account three offline media sources and four online media sources.

To obtain information, backpackers mainly rely on word-of-mouth advertising (92%) and the classic travel guide in book form (88%). The widespread use of online media is clearly demonstrated by a usage rate of 83 percent for traditional travel websites and portals.



	Daily	4-6 times a week	1-3 times a week	less than once a week	never
Communities	2%	6%	13%	23%	56%
Podcasts	1%	1%	0%	14%	84%
Weblogs	4%	7%	14%	23%	52%
Travel Websites	11%	21%	23%	28%	17%
Travel Agencies, Tourist Boards	2%	7%	22%	36%	31%
Travel Guidebooks	45%	19%	15%	10%	12%
Word of mouth recommendation	31%	23%	29%	9%	8%

Fig. 2. The use of various information channels while travelling

Considering "new" media, almost half of the backpackers surveyed use weblogs (49%) and communities (44%). Even though these usage rates cannot compete with traditional information channels, this underscores the significance of new media nonetheless.

16 percent of the backpackers view podcasts, albeit rarely. The authors conclude that podcasts with improved content presentation will gain popularity – with the trend leading away from audio podcasts and towards video podcasts.

4.3 Awareness Level and Use of Weblogs

Among those surveyed, almost 59 percent indicated that they are familiar with weblogs; 83 percent are also avid users. Of these, another 56 percent are merely blog readers, 15 percent also comment on the entries they read and 17 percent indicated that they read blogs and also actively write their own weblog. The most active group – those that read, write and comment on blogs – comprises 12 percent of those surveyed.

4.4 Usage Frequency of Travel Guides and Weblogs in Comparison

Of the 121 backpackers surveyed, 45 percent use a travel guide to obtain information on a daily basis, while only 4 percent use a weblog to the same extent. The comparative use of the two forms is much more balanced when viewed from a weekly perspective. 34 percent of those surveyed use traditional travel guides on a weekly

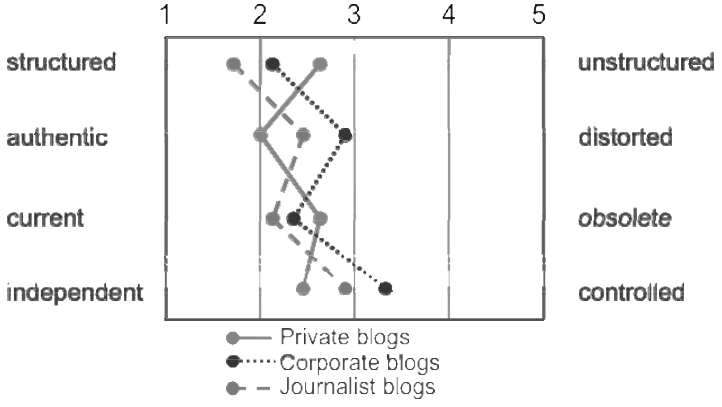
basis and 22 percent of the backpackers use a blog in the same period. Thus, with regard to usage, weblogs have been unable to compete with travel guidebooks.

4.5 How Suitable are Travel Guides and/or Weblogs for Current Information while Travelling?

To find the answer to this question, the random sample was divided into two groups. All 121 participants were able to comment on the suitability of the travel guide, whereas only 71 backpackers indicated that they were familiar with weblogs and were thus able to comment on them. Although weblogs are still very far behind the traditional travel guides with respect to usage frequency, weblogs are considered to be a suitable medium for the exchange of current information during a trip for the majority of those surveyed.

4.6 What Attributes do Backpackers Associate with Weblogs?

Various studies (cf. Axup 2006 [onl.]; Muenz 2007 [onl.]; Eck 2007, p. 30 et seq.) indicate that the current relevance, independence and authenticity of weblogs play a deciding role for users. In the survey, the associations of backpackers to various weblog typologies were polled on a scale of 1 to 5 using the semantic differential method. The survey differentiated between privately run online journals, corporate blogs and journalist blogs.



	Private Blogs	Corporate Blogs	Journalism Blogs	
structured	2,7	2,1	1,8	unstructured
authentic	2	2,9	2,4	distorted
current	2,7	2,3	2,1	obsolete
independent	2,4	3,3	2,9	controlled

Fig. 3. Associations of backpackers to various weblog typologies

In a direct comparison we notice that the privately run blogs are clearly ahead of the two other blog types when it comes to authenticity and independence. Conversely, backpackers associate journalist blogs and corporate blogs with more current

information and a more well-structured presentation of postings. The figure also illustrates that journalist blogs – when compared directly with corporate blogs – receive higher marks in every category.

5 Discussion and Outlook

The online survey conducted gives an initial rough estimate on the significance and relevance of weblogs for backpacking tourism. The insight gained should serve as a starting point for further research activities. In a second step, it might be possible to perform a qualitative content analysis of weblog entries in order to reach additional conclusions about the informational content of the postings. Weblogs contain – regardless of weblog typology – an expansive collection of information that is very suitable for content analyses. Data evaluation process therefore is planned in three phases: (1) Choice of "relevant" weblogs; (2) Profiling blog authors and blog readers; (3) Content analysis. Due to the fact that a manual execution is neither exact enough nor to manage in time, software is needed for this process. Waldhoer (2007, p. 114) introduces with "etBlogAnalysis" a program that is examining three scopes of common weblogs.

- Classification of blog entries with regard to different categories
- Analysis of the content with regard to positive, neutral an negative utterances
- Analysis of blogger characteristics

The current survey has demonstrated that traditional travel guides continue to be the most frequently used source of information for backpackers while travelling. The reason for the clear results in support of this medium lies in its excellent portability and, consequently, the instant availability of information. With a usage rate of 83 percent, travel websites and portals clearly demonstrate their now significant level of penetration. Almost half of the backpackers surveyed use weblogs and online communities, although there is still more potential to be tapped into here.

It is a well-known adage that travel is a learning experience. According to Pearce and Foster (2007, p. 1287), the educational value obtained through travelling is increased by reflecting on one's own experiences – for example, by writing an online diary (weblog). Enabled by more affordable and quicker transportation options, improved infrastructure facilities in backpacking destinations and the information made transparent and available worldwide thanks to ICT, backpacking trips are becoming increasingly popular. With the growing numbers of backpackers, the critical mass is also expanding rapidly in the relevant peer-to-peer networks in which backpackers exchange information with one another. It is therefore conceivable that in the future conventional travel guidebooks may begin to blend with portable electronic devices (notebook computers, mobile phones, PDAs, etc.) in order to provide the backpacker community with detailed information quickly and in real time. The content is created by like-minded backpackers who are already publishing the information of tomorrow today.

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The Effects of Virtual Product Experience on Changing Consumers' First Impression Bias

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Abstract

Recommendation agents have been seen as one of the most powerful Website marketing techniques due to their ability to facilitate consumers' online purchase decisions. However, in a modern society within which information is exchanged and transmitted quickly, it is quite often the case that consumers have already received product information from different sources before they browse recommendation agents' messages on the Website. That is, the first impression bias toward a specific product may already exist in the consumer's mind when they read the Website message that is trying to persuade them to buy that product. Is the message delivered by recommendation agents able to change such bias and achieve its intended benefit: persuading consumers to buy from the Website? By integrating the theory of first impression bias, the elaboration likelihood model and virtual product experience, this study has developed and empirically examined a research model proposing that the virtual product experience can improve the recommendation agents' argument quality and source credibility, by which consumers' first impression bias can be changed.

Keywords: recommendation agents; virtual product experience, impression bias

1 Introduction

The prosperous development of the Internet has led to a concurrent boost for E-commerce. Consumers have gradually shifted trade from traditional markets to virtual markets. However, in such an information-laden environment, because humans have limited capability to deal with information, it is not easy for them to find their required merchandise in the maze of complicated product details. In this situation, they need assistance from recommendation agents (RAs). Wang & Benbasat (2007) argued that in the E-commerce environment, RAs are regarded as a support tools to help consumers at each step of the decision-making process, helping them to negotiate the mass of product information and also improving the quality of decision-making and increasing their confidence in their decisions. In recent years, there has been a gradual increase in the amount of research pertaining to RAs (Ricci & Del Missier,

2004), and travel Websites have offered RAs in droves, e.g. Triplehop's TripMatcher (employed by www.ski-europe.com) and VacationCoach's expert advice platform (employed by travelocity.com), to help travellers to search or select products and provide customized services. Therefore, studies of RAs and related applications have become a popular topic in both academic and practical circles (Ricci, 2002).

The main purpose of RAs is to introduce users to products that are related to their interests and to make suggestions that reassure them as to whether a particular product meets their requirements (Wang & Benbasat, 2005). Nevertheless, if a successful RA merely emphasizes quite precise algorithms and does not take account of other factors, such as the interaction between users and the system, it will not be able to attract consumers and will not bring in additional value for the enterprise (Swearingen & Sinha, 2001; Xiao & Benbasat, 2007). There are currently numerous publications that discuss the factors that influence the attitudes or adoption conduct of RA users. However, the key premise of these studies runs counter to related research carried out under circumstances wherein consumers are not distracted by other information sources.

In the past, before consumers bought products, they would collect and process information related to these products. Because of the relative lack of communication channels, they could only obtain information from a limited number of sources. Nowadays, however, information is continually pouring from every channel, and the details provided by the various sources are often quite different. Therefore, when consumers want to make decisions, they are faced with ever more complicated sources of interference. Although using RAs can help them to save time in making decisions and solve the problem of information overload on the Internet, they are still faced with excessive numbers of information sources. Before viewing the recommendations provided by RAs, they have been prejudiced by first impressions of the recommended products, which means that other information sources have already interfered and generated first impression bias. If the information provided by RAs is inconsistent with other information sources, it will confuse the users and might make them suspicious of RAs. However, after reviewing the extant literature, there appears to be no study on what factors might change users' attitudes and reverse their first impression bias.

In an investigation of first impression bias, Lim et al. (2000) suggested that applying the properties of multimedia can decrease the effect of first impression bias. Hess et al. (2006) further claimed that the vividness of multimedia will influence the degree of involvement and the decision-making outcome of the support techniques. Therefore, the purpose of the present study is to understand what factors can change first impression bias. The study is based on the Elaboration Likelihood Model (ELM) and virtual product experience (VPE) and investigates whether they are able to effectively reverse the first impression bias of consumers so that when the consumers encounter the impact of recommendation, they will tend to adopt the suggestion offered by RAs.

2 Theoretical Background

2.1 First Impression Bias

Nowadays, the Internet has become an essential part of life and is also one of the main sources of travel information (Werthner & Ricci, 2004). There is a range of information sources on the Internet, from traditional sources such as other travellers (travellers' comments on the Websites such as tripadvisor.com) to individualized recommendations by RAs (West et al., 1999). Senecal & Nantel (2004) pointed out that sources of online recommendations would affect consumers' selection of the products. Thus, sources of recommendations are generally divided into three kinds: (1) other consumers, (2) experts, and (3) expert systems. It is assumed that these three different recommendation sources will affect consumers' selection of products to different degrees.

Although the assistance of RAs may save some decision-making time and go some way towards solving the problem of information overload, there are numerous information sources. Before seeing the RA's recommendations, travellers may be prejudiced by first impression bias on the recommended products. At this stage, if the recommended information provided by RAs is inconsistent with recommendations from other information sources, travellers will be confused and even suspicious. Asch (1946) proposed the concept of "First Impression Bias" in the field of information science. Asch asked subjects to form an impression of a person according to their individual qualities. Later, two sets of subjects were given one or other of the following lists of adjectives describing individual qualities and asked to choose one of them:

- Example 1: Intelligent, industrious, impulsive, critical, stubborn, and envious.

- Example 2: Envious, stubborn, critical, impulsive, industrious, and intelligent.

Example 1 lists two positive qualities (intelligent, industrious) first, followed by three qualities that could be either positive or negative (impulsive, critical, stubborn) and finally a negative quality (envious); Example 2 is the opposite. Afterwards, the subjects were asked to use 18 pairs of totally different characteristics. The result indicated that when subjects were given Example 1 (positive qualities first), their evaluations were far more positive than those of subjects who had been given Example 2 (negative qualities first). Therefore, Asch's study clearly demonstrates that the first information received will greatly affect judgment and indicates the natural qualities of human decision-making (Lim et al., 2000):

- People tend to make instant decisions on the basis of very little information. Although decision-makers might believe that their judgments are rational and unbiased, the fact remains that a judgment made on the basis of so little information has a great chance of being biased.

- People tend to hold strong views based on their first impressions and continue to judge the information they receive later according to these biases. If the information they receive later conforms to their first impression, this impression will be deepened; on the contrary, if it does not conform, then they will ignore this subsequent information and consider it as anomalous. Only after becoming aware that the majority of the information available is inconsistent with their first impressions will they begin to examine the accuracy of their first impression.

2.2 The Elaboration Likelihood Model

The "Elaboration Likelihood Model", developed by Petty et al. (1981), states that when people receive information in different situations, they will have different attitudes towards this information because of their own cognitions and the different levels of deliberation on that information, the effect of which will depend on the situation. ELM indicates that information will directly affect people's cognitions and behaviour. Specifically, ELM explains why a given influence process may generate diverse results across different users in a given usage setting (Bhattacherjee & Sanford, 2006). Therefore, it can be used to understand that when travellers accept the suggestion presented by RAs, ELM presumes that the different thoughts and levels of inference in response to the information provided will lead to different processing routes. Depending on which of these routes is taken, individual attitudes will also vary (Petty et al, 1981; 1986):

- Central route: One infers in detail the content of information and carefully considers the value and correlation of the argument, and further changes one's attitude. For example, travellers carefully evaluate the potential advantage of a travel destination, compare its quality and cost with other destinations and then make up the mind to visit that destination.

- Peripheral route: One expends less cognitive effort, does not think carefully about the content of the information and evaluates it only using simple decision-making principles, assuming that the information content is correct. For example, travellers may accept the recommendation message straight away and visit the destination without carefully evaluating the content and argument quality of the recommendation message.

In addition, Petty & Cacioppo (1986) proposed the following two propositions in respect to the use of the central route and the peripheral route. Proposition 1: Being able and motivated to process the information, a highly involved individual will analyze the information via the central route. Proposition 2: Lacking the motivation and ability to process the information, a less-involved individual will deal with the information via the peripheral route.

From the perspective of the above statement, the suggested routes of the two different processes of persuasion will cause different attitudes. The central route is claimed to be related to thoughtful understanding about the topic concerned. The factors

emphasized by this process include thoughtful comprehension of the arguments and assessment of the quality of those arguments. Another is the peripheral route, which mainly emphasizes clues such as credibility, attraction or authoritative sources to mold changes of attitudes and generate adoption demands (Petty et al., 1981).

Sussman & Siegal (2003) and Bhattacharjee & Stanford (2006) defined the central and peripheral routes of the Elaboration Likelihood separately, arguing that they depended respectively upon "Argument Quality" and "Source Credibility", as illustrated in figure 1.

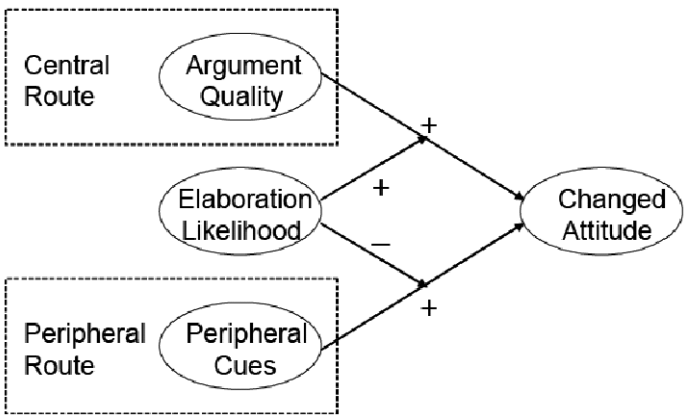

Fig. 1. Elaboration Likelihood Model

Sussman & Siegal (2003) adopted the ELM and integrated it with the Technology Acceptance Model (TAM) to investigate whether, when knowledge workers received information related to their work, they would regard it as useful to them and subsequently adopt this information. They found that two kinds of information would interfere with the process: the accepters' professional knowledge and their degrees of involvement. The result of the study indicated that if knowledge workers perceived the quality of the argument as high, this would positively and perceptibly affect them, leading them to perceive that the information was useful. Furthermore, if they perceived that the information sources were more credible, this would also positively affect their perceptions of the usefulness of the information, and higher perceptions of usefulness would also significantly affect their intentions to adopt the information.

Bhattacharjee & Stanford (2006) used the ELM to examine the acceptance of document management systems. Their study integrated the ELM with perceived usefulness and attitudes towards IT acceptance, plus one's motive (related to work) and ability (one's own expertise). The results indicated that both argument quality and source credibility would positively affect perceptions of usefulness and attitude, which would also significantly affect intentions to use IT.

Tam & Ho (2005) applied the ELM to investigate how to develop persuasion strategies through Web personalization and to study the interactive process between the Website and the consumers. They applied three kinds of persuasion strategies to

achieve the goal, including the level of preference matching, recommendation set size and sorting clues; they also set out to assess the effectiveness of three persuasion strategies through individual characteristics (different personal dispositions and need for cognition). The results indicated that at the stage of dealing with different information, differences in personal cognition effort led to the result that different persuasion strategies would lead to different processes of inference and further change one's attitude, generating adoption of personal services provided by the Website.

2.3 Multimedia Vividness

Multimedia means that users use tools such as computers and others as media to instantly display text, sound, video, graphics, etc. Basically, multimedia has the following two unique characteristics (Lim et al., 2000): Rich language and complementary cues. Steuer (1992) argued that vividness meant the abundance displayed by media, which could affect people's experiences of some techniques. The more vivid the media, the more information hints could be applied, including transmitting information through more sensory channels (video and audio, etc.) or applying high definition media such as pictures and animations to replace text to increase individual sensory experiences. Lim et al. (1992) concluded that multimedia information presentation could decrease users' first impression bias.

3 Research Model

Jiang & Benbasat (2005) used a virtual control technique to enable potential consumers to experience products virtually. They proposed the virtual control mechanism, a specific type of VPE implementation, and identified its two dimensions: visual control and functional control. Visual control helped consumers to understand the appearance of products by means that they could directly control to zoom in and zoom out of pictures of the products from various angles or distances in order to increase their sense of undergoing an experience. Functional control helped consumers to experience and explore the different functions of the products by way of pictures, animations, videos or sound. The results of the study indicated that both visual control and functional control could increase consumers' perceived diagnosticity on products. Integration of both controls could affect their perceived diagnosticity and flow.

The present study is based on the Elaboration Likelihood Model and proposes that VPE (i.e. virtual and function control) will promote consumers' perceptions of the argument quality of recommendation messages, and that applying VPE will also increase the source credibility of recommended messages and further reverse first impression bias, as well as increasing intentions to adopt RAs' suggestions (i.e. purchase intention). Therefore, the model for this study is as shown in Figure 2:

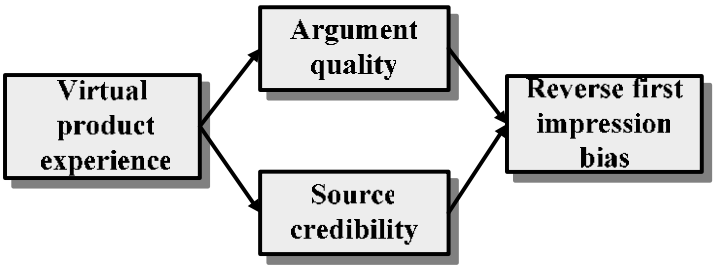

Fig. 2. Research Model

On the basis of the previous literature, this study proposes that presenting information by virtual control will increase the users' degree of understanding of the recommended content, decrease uncertainty and increase their involvement with the recommended content. Users with high involvement can also carefully think about the content without biased recognition. Therefore, we hypothesize that virtual product experience can increase the quality of the recommendation argument. Furthermore, virtual control can also increase users' level of experience of online products and will be beneficial to product evaluation. Thus, we hypothesize that the virtual product experience can increase the credibility of the source of the recommendation message. To sum up the above, we propose hypotheses 1 and 2:

- H1: Presenting recommended messages with virtual product experience will increase consumers' perceived argument quality.

- H2: Presenting recommended messages with virtual product experience will increase consumers' perceived source credibility.

ELM indicates that the diversity of the two routes will change individual attitudes, and attitude change, in this study, means the reversal of users' first impression bias. To sum up the above, we propose hypotheses 3 and 4:

- H3: The higher the degree of recognition of argument quality of the recommended messages, the greater the likelihood of reversal of consumers' first impression bias.

- H4: The higher the degree of source credibility of the recommended messages, the greater the likelihood of reversal of consumers' first impression bias.

4 Research Methodology

4.1 Subject and Experimental Design

A general non-tourism specific environment was chosen for this exploratory study to gain general results and future studies will be organized in a tourism-specific environment. Empirical data were collected via an online experiment in which the

subjects were asked to make a shopping decision. Forty students were recruited for this experiment. Most of them (82.5%) had prior online shopping experience. Among the respondents, 70% were male and 30% were female; 30%, 60%, and 10% were under 20, 21-25, and above 26 years old, respectively.

A Website entitled "ePhone.com" was developed exclusively for this study. Each subject was randomly assigned to either the experimental or the control group. Between these two groups, the virtual product experience was manipulated. Specifically, subjects within the control group could only see the recommendation message for the ASUS K2000i and the introduction to this mobile set. As well as these two types of information, subjects within the experimental group were also able to browse the virtual production experience function supported by ePhone.com.

Subjects were requested to perform a purchase task based on the shopping scenario outlined below: Jane has wanted a mobile phone for a while and next month is her 20th birthday. Jane's father would like to give her a birthday surprise and he happens to know that ASUS has recently launched the K2000i, which is only sold online by a well-known Website, ePhone.com. As he does not use the Internet, he has asked you to browse the product information about the K2000i at ePhone.com and tell him whether you think this mobile phone set is a good buy. However, before you browse ePhone.com, you have learned from friends that the connection quality, supporting functions and interface design of ASUS K20001 are no more than acceptable. They all rate this mobile phone as an 'okay' model.

4.2 Measurement

Argument quality was measured using a 7-point Likert scale adapted from Bhattacherjee & Sanford (2006). All four items in the original scale were employed. Source credibility was assessed using a 7-point Likert version of Bhattacherjee and Sanford's four-item scale. Finally, attitude was measured using Taylor and Todd's (1995) four-item semantic differential scale. The initial version of the scales was pre-tested for content validity by two professors, who served as expert judges. A pilot study was then carried out to examine the questionnaire.

5 Research Results

Table 1 presents the means and standard deviations of the investigated constructs. Multiple univariate analysis of variance (MANOVA) was applied to examine whether the VPE significantly affected argument quality and source credibility. The results indicated that the VPE has a significant effect on both argument quality and source credibility (Wilks' Lambda = 0.59, F=13.01, $p < 0.00$, power = 1.00). Thus, hypotheses 1 and 2 were supported. That is, presenting recommended messages with VPE will increase consumers' perceptions of argument quality and source credibility.

Table 1. Experimental results

Group	AQ[a]	SC	SAB	SAA
Control group	2.73 (1.13)	3.21 (1.07)	3.69 (0.95)	2.99 (1.54)
Experimental group	4.43 (0.99)	4.29 (1.04)	3.65 (0.75)	4.55 (1.07)

[a]Legend: AQ = Argument quality; SC = Source credibility; SAB = Shopping attitude (before measure); SAA = Shopping attitude (after measure).

The paired-samples t test was further employed to compare the mean scores for shopping attitude change ('before' and 'after' measures) for each group. The results showed that the subjects' shopping attitudes changed significantly in both control ($t=-2.342$, $p < 0.05$) and experimental groups ($t=2.651$, $p < 0.05$). As expected, the subjects' shopping attitude significantly increased in the experimental group. Interestingly, subjects' shopping attitudes decreased in the control group.

To examine hypotheses 3 and 4, a multiple regression model was developed to test whether argument quality and source credibility are useful predictors of first bias change:

- First bias change (i.e. shopping attitude change) = $\beta 0+\beta 1*$ argument quality $+\beta 2*$ source credibility

The model has a significant F ratio ($F(2, 37 = 3.8$, $p < 0.05$), indicating acceptable fit ($R^2 = 0.29$), and is statistically significant in explaining first bias change. The Beta coefficients ($\beta 1 = 0.473$, $p < 0.05$ and $\beta 2 = 0.26$, $p = 0.17$, respectively) indicate the relative importance of the independent variables in explaining first bias change. Thus, we find support for H3. However, H4 was not supported.

6 Implications and Limitations

Table 2 below summarized the hypotheses testing results of the experiment. This study has empirically confirmed that using virtual product experience to deliver a recommendation agent's message is able to significantly increase perceptions of argument quality and source credibility. However, only argument quality was found to significantly and positively reverse consumers' first impression bias. In other words, consumers tended to be persuaded via the central route while deliberating messages from the recommendation agent against the first impression bias. To verify this situation, an analysis of subjects' involvement levels was thus conducted with the original data collected from the experiment. The findings confirmed that consumers' involvement level was high when considering messages provided by the recommendation agent, with an average score of 5.12 on a 7-point Likert scale.

Table 2. Summary of hypotheses testing

Hypotheses		Testing result
1.	Presenting recommended messages with virtual product experience will increase consumers' perceived argument quality.	Supported
2.	Presenting recommended messages with virtual product experience will increase consumers' perceived source credibility.	Supported
3.	The higher the degree of recognition of argument quality of the recommended messages, the greater the likelihood of reversal of consumers' first impression bias.	Supported
4.	The higher the degree of source credibility of the recommended messages, the greater the likelihood of reversal of consumers' first impression bias.	Not supported

This study's findings were fruitful for the travel and tourism sector. For example, tourists may already have developed the impression bias towards specific travelling spot or hotel via different information sources before he/she browsed the recommendation message provided at the tourism Website. To change this bias and convince the tourists to accept the recommendation message, the virtual product experience function may be integrated into the recommendation agent so as to enhance tourists' perceived argument quality and source credibility. By doing so, not only the investment in building a RA can be fulfilled, but also the Website sales can be facilitated. This is a significant oversight, as the expected gains in efficiency, effectiveness or productivity of RAs on tourism Websites cannot be realized if the intended individual travellers do not consider the messages provided by RAs to realize their travelling needs in the first place. As in any other research, this study is not without its limitations. Considering the computer related products were the one of the most frequently purchased product that the university students, that are, this study's participants, to buy online, buying such products were chosen to be the experiment task. However, in the context that one consumer's online purchase decision making process may not vary greatly, the study's finding, that is, to facilitate tourists' online purchase intention via enhancing their perceptions towards the argument quality and source credibility of the RA, may still hold truth for customers' of the tourist Website. To deepen knowledge of how the virtual product experience on changing travellers' first impression bias, future studies could repeat our study in the travel sector and consider the special characteristics of the decision-making process in the tourism industry.

Being an exploratory study, a general non-tourism specific environment was chosen for this research. Base on the fruitful findings discussed above, future studies that extend this study's results to a tourism-specific environment are essential.

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Towards Risk Minimization for Novice Gamblers: A 'Not So Expert' System

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Abstract

Racing (thoroughbred, harness and greyhound) brings many visitors and economic and social benefits to regional areas in Australia. Many casual gamblers, however, have little knowledge of racing and of the fundamental rules that underpin its various forms (which, while reasonably consistent across both location and type, do differ in some respects). Thus, in this paper, we introduce a decision support system designed to assist and educate novice punters. A motive underpinning this research was a desire to produce a tool that might assist visitors wishing to experience the Australian provincial racing circuit to get the most out of their involvement.

Keywords: tourism activities; gambling; decision support systems (DSS).

1 Introduction

While gambling is *the* major tourist attraction for a few, select destinations (Las Vegas being the classic example), other locations depend upon the activity in important but less-obvious ways.

An interesting example is country (provincial/rural) racing in the Australian state of Victoria. In a recent report (CSES, 2006), the economic and social benefits of (thoroughbred) horse racing to various regions, covering the whole state were highlighted: specifically, it was estimated that total local expenditure (including gambling margin) at 53 racing clubs, over 417 race meetings was of the order $AUS500 million pa. When the impacts of multipliers and at least the same number of harness and dog race meetings are factored in, this figure rises to in excess of $AUS1 billion pa.

Also, in addition to increasing yield and smoothing visitor fluctuations, the racing industry contributes to the social life of regional communities in significant ways; such as providing opportunities for community gatherings and reunions, building community pride and social capital, destination showcasing and the development and maintenance of infrastructure and facilities that can be used for other purposes. The CSES report emphasizes that these social dimensions are critical to any holistic analysis of country racing in Victoria (and, indeed, every other state and territory in Australia).

The CSES report also focuses on the potential of country racing as a regional tourism attractor and, here, the target market is not so much racing followers per se but more 'general' tourists (local and international) wishing to experience a wider range of a region's attractions, culture and heritage. A difficulty with this is that many of these tourists are likely to be unaware of the fundamental probabilities, rules and realities that underpin racing. Thus, our aim in this research project is to develop a decision support system (DSS) that might be used to alleviate this problem to some extent or, at least, to guide inexperienced gamblers towards betting choices that limit their potential losses. More specifically, we have adopted the 'not so expert' system concept proposed by Debenham (1985) over 20 years ago.

For reasons identified later in the paper, we have chosen the greyhound racing domain and we demonstrate that, within fairly prescribed guidelines, our system performs at least as well as recognized experts in predicting race winners and place-getters. We believe that it has the potential to enhance the experience of visitors wishing to share the many pleasures that the provincial racing circuit in Australia has to offer – particularly visitors with little punting knowledge. That, in turn, can only benefit regional tourism in Australia.

Our paper is organized as follows: background to our study is presented in the following section and this is followed by a brief introduction to the research design. Data analysis is presented in Section 4 and this is followed by a section dealing with system validation and the development of preliminary betting guidelines. The final section contains a discussion and concluding remarks.

2 Background: Technical Approach and Problem Domain

Our DSS is based upon artificial intelligence (AI) and data mining principles and technologies.

Despite some notable successes, many early AI (and, particularly, expert system) projects were perceived as failures. Common problems identified by Luger (2005) included: i) difficulties in capturing 'deep' problem domain knowledge; ii) a lack of robustness and flexibility; iii) poor explanations of how solutions were arrived at; iv) limited means of solution verification; and v) little learning from experience.

Beemer and Gregg (2008) suggest that (partly as a response to this) expert systems have now evolved into *advisory* systems. They distinguish this newer breed of intelligent systems by: their ability to cope with unstructured knowledge and uncertainty; the use of case-based reasoning (CBR) in lieu of the more traditional rule-based approach; support for iterative decision-making and environment monitoring; and the ability to cope more effectively with problem context. In particular, they claim that, whereas expert systems tend to focus on a narrow domain and present the user with a recommended course of action, advisory systems gradually (i.e. iteratively) guide the user towards a range of acceptable options and leave the ultimate decision up to the end-user.

While one might accept this prescription-advice distinction, we are inclined to the view that the other advisory systems distinguishing features detailed above apply just as much to expert systems. Moreover, differentiating the two system categories in this way tends to downplay the significance of many important, early AI research contributions and, perhaps more unfortunately, reinforce the view (all too common in the IT industry) that for something to be worthwhile it must be recent. (It is worth noting that (for example) Ross Quinlan's pioneering work on reasoning with uncertainty was first published in 1983 and foundational work on CBR by Schank, Minsky and others dates back to the early-1970s (Minsky, 1975; Rieger, 1975).)

Nevertheless, it is now generally accepted that applications which satisfy Beemer and Gregg's (op. cit) criteria for advisory systems may lay a greater claim to the label, 'intelligent', than those that do not. Consequently, over the past 20 years or so, considerable advances have been made in fields such as fuzzy logic (Cox and O'Hagan, 1999) neural networks (Rojas, 1996) and various approaches to automated learning (Segaran, 2007). In particular, many of these methods and technologies have found their way into the various data mining (Berson et al., 1999) software packages now used by organizations to gain competitive advantage through 'business intelligence' (Davenport and Harris, 2007).

One interesting result of the integration of these technologies into expert systems, however, is that more recent applications have become increasingly sophisticated and complex. A downside to this, of course, is that these systems are more costly to build and maintain. Over 20 years ago, however, Debenham (1985) proposed the idea of the 'not so expert' system, a concept which was, effectively, an instance of the 80:20 applications development rule - where 80% of the functionality might be developed with only 20% of the total effort required (Abdel-Hamid and Madnick, 1991: 197-202).

This, essentially, is the approach we have taken here. Specifically, we have simplified a problem domain containing over 30 relevant variables to one with less than 10. We have, however, made extensive use of the technological advances discussed above; in particular, in the areas of rule-based development, data mining, CBR and reasoning with uncertainty.

As noted earlier, the problem domain was greyhound racing and, more specifically, meetings conducted in the state of Victoria, Australia. The major objective of the system is to predict race winners and place-getters. Some of the key variables and dependencies between them are indicated in the causal-loop diagram (CLD) presented in Figure 1. (Note that in CLDs a '+' annotation indicates that the two variables (i.e. the cause and effect variables at either end of an arrow) move in the same direction, while a '-' annotation means that they move in opposite directions. Here, some care should be taken with *tip, posn* and *quote* variables as, generally speaking, the lower these are, the better.)

Over the years, much research has been conducted into intelligent forecasting and decision support systems (DSS) in finance (for recent examples, see: Kim, 2004; Lee,

2004; and Tsang et al., 2004). Several researchers (for example Asch et al., 1984; Hausch and Ziemba, 1985; and de la Maza, 1989) have noted very strong similarities between financial and horse racing forecasting and, indeed, Tsang and his colleagues (Tsang et al., 1998; and Tsang et al., 2004) have applied their *EDDIE* system (based on genetic algorithms) to both domains with considerable success. Much less attention, however, has been devoted to applications of intelligent systems in greyhound racing per se (for an exception, see Chen et al., 1994).

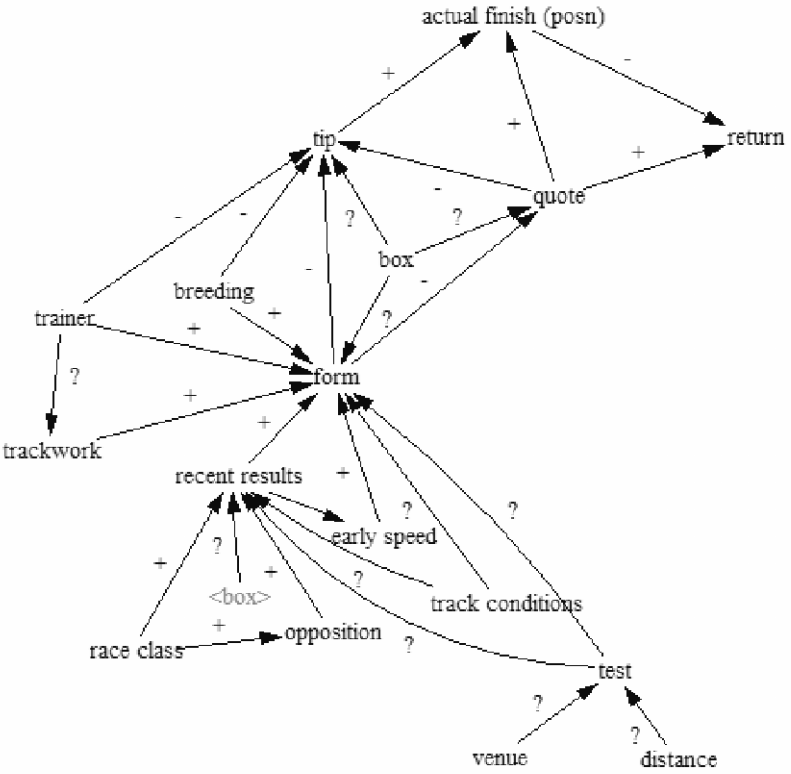

Fig. 1. Greyhound racing: Some key variables and dependencies

Obviously though, there are very strong parallels between horse and greyhound racing: for example, form, odds and experts' tips are very important when making selections; there is exactly the same trade-off between odds (quotes) and returns; and breeding, trainers' records, track conditions and the match between the object race and a dog's record over that test (venue and distance) are all vital factors in predicting outcomes. However, there are significant differences between the two domains: specifically: i) the greyhound racing domain seems to be somewhat more predictable; ii) win and place returns are generally lower with the dogs; iii) with eight runners in every race, greyhound racing is more standardized; and, perhaps, most importantly iv) a dog's starting box appears to be very important.

McNatton (1994) has emphasised just how complex the racing domain is and the importance of obtaining expert input when developing intelligent prediction systems in this domain. In addition, Tsang et al. (1998) have noted that data input is extremely laborious. Genuine expert input is very difficult to obtain and, with very limited resources available for data entry, we found ourselves pretty-much forced to adopt Debenham's (op. cit) 'moderately expert' approach (noted earlier) and restrict our analysis to the following variables: *test, box, quote, tip, position* and *return. Form* is obviously critical and, from Figure 1, it can be seen that it is also quite complex. Our alternative was to use a particular expert's tips as a surrogate for this variable. Specifically, we used a tipster called the 'Watchdog', whose tips for all meetings appear daily in the Melbourne Herald-Sun.

To conclude this section, we should briefly note that our DSS is currently implemented as a stand-alone Windows Prolog prototype. For the future, our aim is to partner with some tourism and/or racing industry party and to deliver the final application via a combination of Web and cell phone technology. The latter is required so that tourists/punters can receive up-to-date information (e.g. tips and ratings updates) on-course, while the complete Web-based version will contain a comprehensive help and educational facility (which intended users may interact with before or after actual race meetings at their leisure).

3 Research Approach

This research was, essentially, exploratory in nature. The questions addressed were:

Q1: To what extent can modern artificial intelligence (AI) techniques be used to provide useful advice to novices in a complex and uncertain domain (specifically, greyhound racing)?

Q2: Can a substantially-simplified DSS, constructed using these techniques, produce reasonable results (with the consequent benefit of reduced effort – in both DSS construction and operation)?

The AI technologies employed were rule-based expert systems, CBR, data mining and fuzzy logic. A number of other AI technologies, such as machine learning systems based on neural networks and genetic algorithms (Carbonell et al., 1983), were considered for use but rejected because of the substantial increases in complexity and effort this would have entailed (see *Q2* above). The greyhound racing domain chosen was introduced in the previous section and further detail is provided in the next and subsequent sections.

The beauty of the domain used is, of course, that while the prediction process itself is highly-uncertain, outcomes are absolute: i.e. a dog either wins and/or places or it doesn't! Moreover, outcomes are (potentially) available within a few minutes of predictions being made. Finally, the key indicator of experimental outcomes is again absolute: i.e. the amount of money won or lost.

Our experiment consisted of the following two stages:

1. A 'training database', constructed from 600 tips (involving 200 races) made by our chosen expert tipster was assembled between 4/2-8/3/2008. This database was analysed as detailed in the following section, resulting in the induction of four betting guidelines.

2. The four guidelines were then applied to a 'test database' of a further 1404 tips (468) races made by our expert, constructed between 11/3-31/5/2008. Profit and loss figures from this activity were calculated and analysed as discussed in the penultimate section.

It should be noted that, while our research appears to have produced some very-interesting results, these are preliminary at this point. In particular, substantial additional analysis will be required to validate tentative conclusions drawn from the initial application of our induced betting guidelines. On the other hand, we suspect that, in part at least, external validity may be strong: i.e. we see no reason why our results should not be applied to greyhound racing in other Australian states and, indeed, internationally.

4 Data Analysis: Training Database

As noted previously, rules, CBR and fuzzy logic play important roles within our DSS. However, because of space constraints, we shall focus here on data mining and its outputs.

Rule induction systems are probably the most common form of data mining application (Shalfield, 2004). While CBR is fundamentally concerned with prediction, rule induction involves searching a database for 'interesting patterns' – which may then be expressed in the form: *antecedents* → *consequent.*

Results of one such search (undertaken using *Win-Prolog's Data Mining* toolkit (Shalfield, 2004)) are presented in Table 1. We are concerned here with the relationship between tips and boxes (antecedents) and results where there is a place payout (consequent).

Table 1. Data mining – tips, boxes and place results

Measure	Tip = 1 Box = 1	Tip = 1 Box = 2	Tip = 1 Box = 1 or 2	Tip = 1 Box = 1,---,8
Base	201	201	201	201
Condnl	43	33	76	201
Hits	29	21	50	121
Accuracy	67.44	63.64	65.79	60.2
Coverage	21.39	16.42	37.81	100

Although the training database contains 603 *result* table entries, the *base* is actually 201 (because there are 603/3 (=201) races, with one tip each for places 1, 2 and 3 per race). Looking at the first column, there are 43 instances where a dog racing from box 1 was tipped to finish first and this is the *conditional count (condnl)*. Of these, 29 actually placed and this is the *hit count (hits). Accuracy* is *(hits/condnl).100* and, in this case, is 67.44%. *Coverage* is defined as *(condnl/base).100* and is 21.39% in our example. Accuracy is concerned with the extent to which one can rely on an induced rule and coverage deals with the extent to which a rule applies. There is a trade-off between accuracy and coverage and that is evident to some extent in Table 1.

In addition to starting boxes and tips, we have discussed a number of other factors that have in impact on whether a dog will win or place. We might summise that one of the most important of these is quoted odds and results of a data mining exploration focussed on the *quote* → *PayPlace* relationship are presented in Table 2. (Note that tips are also a factor in this exploration as we have restricted analysis to cases where the tip is 1.)

In Table 2, the trade-off between accuracy and coverage is demonstrated much more clearly. Where the quote is $2.00 or less (column 1), accuracy is a very impressive 82.35% but this applies to only 8.46% of the base. If we then move the quote boundary out to $3.00 (column 2), accuracy drops but coverage improves substantially. That is, the cumulative statistics indicate that, with the odds limit at $3.00, we can now only expect a return in 65.43% of cases. On the other hand, we now have the option of betting in over 40% of races. This trend continues through columns 3 and 4.

Table 2. Data mining – quotes and place results

	Quote			
Measure	**0 - 2.00**	**2.01 - 3.00**	**3.01 - 4.00**	**4.01+**
Base	201	201	201	201
Condnl	17	64	89	31
Hits	14	39	47	11
Accuracy	82.35	60.94	52.8	35.48
Coverage	8.46	31.84	44.28	15.42
Cumulative:				
Condnl	17	81	170	201
Hits	14	53	100	111
Accuracy	82.35	65.43	58.82	55.22
Coverage	8.46	40.3	84.6	100

In this preliminary research, we have concentrated mainly on place (rather than win) payouts. In addition to the impacts of tips, boxes and quotes on *PayPlace,* we also explored the effects of tests (broken down into venues and distances) and various combinations of all parameters. Space does not permit the presentation of all these results here but the more-critical relationships discovered were used to instantiate uncertainty factor parameters in our prediction engine. We now turn our attention to validation activity.

5 Validation and Preliminary Betting Guidelines

The training database contains some 600 cases (tips/predictions) involving 200 races. Complete results of the analysis of the testing database are presented in Table 3.

Table 3. Test database – analysis results summary

Quote	BoxAdv	Tip	Cases	Wins	AvWin	Places	AvPlace	Outlay	WTotal	PTotal
0-2.00	+	1	10	6	1.48	8	1.16	10.00	8.88	9.28
0-2.00	+	2-3	0	0	0.00	0	0.00	0.00	0.00	0.00
0-2.00	0	1	39	23	2.15	31	1.27	39.00	49.45	39.37
0-2.00	0	2-3	6	2	2.45	3	1.15	6.00	4.90	3.45
0-2.00	-	1	3	2	2.95	3	1.40	3.00	5.90	4.20
0-2.00	-	2-3	0	0	0.00	0	0.00	0.00	0.00	0.00
Group Totals			58	33		45		58.00	69.13	56.30
Pct				56.90		77.59				
2.01-3.00	+	1	47	17	2.48	35	1.37	47.00	42.16	47.95
2.01-3.00	+	2-3	27	13	2.93	17	1.45	27.00	38.09	24.65
2.01-3.00	0	1	162	59	2.81	109	1.47	162.00	165.79	160.23
2.01-3.00	0	2-3	82	21	3.58	46	1.54	82.00	75.18	70.84
2.01-3.00	-	1	13	6	2.67	9	1.41	13.00	16.02	12.69
2.01-3.00	-	2-3	4	0	0.00	2	1.65	4.00	0.00	3.30
Group Totals			335	116		218		335.00	337.24	319.66
Pct				34.63		65.07				
3.01-4.00	+	1	17	7	2.70	14	1.35	17.00	18.90	18.90
3.01-4.00	+	2-3	25	3	2.73	10	1.41	25.00	8.19	14.10
3.01-4.00	0	1	60	11	3.65	39	1.70	60.00	40.15	66.30
3.01-4.00	0	2-3	118	21	3.76	68	1.63	118.00	78.96	110.84
3.01-4.00	-	1	0	0	0.00	0	0.00	0.00	0.00	0.00
3.01-4.00	-	2-3	5	2	4.10	5	1.70	5.00	8.20	8.50
Group Totals			225	44		136		225.00	154.40	218.64
Pct				19.56		60.44				
4.00+	+	1	16	2	3.15	8	1.61	16.00	6.30	12.88
4.00+	+	2-3	90	13	6.35	41	1.95	90.00	82.55	79.95
4.00+	0	1	67	11	4.67	31	1.95	67.00	51.37	60.45
4.00+	0	2-3	480	58	6.92	210	2.03	480.00	401.36	426.30
4.00+	-	1	2	0	0.00	1	1.80	2.00	0.00	1.80
4.00+	-	2-3	50	4	9.65	18	2.21	50.00	38.60	39.78
Group Totals			705	88		309		705.00	580.18	621.16
Pct				12.48		43.83				
Totals			1323	281		708		1323	1140.95	1215.76

Analysis of the training database was covered in the previous section and this resulted in a number of conclusions, presented below as tentative guidelines:

G1: If the quoted odds are in the 0-2.00 range, bet for a win.

G2: If the quote is in the 0-3.00 range and tip = 1, bet for a win and place.

G3: If the quote is in the range 3.01-4.00 and tip =1, bet for a place only.

G4: If the quote is greater than 4.00, don't bet.

Essentially, this data represents the view (and performance) of our expert tipster and, in summary: i) of the 1323 tips, 281 were winners (21.24%) and 708 managed a place (53.51%); and ii) the overall ROI was 86.24% for a win and 91.90% for a place. Interestingly, our expert's performance compares very favourably with the panel of three tipsters employed by Chen et al. (1994) in testing their *ID3* system: specifically, their win bet ROI was only 65.0%.

Results of the application of guidelines *G1-G4* to our test database are presented in Table 4.

Table 4. Guideline application results summary

Guideline	Cases	Wins	Win%	Places	Place%	Outlay	WTotal	PTotal
G1	58	33	56.90	*45*	*77.59*	58.00	69.13	*56.30*
G2	274	113	41.24	195	71.17	274.00	288.20	271.72
G3	77	*18*	*23.38*	53	68.83	77.00	*59.05*	85.20
G4	*705*	*88*	*12.48*	*309*	*43.83*	*705.00*	*580.18*	*621.16*
Actual Bets Only	409		98	248		683.00	357.33	356.92

Note: Italics indicate bets not place and where hypothetical data is provided for information only.

With respect to guideline *G1,* betting for a win only where the quote is in the $0-2.00 range, yields a return of $69.13 on a $58.00 outlay (ROI = 119.19%). This indicates that the strategy shows promise but, since only 4.38% of betting possibilities are within this quote range, it can only be applied rarely. It is also interesting that, even with very low average returns, place betting would result in an ROI of 97.07% (with a very high success rate of 77.59%). Obviously though, with so very few cases to work with, considerable care should be taken in basing any major investment decisions on this limited set of results.

On the other hand, guideline *G2* can be applied in 332 cases (25.09%). Here, win and place betting yields ROIs of 105.18% and 99.17% respectively, an overall return of 102.18%. Moreover, referring to Table 4, it appears that win and place betting on tips 2 and 3 might also be appropriate in this range provided the dog has a box advantage. Again, however, further data is required.

With guideline *G3,* place betting on dogs tipped to win in the $3.01-4.00 range yields an ROI of 110.65%, suggesting the strategy has promise. As with *G1,* coverage here is low (77 out of 1,323 cases = 5.82%). Table 4 suggests though, that betting for a win in this range where there is a box advantage (and tip = 1) might also be worth further investigation.

Finally, our tentative suggestion that betting of any sort should be avoided where the quote is over $4.00 (guideline *G4)* appears sound, as the ROIs in this range are 82.30% for a win and 88.11% for a place. The downside is that 705 cases (53.29%) are covered by this guideline, a significant negative if a punter is betting principally

for enjoyment and entertainment. It might also be worthwhile undertaking a finer-grained analysis of results within this range.

6 Discussion and Conclusion

Returning now to the research questions presented earlier, it would appear that our results do, indeed, suggest that modern AI techniques can be used to good advantage in complex decision making – at least, in the domain investigated. Specifically, application of our four induced betting guidelines yielded an overall return of $714.25 for a $683.00 outlay (ROI = 104.58%). This is substantially better than Chen et al. (1994) achieved with their *ID3* system and, in addition, is better than the performance of the expert tipster we employed as a surrogate for form (32.65% of winners tipped for an ROI of 90.86%).

Moreover, adopting this tactic (i.e. using a surrogate for *form* – and all the factors that impact on that variable) did enable us to greatly simplify the design, construction and use of our DSS. Notably, the intensional component of our knowledge base was reduced to a few simple rules and some accompanying *Prolog* code (used principally for calculation and list manipulation). Most of the complexity encountered during our study was in the rule induction process (conducted, primarily, as a data mining exercise) and most of the (hard-slog) work involved was in constructing the extensional component of the knowledge base (mostly routine data entry of key pre-race data and post-race results). Thus, the tentative answer to research question *Q2* is 'yes': i.e. a 'not so expert' system may well be able to provide good and useful advice in a complex and uncertain domain. In effect, of course, our approach has been to build upon the distillation of a specific expert's output without looking into the detail too much (a 'black box' approach in fact).

Much remains to be done however. Firstly, substantial extra data needs to be gathered and analysed in order to confirm the veracity of our guidelines and to explore the potential of additional observations made during testing. Secondly, there appears to be great scope for the application of alternative betting strategies (particularly those based on sequence betting) and it should be possible to do this without much additional data entry and maintenance costs.

Further issues which need to be addressed include:

- *Technical aspects:* Conversion of the current prototype to a Web-based production application (as discussed earlier).

- *Business model:* State governments, destination managers, tourism authorities, race clubs and peak racing bodies may all be interested in the system. All have a vested interest in enhancing the regional tourism experience and the racing industry could perhaps use it as a business attractor.

- *Technology adoption and diffusion:* If the DSS is to perform its intended role, it needs to educate its users. This should be an automatic by-product of

system usage and must be implemented in such a way that the DSS is 'fun' and entertaining to use.

All these issues will be addressed in subsequent stages of this research.

Finally, we should address the important social issue of 'problem gambling'. Difficulties experienced by problem gamblers include: poor work performance/study performance; unemployment; debts/bankruptcy; loss of housing, poorer nutrition, poorer hygiene; an increase in criminal related offences (especially domestic violence); health related problems; high rates of divorce/separation; increased sexual risk-taking behaviours; high rates of suicide ideation or suicide; high levels of co-morbidity with substance/drug abuse; and high levels of co-morbidity with psychological disorders (Neal et al., 2005: 43-44).

Many underlying causes of problem gambling have been proposed (see e.g. Alessy and Petry, 2003) but it would appear that ignorance (of both fundamental probability theory and the rules and the realities that underpin specific gaming opportunities) is a significant factor (Safe Gaming, 2005). Thus, we were tempted to conclude that our DSS could, perhaps, assist in alleviating problem gambling. The likelihood, however, is that if it does its job as intended, it might only serve to exacerbate the problem.

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Acknowledgement

I would like to gratefully acknowledge Henk Meijerink for his assistance with the development of our initial prototype.

Building an Ontology-Based Framework for Tourism Recommendation Services

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Abstract

The tourism product has an intangible nature in that customers cannot physically evaluate the services on offer until practically experienced. This makes having access to credible and authentic information about tourism products before the actual experience very valuable. An Ontology being a formal, explicit specification of concepts of a domain provides a viable platform for the development of credible knowledge-based tourism information services. In this paper, we present an approach aimed at enabling assorted intelligent recommendations services in tourism support systems using ontologies. A suite of tourism ontologies was developed and engaged to enable a prototypical e-tourism system with various knowledge-based recommendation capabilities. A usability evaluation of the system yields encouraging results as a demonstration of the viability of our approach.

Keywords*:* Tourism, Recommendation, Ontology, e-Tourism Services, Semantic Web, Knowledge-based Recommender Systems

1 Introduction

The tourism product has an intangible nature in that a prospective traveller cannot touch the product before the trip. This is one major reason why information about tourism and travel services (e.g. destination, hotel, restaurants, events, transportation etc.) must be accurate and credible, one that fosters users' confidence. One way to achieve this level of credibility is to engage knowledge representation formalisms that can sufficiently capture all relevant facts about tourism objects in a domain on which approaches to rendering tourism information services can be based. An ideal approach to achieve this is the use of ontologies which provide the platform on which recommendation formalisms that exploit deep knowledge of the user, tourism objects, and other relevant contextual information that closely model reality can be built.

An ontology is a formal explicit specification of a shared conceptualisation of a domain (Noy and Hafner, 1997). *Conceptualisation* entails the use of abstract models to depict what is understood about entities in a domain of interest. *Explicit* means that

the concepts used and the constraints on them are clearly defined while *formal* means that entities in the ontology are represented in full or semi-machine processable form. Also, the fact that it is shared means that the knowledge captured in the ontology is mutually agreeable to a group of people. This typifies an ontology as a deliberate semantic description of what is generally known about some real world phenomena in a domain of interest using concepts and relationship abstractions in a way that is readable by both man and machine. An ontology defines a vocabulary that encapsulates the body of knowledge for a particular domain thereby providing a platform for effective communication and knowledge sharing among stakeholders.

The use of ontologies has the potential to solve a number of problems in tourism. First, the fact that it allows the sharing of domain knowledge using a common vocabulary across heterogeneous platforms means it can be used to solve interoperability problems (Dell'Erba et al., 2002). Secondly, ontology enables the sharing of common understanding of the structure of information among people and software agents (Noy and McGuinness, 2003); this also can help to standardize business models, business processes and knowledge architectures in tourism. Thirdly, ontology serves as a model of knowledge representation from which knowledge bases that describes specific situations can be built. These reasons motivated our decision to develop a suite of tourism-related ontologies for the geographic context of Nigerian tourism. This is premised on our belief that an ontology-based framework that enables the leveraging of factual knowledge about a specific tourism context for recommendations has potentially high tendency to enhance the quality and credibility of tourism recommendation services for such a context.

Knowledge-based recommender systems though sometimes regarded as being fundamentally content-based systems are a class of recommender systems that exploit deep knowledge about the product domain in order to determine recommendations (Burke, 2000). They make use of knowledge about users and products to generate a recommendation and reasoning about what products meet the user's requirements. A knowledge-based recommender system avoids the problem of sparsity associated with both Content-Based Filtering and Collaborative Filtering systems (Sarwar et al., 2001). The recommendations of knowledge-based recommender systems do not depend on a base of user ratings. It does not have to gather information about a particular user because its judgements are independent of individual tastes. These characteristics make knowledge-based recommenders very valuable systems when used independently and also when used to complement other types of recommender systems (Burke, 2000). The usual concern about knowledge-based recommender systems is the expensive nature of knowledge engineering endeavours which makes the systems more costly to implement. However, to the contrary, relying on our experience we argue that the cost is not prohibitive, in particular when the currently available tool-support for knowledge engineering is used to maximum advantage (Farquhar et al., 1997; Knublauch et al., 2003, Fernández et al., 2006). Also, in the context of the focus of this paper, the fact that the features of the tourism product in a particular domain are well-known significantly minimizes the cost of knowledge acquisition which is a core activity of knowledge engineering. Moreover, the potential gain in the credibility of recommendations that can be realized will more than

sufficiently justify any effort expended on knowledge engineering. In this paper, an ontology-based architectural framework that enables the generation of various knowledge-based recommendations is presented. As a demonstration, two OWL knowledge representation ontologies were developed to enable a prototypical national e-tourism platform with destination and accommodation recommendation capabilities. A usability evaluation of the prototype system with selected users was undertaken to confirm the viability of the approach.

The rest of this paper is organized as follows. In Section 2, we present a review of related work. Section 3 gives a detailed description of the procedures engaged in ontology development. Section 4 presents an overview of our ontology-based framework, prototype e-tourism system developed and the result of its usability evaluation. The paper is concluded in Section 5 with a brief note.

2 Related Work

In (Henrikson, 2005) the profile of some ontology-based EU projects that were aimed at enabling semantic web capabilities and semantic interoperability between e-tourism services and resources were given. These include the following: The HARMONISE project (Dell'Erba et al., 2002), which is a prominent ontology-based solution for the interoperability problems in the European travel and tourism market. The Harmonise project is aimed at providing a knowledge sharing and ontology mediation platform for the diverse e-commerce applications within the European e-tourism market sphere. The ontology used focussed specifically on the events and accommodation sub-domains of tourism. HI-TOUCH (Hi-touch, 2003) is the acronym for E-organisational metHodology and tools for Intra-European sustainable Tourism. The aim of the Hi-Touch project is to develop software tools to be used by travel agency sales assistants for providing a tourist prospect with the best-adapted offer. The developed tools leverage ontological databases and semantic descriptors, and multi-lingual thesaurus to deliver their functionalities. SATINE (www.srdc.metu.edu.tr/ webpage/projects/satine/ [July 7, 2008]) is an acronym for Semantic-based Interoperability Infrastructure for Integrating Web Service Platforms to Peer-to-Peer Networks. The ongoing project will be used to create a semantic based infrastructure that will enable the Web Services on well-established service registries like UDDI or ebXML to seamlessly interoperate with Web Services on P2P Networks. Relevant travel ontologies will be developed and the semantics of the Web Services will be based on standard specifications like the one produced by Open Travel Alliance. The semantic infrastructure will be used to develop an innovative business pilot application in the tourism industry. IM@GINE IT (Moraitis et al., 2005) is the acronym for Intelligent Mobility AGents, Advanced Positioning and Mapping Technologies INtEgration Interoperable MulTimodal, location based services. The IM@GINE IT project aimed at developing one and single access point, through which the end user can obtain location-based, intermodal transport information, mapping and routing, navigation and other related ubiquitous services in Europe, at anytime, and in a personalized way. The technology relied on a common transport and tourism ontologies.

Examples of knowledge-based recommender systems that have been reported in literature include: The PersonalLogic recommender system that offers a dialog that effectively walks the user down a discrimination tree of product features (Bhargava et al., 1999). The restaurant recommender entree (Burke et al., 1997; Burke et al., 1996) makes its recommendations by finding restaurants in a new city similar to restaurants the user knows and likes. The system allows users to navigate by stating their preferences with respect to a given restaurant, thereby refining their search criteria. Other implementations of knowledge-based recommender systems are discussed in (Felfernig and Kiener, 2005; Jiang et al., 2005; Thompson et al., 2004).

In the travel and tourism domain, the TripMatcher (see www.ski-europe.com) from Triplehop and Me-Print (used by travelocity.com), which is an expert advice platform from VacationCoach (Staab et al., 2002) are notable recommender technologies. The two systems make use of a content-based approach for generating destination recommendations. However, recommendations on other forms of tourism objects such as accommodation, cruises, restaurants, event services and so on were not covered by these systems. Another successful recommendation technology is the trip@dvice (see http://www.nutking.ectrldev.com/nutking/), which has been applied in some e-tourism portals (e.g. visiteurope.com) (Venturini, 2006; www.ectrlsolutions.com [June 6, 2008]). Trip@dvice predominantly uses case-based reasoning as its recommendation technology but unlike TripMatcher and Me Print offers a range of recommendation services on several tourism objects. One characteristic common to all of these implementations is the fact that the parameters used for destination recommendation were strictly two-dimensional i.e. the user's travel preferences and the description catalog of travel destinations. The use of relevant contextual information that can improve the quality and dependability of recommendations was not considered (Adomavicius and Tuzhilin, 2005; Adomavicius et al., 2005). Hence, this work offers as its contribution a demonstration of an instance of ontology-based tourism recommender systems development that incorporates the use of contextual information for the generation of dependable tourism recommendations on various tourism objects.

3 Ontology Development

We constructed two tourism-related OWL ontologies which are the Destination Context Ontology (DCO) and the Accommodation Ontology (AO) using the Methonthology methodology (Gomez-Perez et al., 2004) of ontology development. The OWL (Web Ontology Language) is one of the most recent and popular ontology languages. It is the semantic web standard for formally specifying knowledge on the web. OWL is a markup language for publishing and sharing data using ontologies on the Internet. OWL is a vocabulary extension of the Resource Description Framework (RDF) and is derived from the DAML+OIL Web Ontology Language. OWL facilitates machine interpretation of Web contents in a way that is better than XML, RDF, and RDF Schema (RDF-S) by making use of additional vocabulary apart from formal semantics (Knublauch et al.,2004). The DCO and AO ontologies were implemented with OWL DL using the Protégé 3.3.1 ontology editor tool. An OWL ontology essentially consists of classes (which represents the concepts in a domain), a

class-hierarchy (concept taxonomy), properties (slots), property values, relations between classes (inheritance, disjoint, equivalent), restrictions on properties (type, cardinality), characteristics of properties (slots) (e.g. symmetric, transitive) and individuals (for knowledge-bases). OWL also offers classification and subsumption reasoning capabilities (www.w3.org/TR/owl-features/ [May 13, 2008]).

3.1 Destination Context Ontology (DCO)

The motivation for the DCO was the quest to engage a multi-dimensional approach to destination recommendation with the use of contextual information different from the 2-dimensional approach currently engaged in most of the existing recommendation platforms (Adomavicius and Tuzhilin, 2005; Adomavicius et al., 2005). Indeed, many of the existing destination recommendation systems have placed more emphasis on user's travel activity preferences, the facilities and services, and the type of accommodation available at specific destinations without much consideration for the social attributes of such destinations. The social attributes of a destination such as the general scenery (atmosphere), security, population size, flow of traffic, behaviour of inhabitants, linguistic complexity and many other factors are very crucial to the outcome of peoples' touristy experience in most cases. We wanted to enhance the dependability of destination recommendations by incorporating contextual information about the social attributes of prospective destinations. Hence, DCO was conceived as a model of knowledge representation ontology that captures contextual information about the social attributes of possible destinations within the Nigerian tourism domain.

A conceptual taxonomy of Destinations was developed consisting of three class abstractions: *City, Town* and *Village* with *'ISA'* relationships. The five social attributes of a tourist location that were of interest were: *Weather Temperature, Scenery, Volume of Traffic, Crime Rate,* and *Status*. These attributes were modelled as properties of a destination using *'FeatureOf'* association. Each of the five attributes consists of a set of five possible values from which values that define the characteristics of a typical destination are derived. These are given as follows:

- Weather Temperature = {"Cold", "Mild", "Warm", "Hot", "Very Hot"}
- Scenery = {"Very Quiet", "Quiet", "Medium", "Noisy", "Very Noisy"}
- Volume of Traffic = {"Very Low", "Low", "Medium", "High", "Very High"}
- Crime Rate = {"Very Low", "Low", "Medium", "High", "Very High"}
- Status = {"City", "Urban", "Town", "Settlement", "Village"}

Such that, if C is a vector denoting the social attributes of a destination, then

$$\mathbf{C_{(Ibadan)} = <Mild, Medium, Medium, Low, City>}$$

connotes that *Ibadan* as a destination has *Mild* weather temperature, *Medium* scenery rating, *Medium* volume of traffic, *Low* crime rate and a *City* rating in terms of its metropolitan status. The semantic relationships that may exist between different instances of specific social attribute classes were modelled with the *'CloserTo'*

association. For example 'Hot Weather' is specified as symmetrically closer to 'Very Hot Weather', in order to provide adequate basis for reasoning about entities represented in the ontology. The relationships between the different destination abstractions were represented using *'PartOf"* association, whereby Villages and Towns are conceived as extensions of specific City destinations.

The DCO was implemented using the Protégé 3.3.1 Ontology tool. The OWL ontology consists of five disjointed classes namely: *CrimeRate, Scenery, Traffic, CityStatus, Weather* and *Destination*. Three classes: Town, City, Village were defined as subclasses of the Destination class. The classes: *CrimeRate*, *Scenery, Traffic, CityStatus, and Weather* which represents the attribute features of a destination were defined as OWL Values Partition. A partition of a concept C is a set of subclasses of C that does not share common instances (disjointed classes) but cover C, that is there are not instances of C that are not instances of one of the concepts in the partition. The 'FeatureOf' relationship between a Destination and each of the feature classes were modelled using corresponding OWL functional Object properties of *hasCrimeRate, hasScenery, hasTraffic, hasStatus and hasWeather* respectively. This ensured that a particular functional object property maps to only one specific subclass of the corresponding feature values partition i.e.:

$$hasCrimeRate\ (Destination) \rightarrow Cri \in CrimeRate$$

which means that the object property hasCrimeRate must necessarily take its value from one of the values in the CrimeRate value partition. The 'CloserTo' and 'PartOf' relations between entities in the ontology were modelled as inverse and symmetric object properties. This ensures that if A is 'CloserTo' B, then B is 'CloserTo' A. As such, many of the subclasses in the feature value partition have specific 'isCloserTo' properties defined on them. The ontology was populated with OWL individuals representing concrete facts that pertain to specific destinations in Nigeria. A total of 37 cities and 100 towns and villages were covered. Fig. 1 and Fig. 2 are snapshots of our implementation.

Accommodation Ontology (AO)

The AO is a semantic representation of the attributes of the various types of tourism accommodation (see Fig. 2.). It was modelled following the Harmonise ontology (Dell'Erba et al., 2002), which captured facts about accommodation types and events in the European tourism domain. Five specific attributes of accommodation types (e.g. hotel, guest house, hostel, chalet etc.) were considered. These are 1) *Services*: the description of kinds of services rendered; 2) *Gastro*: profile of eateries, cuisines or restaurants nearby; 3) *Attraction*: special attractions within or nearby; 4) *State*: province or region where it is located; and 5) *Facilities*: physical facilities available.

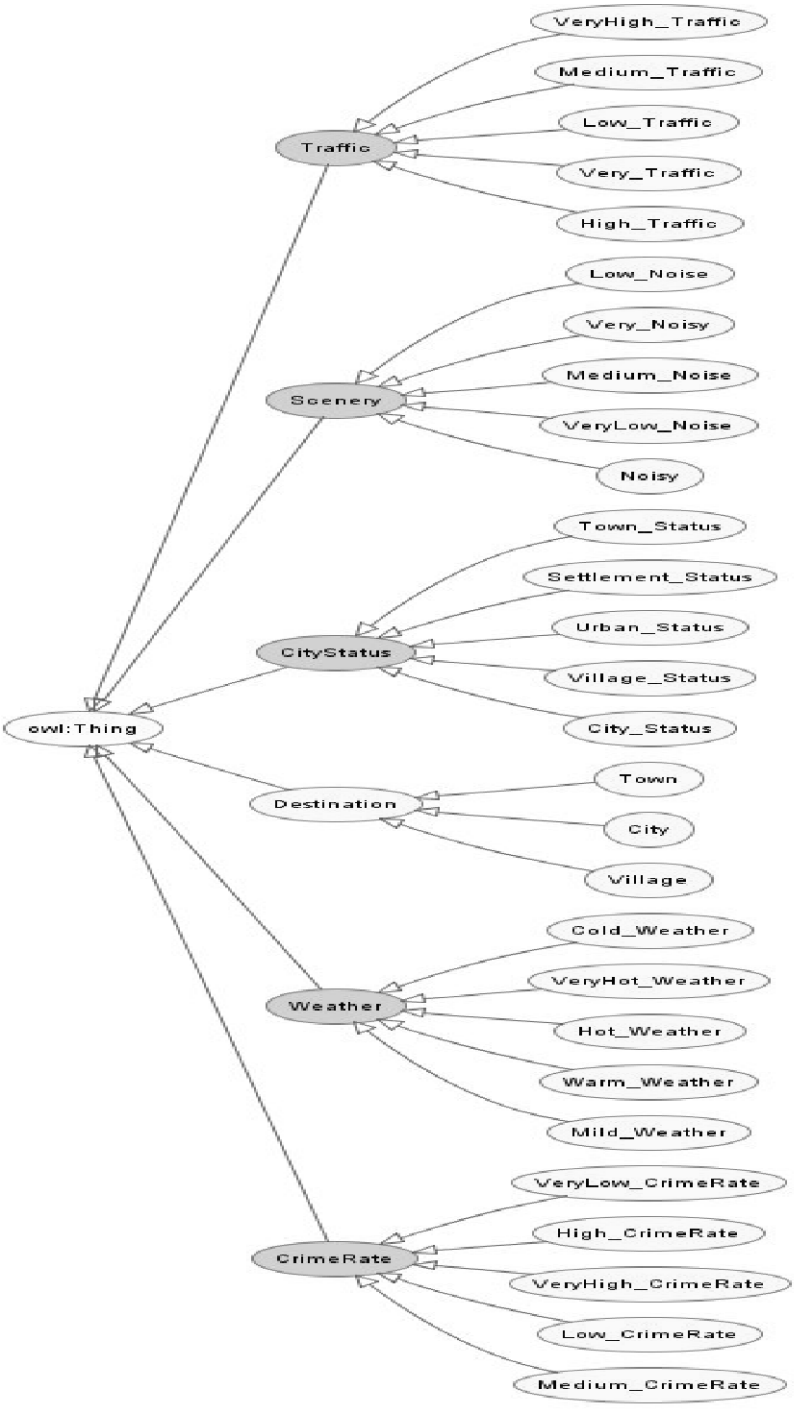

Fig. 1. A View of DCO Classes in Protégé

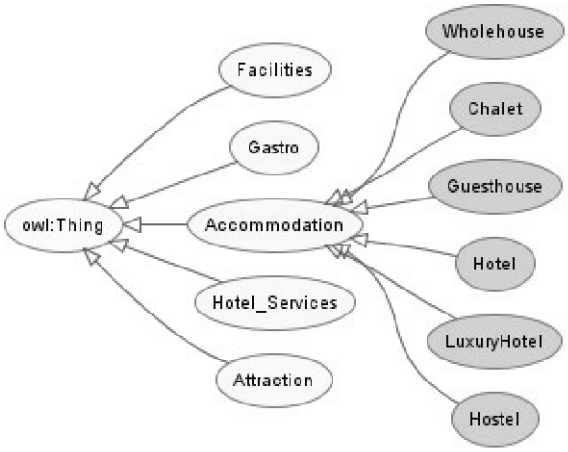

Fig. 2. A View AO Classes in Protégé

The AO was also implemented using Protégé 3.3.1 Ontology Editor. The ontology consists of six disjointed classes namely: *Accommodation, Attraction, Facilities, Services, Gastro* and *State*. Six classes: *LuxuryHotel, Hotel, GuestHouse, Hostel, WholeHouse* and *Chalet* were defined as subclasses of the *Accommodation* class. The classes: *Attraction, Facilities, Services, Gastro* and *State* which are the product features of a tourism accommodation were related to the *Accommodation* class by using OWL object properties. The object properties in the ontology are *hasServices, hasGastro, hasAttraction, hasState,* and *hasFacilities*. While *hasState* was defined as a functional property that maps an accommodation type to a particular state in the country, all the other object properties were defined as non-functional properties with a maximum cardinality restriction value of 20 imposed on each of them. This is to ensure that up to 20 different object property values can be specified for each of the attribute classes of *Attraction, Facilities, Services,* and *Gastro* for every instance of an *Accommodation* class. Just like the DCO, the ontology was populated with specific instances (OWL individuals) that pertain to hotels and various types of accommodation to create a knowledge base of accommodation. (See Fig. 2).

4 Ontology-based Tourism Recommendation Framework

Our ontology-based framework for various tourism recommendation services is presented in Fig. 3 as a functional architecture of three-layers. The first layer is the client-tier where specific kinds of recommendation services can be accessed. The second layer consists of a crew of embedded tourism recommender systems rendering knowledge-based recommendation services. A rule engine and a semantic matching engine constitute a body of necessary middleware infrastructures that enables each recommender system in this layer with semantic web capabilities (to read, and process facts stored in ontologies). The third layer which is the ontology layer consists of a suite of ontologies that can be leveraged for knowledge-based recommendations. A prototype e-tourism portal based on this framework was developed.

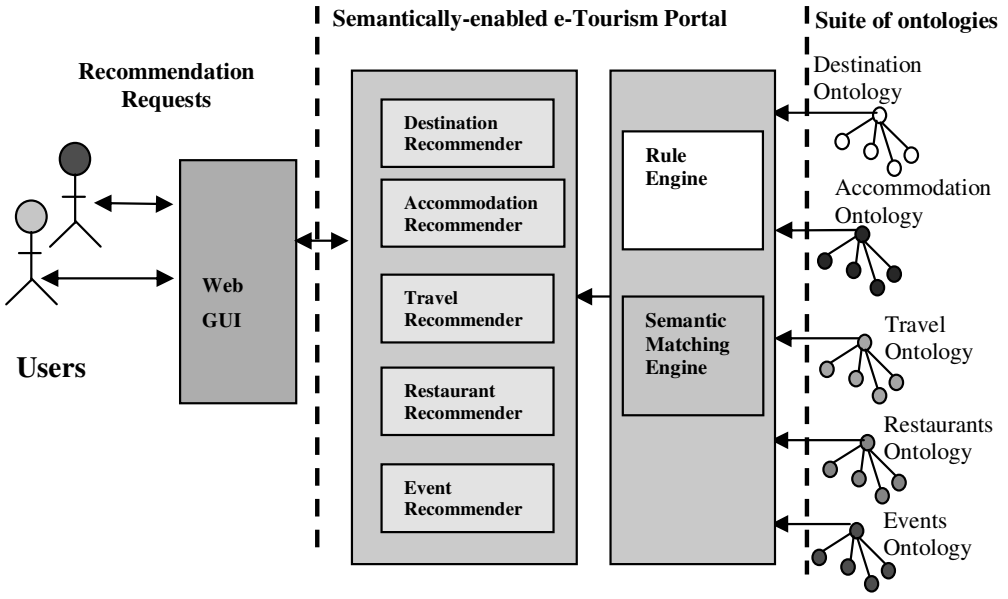

Fig. 3. A view of the Ontology-based Framework Architecture

4.1 Nigeria-Discover e-Tourism Portal

As a demonstration of our concept, an e-tourism portal prototype for the promotion of Nigerian tourism was built which encapsulated two knowledge-based recommender systems for destination recommendation and accommodation recommendation.

The Destination Recommender (DRS) has a hybrid architecture that leverages content-based filtering and case-based reasoning (www.etrlsolutions.com, [June 6, 2008]) for its initial recommendations. It takes a list of travel activity preferences of a user as input, which is then correlated with the content description of various destinations as captured in a tourism asset database to produce an initial ordered list of top nearest neighbourhood recommendations. Thereafter, the description of the social attributes of destinations as captured in the destination context ontology (DCO) are used to revise the initial recommendations based on the social attribute preferences of the user.

The Accommodation Recommender System (ARS) is a knowledge-based recommender system that leverages the knowledge captured about specific accommodation types to generate recommendations. By doing so deep knowledge filtered from the content description of key attributes of different accommodations types (e.g. hotel, guest house, chalet etc.) as stored in the accommodation ontology (AO) are used for recommendations. The Rule Engine associated with the ARS provides a basis for reasoning for decision making while its semantic matching engine executes an algorithm that matches the content descriptions of accommodation

instances with the specified preferences of the user to generate a list of Top–N recommendations.

Our implementations were based on Java Servlet technology, running on Sun Application Web Server 9.0 using the NetBeans Java IDE. The Web GUI and functionalities were implemented using Macro Media Flash and Dream Weaver web design tools, and Java Server Pages (JSP). The recommender systems were implemented as Enterprise Java Beans (EJB) components embedded in the web interface. Each of the EJBs references the specific ontology to which they were mapped using the Protégé ontology Java APIs (http://protege.stanford.edu/ [March 12, 2008]) to trigger ontology querying and reasoning capabilities. The Pellet 1.5 Descriptive Logics (DL) reasoner (http://pellet.owldl.com [May 16, 2007]) was used as the reasoning engine for the ontologies.

4.2 Empirical Usability Evaluation

Usability evaluation is an attempt to measure the user's perception of a system after an interaction experience. The essence of usability testing is to assess the quality of human-computer interaction properties of a system. According to ISO 924-11 (1998), usability is the extent to which specified users can use a system to achieve specified goals with effectiveness, efficiency and satisfaction. It is also a perception of a system's ease of learning and use from both the experienced and un-experienced users' viewpoint (Lindgaard, 1994).

A trial experiment was undertaken with 10 users, comprising of staff and students of the Science and Technology faculty of Covenant University. All the participants gave their informed consent to participate in the experiment, and were taken through a 15 minutes tutorial session at the commencement of the experiment. Participants were requested to respond to a pre-experiment questionnaire which was specifically designed to evaluate the background of the participants particularly in terms of their IT skills, knowledge of the Internet, familiarity with recommender systems, e-tourism portals, and general tourism and travel experience. They were asked to rate themselves on a scale of 100, which was graduated into 5 class categories. Our analysis of the characteristics of the participants showed that 80% claimed to be expert Internet users (indicating a rating of 70-100). 50% of participants claimed to have very good familiarity with recommender systems and e-tourism portals, 50% rated their travel and tourism experience as excellent while another 30% rated their travel and tourism experience within Nigeria as above average. 20% claimed to have little or no travel and tourism experience.

The post-experiment questionnaire was formulated based on the Post-Study-Satisfaction-User-Questionnaire (PSSUQ) standard (Lewis, 1995; Zins et al., 2004). The PSSUQ had 26 questions, which were specifically adapted to fit the scenario of our case study. The participants were required to rate each item in the post-experiment question on a scale of 1-5 (1-Excellent, 2-Good, 3-Satisfactory, 2-Unsatisfactory, 1-Poor) while 'n/a' was used for any questionnaire item they choose not to rate. The questions addressed various aspects which include: design layout,

functionality, ease of use, learnability, satisfaction, outcome/future use and reliability of the system. The post-experiment questionnaire was analysed statistically to determine the mean scores of user ratings of the system based on the seven usability metrics used for evaluation. Table 1 shows the mean scores obtained for each of the metrics used. From the result, the system had a mean score of above 4.0 in all of the 7 parameters used which suggests that the system is sufficiently usable and has an acceptable performance level. In our experiment, we sought to know what users feel about the fact that the recommendations were knowledge-based. From the feedback, we discovered that most of the users felt that the recommendation were accurate enough to earn their trust, because of convincing evidences that they were based on some facts that they are also aware of.

Table 1. Means Scores of Usability Metrics for e-Tourism System Prototype

	Usability Metrics	**Mean Scores**	**Std. Deviation**
1	Design/Layout	4.13	0.57
2	Functionality	4.19	0.63
3	Ease of Use	4.15	0.25
4	Learnability	4.00	0.56
5	Satisfaction	4.15	0.28
6	Outcome/Future Use	4.20	0.34
7	Reliability	4.02	0.68

Summarily, 80% of the sample population responded that they felt comfortable with the system by giving it a rating of 5 (excellent) or 4 (good). 20% of the participants gave the system a rating of 3 (satisfactory) or 2 (unsatisfactory). 60% of the sample population rated the recommendations of the system as excellent or good and claimed to believe it, 20% gave it a rating of 3 or 2 while 20% chose not to comment. 80% expressed general satisfaction with all aspects of the system.

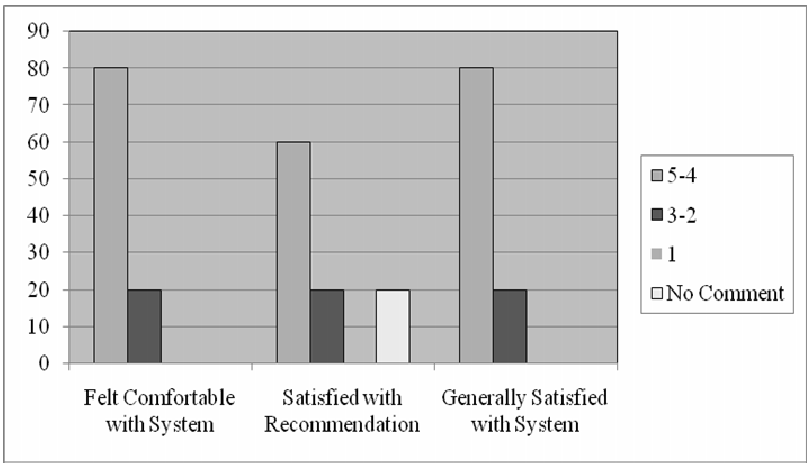

Fig. 4. A graphical View of User's Satisfaction Index for the System

Fig. 4 is a visualization of user's perception of the system. We consider the results of the evaluation experiment encouraging and supportive of our belief that the development of ontology-based platform will engender the delivery of assorted knowledge-based recommendations that will command users' confidence is indeed viable.

5 Conclusion

In this paper, an ontology-based framework that engenders the generation of knowledge-based tourism recommendations has been presented. The contribution of this approach is the creation of an ontological framework that is based on the use of contextual information for the generation of dependable knowledge-based tourism recommendations on various tourism objects. A prototype e-tourism portal that offers various recommendation services was developed based on the ontology-based framework, in order to validate the feasibility of our approach. A usability evaluation of the prototype system reveals users satisfaction with the quality and credibility of its recommendation services, which demonstrates the viability of our concept. In our future work, we will be looking to standardise and further expand the scope of tourism recommendation services currently covered by the prototype system.

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Acknowledgements

This work was done under the aegis of the staff development award of Covenant University, Nigeria and a fellowship offered by the Centre for Mobile e-Services for Development at the University of Zululand. The centre is funded by THRIP, Telkom, NRF, Huawei, and Alcatel.

Learning Adaptive Recommendation Strategies for Online Travel Planning

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Abstract

Conversational recommender systems support human-computer interaction strategies in order to assist online tourists in the important activity of dynamic packaging, i.e., in building personalized travel plans and in booking their holidays. In a previous paper, we presented a novel recommendation methodology based on Reinforcement Learning, which allows conversational systems to *autonomously* improve a rigid (non-adaptive) strategy in order to learn an optimal (adaptive) one. We applied our approach within an online travel recommender system, which is supported by the Austrian Tourism portal (Austria.info). In this paper, we present the results of this online evaluation. We show that the optimal strategy adapts its actions to the served users, and deviates from a rigid default strategy. More importantly, we show that the optimal strategy is able to assist online tourists in acquiring their goals more *efficiently* than the rigid strategy, and is able to increase the willingness of the users in accepting several of the system's offers.

Keywords: Conversational Recommender Systems, Reinforcement Learning, Markov Decision Process, Travel Planning, Dynamic Packaging, Information Presentation and Delivery

1 Introduction

Conversational recommender systems are interactive E-commerce applications that assist users in their information-seeking tasks by offering personalized product recommendations during an interaction session [Bridge et al., 2006]. In particular, conversational travel recommender systems assist online tourists in the important activity of *dynamic packaging*, which is a cheap and flexible way of composing complex travel products [Fesenmaier et al., 2006]. They acquire the user preferences, either explicitly (by querying), or implicitly (by mining the user activity logs), in

order to suggest interesting travel products, hence allowing the users to easily construct their travel plans and book their preferred products. More recently, several travel recommenders have been proposed, and are now operational in major tourism portals [Venturini and Ricci, 2006], travel.yahoo.com [Aug. 15, 2008].

At each stage of the session, conversational systems execute one from amongst a set of available actions. The selected action is specified by the system's *recommendation strategy*. For instance, a conversational recommender for itinerary planning could employ the following strategy: "*explicitly acquire all the user preferences before suggesting any points of interest*". Conversational systems typically employ a *rigid* strategy, i.e., one which is determined at design time and hard-coded into the system. In fact, it is infeasible for system designers to evaluate *all* available strategies for a given task, and they select the strategy based on their experience and knowledge, which doesn't guarantee that this strategy will be optimal for all users. In a previous paper [Mahmood et al., 2007a], we have tackled these requirements by proposing a new type of recommender system, which exploits Reinforcement Learning (RL) techniques in order to *autonomously* improve a rigid strategy and *learn* the *optimal* one, given the particular model of the interaction represented by the system. In the context of RL, we use the term "policy" rather than "strategy", where a policy specifies how the strategy is implemented in terms of the system's actions. In [Mahmood and Ricci, 2007a], we validated our approach through off-line simulations within the NutKing travel recommender system, improving NutKing's rigid policy with an optimal one. Moreover, in [Mahmood and Ricci, 2008], we showed that the system learns different optimal policies for different types of user behaviours, and for different representations of the interaction process (state variables).

All these experiments were carried out offline, with simulated interactions, where the system had to learn only *one* decision. Hence, in [Mahmood et al., 2008], we proposed the application of our approach online, specifically, within the Travel Planner tool (TP) that we built for the Austrian tourism web portal (Austria.info). We showed how the rigid (default) user navigation flow of the TP could be made adaptive, by allowing the system to autonomously decide which action to perform in three particular situations of the interaction (*system decision points* or SDPs). In order to learn and validate the optimal policy, we presented our proposed system architecture and a summary of our proposed evaluation methodology.

In this paper, we present the results of this online evaluation. Specifically, Section 2 elaborates our proposed RL-based model, which we exploited in order to learn the optimal policy. Section 3 presents the specific details of our evaluation methodology, e.g., the evaluation phases, user tasks, the evaluation design etc. Section 4 presents an analysis of the learnt optimal policy. Section 5 illustrates our results, wherein we compare the values of several performance variables across the evaluation phases, in order to validate our recommendation approach. Finally, Section 6 discusses our conclusions and the future work.

2 Learning the Optimal Policy

In this section, we shall detail our model in order to learn the optimal policy. Our model exploits Markov Decision Process (MDP) [Sutton and Barto, 1998], modeling the human-computer interaction and the action selection decisions of the system in response to user actions. Our MDP consists of: 1) **a set of states**, observed by the system, and representing all the possible situations (modelled as variables of a state representation) which could occur as users continue to interact with the system; 2) **a set of system actions**, from which the system selects one for execution each time it is in a system decision point (SDP), hence causing a state change; 3) **a reward function**, which assigns a numerical reward to the system for taking a particular action in a given state; and 4) **a transition function**, which defines the probability of a transition to a new state, depending on a particular system action and user response. The set of all *SDP states* depicts all possible situations which could occur at the SDPs of the TP's adaptive flow (in our case there are three SDPs). The optimal policy is defined by learning the optimal action for each SDP state. The reward models the acceptability of system actions by the user. In fact, we assigned a positive reward for favourable actions (e.g., those which lead the user to acquire her goal) and a negative reward for non-favourable actions. As the interaction continues, the system optimises the reward it receives in each state, hence learning the optimal policy that is relative to the specific MDP model.

In order to validate our model, we shall investigate the following hypotheses:

Hypothesis 1: *The optimal policy supports more efficient product search sessions (i.e., those requiring lesser user effort) than the current policy (CP) defined by the system designer.*

Hypothesis 2: *Users are more inclined to follow the system suggestions generated by the optimal policy than those generated by the CP.*

Hypothesis 3: *The optimal policy is able to offer the products that will be preferred by the user at higher positions (than the CP) in the displayed recommendation list.*

We will test these hypotheses in Section 5. In Table 1, we present our (interaction) state representation for our policy-learning task, which comprises 12 variables.

Table 1. State Variables and their Descriptions

State Variable	Description
UserAction	label ranging on all possible user actions
CurrentResultSize (CRS)	the number of products retrieved by a query
CharacteristicsSpecified	whether the user, up to the current stage, has specified her travel characteristics (or not),
CartStatus	whether the user, up to the current stage, has added some product to her cart (or not),
ResultPagesViewed (RPV)	the number of result pages viewed by the user up to some stage
UserGoal	the goal of the user during her session. In our application this is always "travel planning"
UserExperience	the user experience on tourism in Austria
UserTightResponse	the response of the user to the tightening suggestions
UserRelaxResponse	the response of the user to the relaxation suggestions
UserAutoRelaxResponse	the response of the user to the *auto-relax* offer
Position of the most Recent product which the user has Added to her travel Plan (PRAP)	"Position" refers to the product's location in the ranked list of displayed products on a given result page
Score of the most Recent product which the user has Added to her travel Plan (SRAP)	The product "Score" is a value that lies between 1 and 100 (for details, see [Venturini and Ricci, 2006]) and it is the recommender system's estimation of the goodness of the recommendation

The tightening functionality suggests product features for reducing the result set size of a current query, in case this query has retrieved a large number of items [Mahmood and Ricci, 2007a]. In addition, if the user query fails, i.e., retrieves no products, the relaxation functionality suggests features which, if removed from the current query, would allow the system to retrieve some products. Moreover, the *auto-relax* requests the consent of the user for *automatically* relaxing her failing query. Our set of system actions comprises 31 actions. The three SDPs of TP's adaptive flow are *Execute Query*, *Start Query Search*, and *Show Proposals* (for details, see [Mahmood et al., 2008]). For the sake of clarity, we have identified four decision situations of the system that could occur at these SDPs. In, Table 2 we enlist these situations and the system action set for each situation. Here, the name of each system action is shown in parentheses, and the word "product" refers to a destination, an event, or an experience.

Table 2. The Decision Situations, their Explanation, and the set of System Actions available under each Situation.

Decision Situation	Description	System Action Set
Decision Situation A	The user enters the system and submits a request to initiate the query search for products, at the SDP *Start Query Search*	**1)** show the initial product suggestions to the user (*ShowProductSuggestionsView*), **2)** request the user to specify her travel characteristics (*ShowTravelContextView*) and then show the initial product suggestions
Decision Situation B	The user enters the system and requests the travel suggestions (complete travel plans), computed by the system at the SDP *Show Proposals*	**1)** show the product proposals computed by the system (*ShowSeekInspirationsView*), **2)** request the user to specify her travel characteristics (*ShowTravelContextView*) and then show the product proposals.
Decision Situation C	After Situation A, the user submits a product query at the SDP *Execute Query*, and one or more products have been retrieved, i.e., *CurrentResultSize* > 0	**1)** suggest features for tightening the current query (*ShowProductTightenView*), **2)** show the simplest type of result page to the user (*ShowProductRecView*), **3)** show a result page in which the system requests the user to specify the travel characteristics (*ShowProductAskCharsView*), **4)** show a result page which pushes the user to add the top ranked destination to her plan and also offers her to make related searches on this destination (*ShowAddRelSearchView*), and **5)** show a result page which suggests the user to make related product searches on the top ranked destination (*ShowRelSearchView*)
Decision Situation D	After Situation A, the user submits a product query at the SDP *Execute Query*, and the query fails, i.e., *CurrentResultSize = 0*	**1)** suggest a set of features for relaxing the current failing product search query (*ShowProductRelaxView*), **2)** acquire the consent of the user for an automatic relaxation of her product query (*ShowProductAutoRelaxView*)

The execution of each system action leads to a particular View State (web page) being shown to the user. For instance, Fig. 1 shows the View State shown after the execution of *ShowAddRelSearchView*, where the system pushes the user to select the top recommended destination, Pflach, and offers her to search for events and experiences related to Pflach. Due to space constraints, we cannot describe all the View States (for details, see [Mahmood et al., 2007b]).

Finally, we specify our reward function that is centred on the goals of our system. We assign a large positive reward **(+5)** when the user adds some product to her travel plan, i.e., **the main goal** of the users in our system. Moreover, we assign a small positive reward **(+1)** when the system shows a result page to the user, i.e., any of the View States that shows one or more products. This is the **secondary goal** of the users, since it dictates an intermediary (through necessary) step in order to achieve the main goal. Finally, we assign no reward (0) in all other situations.

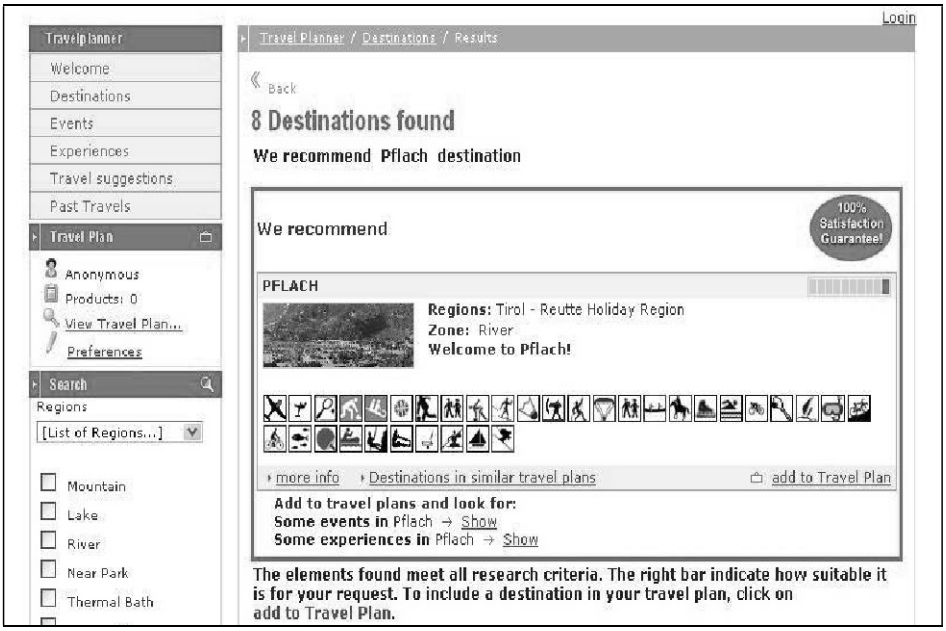

Fig. 1. The View State shown after the execution of *ShowAddRelSearchView*

3 Evaluation Methodology

We implemented two variants of our system, *VariantTrain* and *VariantTest,* in two evaluation phases: 1) **the training phase**, in which *VariantTrain* employed a set of default policies, which were selected with a uniform distribution from a set of meaningful policies. Hence, *VariantTrain tries out* as many actions as possible, in all the SDP states. Then, the ensuing user responses, modelled within the state representation, were exploited in order to learn the optimal policy that was used in 2) **the testing phase**, by *VariantTest*. During each phase, we logged the following data: 1) **the sequential data**, i.e., the state and the system action (amongst other related data), at each stage of each interaction session. The sequential data logged during the training phase was used to learn the optimal policy and 2) **the performance data**, i.e., the set of our performance variables, at the end of each session. We note that, as we stated earlier in Section 2, *the aim of the evaluation is to prove that the optimal policy, as compared to a non-optimal one selected by the system designer, supports a more effective interaction for the users*. To this end, we compared the performance

data across the two phases (with *VariantTrain* as our baseline system) in order to determine any *improvement* in this data from the training phase to the testing phase.

We selected a set of participants for carrying out the testing phases (330 for the first phase, and 214 for the second), according to the guidelines mentioned in [Nielsen, 1993]. Each participant was required to evaluate one task among two. *Task 1* was simple and dictated an interaction path for the users in which the system will never encounter a SDP. This task was introduced to perform another test that is not described here for lack of space. However the logged data from *Task 1* were used, along with those for *Task 2*, for learning the optimal policy. *Task 2* was more complicated; it dictated an interaction path through the SDP *Start Query Search* and the SDP *Execute Query*. It also informed the participants of the possible system behavior at these SDPs, i.e., that the system could request for preferences, suggest or request for query changes (i.e., the tightening, relaxation and the auto-relaxation functionality), push to add some destination to the plan, and make related searches on a destination. We employed a *within-subjects* evaluation design, in which each group (one for *Task 1* and one for *Task 2*) participated in both phases and evaluated both *VariantTrain* and *VariantTest*. This caters for the large individual variation in the skill of online users [Nielsen, 1993]. A major drawback of this design is the *transfer-of-skill* effect, i.e., participants who have evaluated *VariantTrain* might be more experienced when they evaluate *VariantTest*. An ideal solution is to allow two groups to evaluate the two variants in different order. Such a solution was not possible in our case, as the training and the testing phases did not occur concurrently. We ensured, however, that the transfer-of-skill takes place across the same task, and we observe that the two phases were separated by more than two months to limit the transfer-of-skill.

Before carrying out the experimental evaluation, we performed a Heuristic evaluation of the Graphical User Interface (GUI) of our system, in order to judge its compliance with the standard heuristics of web usability [Nielsen, 1993]. This evaluation was carried out by usability experts as well as by students, who detected several shortcomings in our GUI. We catered for all of these limitations, and modified our GUI before the experimental evaluation.

4 Analysing the Optimal Policy

In this section, we shall present an analysis of the learnt optimal policy. Initially, we present the current default policy of the TP tool, which we improved in order to learn the optimal policy, by specifying our selected action for each decision situation (See Table 3).

Table 3. Current Rigid Policy of the TP tool

Decision Situation	Rigid Policy Action
Decision Situation A	*ShowProductSuggestionsView*
Decision Situation B	*ShowSeekInspirationsView*
Decision Situation C	*ShowProductRecView*
Decision Situation D	*ShowProductRelaxView*

This policy doesn't ask the user to specify travel characteristics, or offers her tightening suggestions, auto-relaxation, or related product searches, or pushes her to add a destination to the plan. We will now analyse the optimal policy computed by the system after having observed the user interactions in the training phase. The optimal policy specifies the system action for 739 SDP states, i.e., for all the SDP states which were logged during the training phase. In order to facilitate the comparison of the optimal policy with the rigid policy, we grouped the SDP states under the four decision situations illustrated in Table 2. Our objective is to determine whether the optimal policy dictates different (better) system actions, than those dictated by the rigid policy (Table 3**Fehler! Verweisquelle konnte nicht gefunden werden.**). In fact, our analysis shows that, for each situation, the optimal policy specifies different actions for different groups of SDP states, whereas the manually designed rigid policy doesn't.

In order to illustrate that these differences bring an improvement over the rigid policy, we shall present in the next section a comparison of the performance variables. In addition, here, for each situation, we considered the frequency of all possible actions learnt by the optimal policy in that situation. This is important, as actions learnt for a larger number of states might imply that they are more beneficial for the users (in acquiring their goals), as compared to the others. In addition, we were also interested in understanding the exact situations under which the optimal policy specifies some action. To this end, we selected and analyzed the values of a subset of state variables, for each type of action. We now present our analysis for the different decision situations.

Decision Situation A and **Decision Situation B** (the system must cope with the initial request of the user, either for a query search (Situation A), or for a request to show some travel suggestions (Situation B))**:** In Situation A, the optimal policy specifies *ShowProductSuggestionsView* (show the initial product suggestions) for 66% of the states, and *ShowTravelContextView* (request the user for her characteristics at the beginning of her query search session) for the remaining 34% of the states, i.e., it is optimal to show the initial product suggestions, (almost) twice as much as requesting the user for her travel characteristics. In Situation B, the policy specifies both *ShowSeekInspirationsView* (show the travel suggestions to the user) and *ShowTravelContextView* for 50% of the states, i.e., both actions are specified with the same frequency. For both of these situations, our analysis reveals that, it is optimal to execute *ShowTravelContextView* when she has seen none, or only a small number of result pages, and preferably, has not, as yet, started query-searching for products. This

further implies that, *it is not feasible to request users for their characteristics, once they have started searching for the preferred products.*

Decision Situation C (the system must cope with a non-failing query): The optimal action with the maximum frequency is *ShowAddRelSearchView* (push the user to add the top-ranked destination to her plan, and suggest her to make related searches on this destination), which occurs for 33% of the states. Consider a user who is querying our system for destinations, and has accepted any of the system's suggestions/offers (tightening, relaxation, auto-relaxation) for modifying her query, or has executed a manually-constrained query, such that a product subset has been retrieved. *Our analysis reveals that, in this situation, it is optimal to execute ShowAddRelSearchView, i.e., push the user to add the top ranked destination, and to make searches related to this destination.* This behavior makes sense because, when the system pushes the user to add a product, there is greater chance that she will actually add this product to her plan, and acquire her main goal. In doing so, the system also fulfils our secondary goal (i.e., show a result page). Furthermore, the optimal policy dictates *ShowProductTightenView* (suggest tightening features) for 30% of the SDP states (second largest occurrence frequency). Our analysis reveals that the *optimal policy dictates tightening, largely for users who are willing to accept it.* In case the users are unwilling, the optimal policy suggests tightening only for users whose goals have already been acquired (so the policy can afford the risk of suggesting tightening), and who might require the system's assistance in continuing their interaction. Moreover, the optimal policy dictates *ShowProductRecView* (show the simplest type of result page) for 24% of the states (third largest occurrence frequency), Overall, we found that *the system largely suggests tightening, and shows the simplest result page, later on in the interaction, when their main and secondary goals have already been acquired and they have viewed a large number of result pages.* Moving on to other actions, only 7% of the states, dictate *ShowProductAskCharsView* (request the user for her characteristics during her query search session), which indicates that *users were largely unwilling to specify their characteristics during their query search sessions.*

Decision Situation D (the system must cope with a failing query): The optimal policy specifies *ShowProductAutoRelaxView* (offer auto-relaxation) for 53% of these states, and *ShowProductRelaxView* (suggest relaxation features) for the remaining 47% states, i.e., these actions are specified with an almost similar frequency. Our analysis reveals that *it's optimal to request auto-relaxation and suggest relaxation, earlier on in the interaction, when the main goal of the users has not been acquired.*

5 Experimental Results

In this section, we shall present our results for our experimental evaluation. Specifically, we selected a set of 25 performance variables, and determined whether there was a significant improvement in their values, from the training phase to the testing phase. The significance is determined through a two-tailed, unequal variance t-test, where a p-value of less than 0.05 is considered statistically significant, while a P-

value of less than 0.1 is indicative of a statistical trend. We found significant differences in the values of five variables, shown in Table 4**Fehler! Verweisquelle konnte nicht gefunden werden.** (we don't list the other variables due to space constraints). Here, the column "Performance Variable" lists the variables, MTrain and MTest represent their mean values in the Training and Testing phase respectively, Diff represents the mean difference between MTrain and MTest, and P-value represents the significant values.

Table 4. Performance Variables

Performance Variable	MTrain	MTest	Diff	P-value
Number of elapsed interaction stages	10.5	8.1	-2.4	0.0005
Number of destination queries executed	1.8	1.5	-0.3	0.014
Number of requests for destination search	1.8	1.3	-0.5	0.00001
Number of result pages viewed by the user	3.3	2.7	-0.6	0.095
Number of products added to the cart	2.8	2.4	-0.4	0.079

On the average, users added at least two items to their carts in both the phases, i.e., their main and secondary goals were acquired. Hence, our results imply that *the user goals were acquired in the testing phase with a smaller number of result page views (2.7 for MTest vs. 3.3 for MTrain), query executions (1.5 vs. 1.8) and search requests (1.3 vs. 1.8), i.e., our optimal policy assisted the users in acquiring their goals more efficiently (quickly) in the testing phase, as compared to the training phase.* We must note that the users could also have acquired their goals quickly because they were more experienced with our system in the testing phase. However, the search behavior of E-commerce users is strongly influenced by the actions of the system [Katz, 2001], and the quite large distance in time between the training and test phases (two months), implies that the impact of the previously acquired experience should have been marginal. In fact, our optimal policy *did* influence the users in many ways, as we have shown above. In addition, we analyzed the acceptance rates of the users for the various system offers/suggestions. The aim was to determine whether the optimal policy was able to positively influence the willingness of the users, in accepting the system's requests, i.e., whether there was some improvement in the acceptance rates from the training to the testing phase. Amongst 12 types of requests, we found that for five of them the acceptance rate improved and decreased for two (precise data are not shown here for lack of space). Hence the optimal behavior did influence the willingness of the users in replying to the system's requests. We will now mention our proposed hypotheses, and test them according to the aforementioned results.

- **Hypothesis 1:** *The optimal policy supports more efficient product search sessions (i.e., those requiring lesser user effort) than the current policy (CP) defined by the system designer.* We have validated this hypothesis because, in the testing phase, i.e., with the optimal policy, users added products to their carts with lesser effort (see Table 4).

- **Hypothesis 2:** *Users are more inclined to follow the system suggestions generated by the optimal policy than those generated by the CP.* We have

validated this hypothesis, because the users' acceptance rate of the system's offers, produced by the optimal policy, increased.

- **Hypothesis 3:** *The optimal policy is able to offer the products that will be preferred by the user at higher positions (than the CP) in the displayed recommendation list*. This hypothesis is not validated by our experimentation evaluation, as there is no significant difference between MTest and MTrain (3.0 vs. 3.1). This result may not be unexpected, as the optimal policy is not directly optimising the position of the preferred products.

6 Conclusions and Future Work

In a previous paper, we have proposed a novel methodology for conversational recommender systems, which exploits Reinforcement Learning techniques, in order to *autonomously* learn an optimal (user-adaptive) strategy for assisting online users in acquiring their goals. In this paper, we have applied our approach within an online travel recommender system of the Austrian Tourism portal (Austria.info). We successfully learnt the optimal policy and showed that it dictates intelligent system actions for the users. We successfully validated its performance against a set of non-adaptive default policies, hence showing that it is able to 1) assist the users in acquiring their goals more efficiently, and 2) increase the willingness of the users in accepting several of the system's requests/offers, 3) the proposed method can be used to improve a policy defined by a system designer. Our work is the first attempt in the domain of Travel and Tourism applications, and particularly in the domain of dynamic packaging systems, to learn a strategy of information presentation/delivery for assisting online tourists in planning their vacations and booking their holidays. This approach can be adopted by any conversational system to improve the currently selected policy. As our future work, we are interested in generalizing our recommendation approach to other tourism portals. In this context, we plan to extend our work in [Mahmood and Ricci, 2008] in order to initially determine a generic state representation and a generic reward model which could be used for learning the optimal policy for different portals.

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Wireless Applications in Destinations

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Abstract

This paper is investigating developments of city-wide implementations of wireless broadband networks in destinations around the world. In doing so, it identifies the service industry as a primary beneficiary of extended wireless networks, particularly as regards public and tourism services. The main focus of the paper is on the applications deployed over these networks and business models. It is anticipated that when wide area wireless connectivity is a reality, tourism behaviour at destinations will change to take advantage ubiquitous connectivity and instant access to information. Hence tourism organisations should develop appropriate infostructure and marketing strategies to take advantage. Active involvement of the public sector is also recommended for the sustainability of city-wide wireless broadband services in destinations.

Keywords: wireless; networks; broadband; destinations

1 Introduction

Broadband Wireless Access (BWA) technology is emerging as a tool to deliver communication services. Different broadband technologies, such as WiMAX and WiBro, are now available in the marketplace to respond to the need of wireless destinations. In addition, USB Modems (often called dongles) support connectivity over multiple mobile operators and telecommunication standards such as HSDPA, WCDMA, EDGE and GPRS and a wide variety of end-user devices, such as laptops and desktops, allowing anywhere and anytime communication. This is expected to change their consumer behaviour mainly during their visit to the destination where they will be able to use location based services and up-to-date special arrangements and offers. The service industry, and tourism and travel in particular, are expected to benefit largely from these technologies if they develop appropriate infostructure and marketing strategies. This paper aims to provide an overview of different wireless broadband technologies and look at some practical deployment of these technologies by destinations for the implementation of city-wide wireless networks. The primary focus of the investigation is on the applications developed as well as the business models adopted, in order to identify possible best practices.

2 Technologies for city-wide networks

The Wireless Fidelity (or Wi-Fi) term is used to refer to the IEEE set of standards 802.11. It is typically used to implement Wireless Local Area Networks (WLANs), connecting devices usually within a range of 100m indoors (Sierra Wireless Inc.,

2002). An innovative standard within the IEEE 802.11 family might be the 802.11s, also known as Wi-Fi Mesh (Gunasekaran and Harmatzis, 2007). This standard aims to connect access points over very large networks. As such it can be used to cover fairly large areas, overcoming the limitations inherent to traditional Wi-Fi standards. WiMAX may be defined as a "wide-area wireless technology that has been studied as a means to provide high-speed communication over the last one mile to business and consumer premises" (Kawakami et al., 2005). WiMAX is meant to fill the gap between WLANs, characterized by high data rates and short range coverage, and cellular networks which provide low data rate but high mobile long-range coverage (Teo et al., 2007). The Korean variant of WiMAX is WiBro, a wireless broadband Internet technology based on the 802.16e standard, developed by Korean top telecommunication firms, such as KT and SK Telecom (Nam et al., 2008). The technology is similar to the 802.16e standard, although it differs from it for some technical features (Kuran and Tugcu, 2007). The WiBro commercial service was launched in 2006 in some areas of Seoul, providing wireless Internet connectivity on the move, at reported speeds of 120 Km (74 miles) per hour (EE Times, 2006).

3 Wireless applications in destinations

An industry which can take advantage of wireless technologies is the tourism and travel industry. The market served by this industry consists of highly mobile consumers. Therefore, wireless technologies can provide tools to meet the mobility needs of travellers and deliver better quality and more flexible of service. Some destinations have already deployed wireless network infrastructures. For example, Wi-Fi networks have been installed in venues such as castles to enhance communication between members of staff and provide hand-held tours to visitors (Wi-Fi Planet, 2007). One of the pioneer destinations is the French Riviera, which implemented a Wi-Fi network to provide easy Internet connectivity to businesses and visitors (M-travel.com, 2003). Applications of WiMAX have been tested on the occasion of large events, such as the Melbourne Grand Prix (iWire, 2006), the 15th Asian Games Doha 2006 in Qatar (Broadband Wireless Exchange Magazine, 2007) and the Turin Olympic Games (Wimaxday, 2007) for medical, broadcasting and security applications. It is evident that wireless infostructure will increasingly be available in more destinations around the world in the next few years, bringing new opportunities and challenges to tourism and travel organizations.

4 Methodology

This research is exploratory and aims to investigate the wireless developments, applications for tourism and future potential of these technologies on global tourism. A case study methodology has been adopted for this study. This methodology has been deemed suitable for this research as case studies are ideal tools to investigate complex phenomena in real-life contexts (Yin, 2002). The selected case studies include representative examples of wireless networks in a metropolitan area, which have been, either primarily or indirectly, implemented for tourism purposes. Case studies have been selected through an online search in specialized (IT, governmental etc.) information providers and press releases from IT companies' Websites.

Qualitative methodologies usually imply different collection methods (Eisenhardt, 2002). In this study, data have been collected through telephone and email interviews with Project Officers and Heads of Research and Development in the selected destinations, online articles and reports. Interviews and written material have been analyzed through content analysis.

5 Case studies analysis: technology and applications

Tables 1 and 2 list the technologies used and the applications developed in the destinations selected as case studies:

Table 1. Technology used

Project/Destination	Technology
"Walled City to Wireless City" Project – Derry (UK)	Wi-Fi
Stratford Unplugged Project (UK)	Wi-Fi
Westminster Wireless City's Project (UK)	Wi-Fi
Wireless Philadelphia (US)	Wi-Fi
Boston (US)	Wi-Fi
Minneapolis (US)	Wi-Fi
St. Cloud (US)	Wi-Fi
Seoul (Korea)	WiBro
Jackson Hole (US)	WiMAX

Table 2. Applications

Area	Application
Navigation/Routing	- Multimedia tour guide (Derry, Stratford-Upon-Avon, Seoul, Boston)
Business	- Mobile marketing (Stratford-Upon-Avon) - Mobile payment for on-street parking (Boston)
Mobile workforce for safety and environmental control	- Real time communication between city offices (Environmental Health Officers, parking management, police officers, medical emergencies, fire-fighters, building inspectors, code-enforcement officers) and central offices (Westminster, Minneapolis, Boston, Seoul, St. Cloud) - Remote noise monitoring - Video traffic monitoring and management (Minneapolis) - Vehicular Mobile office for employees (Jackson Hole) - Wireless CCTV security cameras (Westminster)
Provision and exchange of tourist/destination information	- Information to tourists about events and attractions (Westminster) - Streaming video broadcast of real-time events (Minneapolis) - IPTV (Seoul) - Wireless bus (Seoul) - Real-time sending of pics and videos (Jackson Hole)

In the case studies analyzed, Wi-Fi is the most frequently used technology to implement city-wide wireless networks. This is not surprising as Wi-Fi is the technology which has been longer in the market and there is a large number of Wi-Fi

enabled devices for consumers, such as laptops or mobile phones, to name a few. As regards the applications developed, these may be grouped into four different categories. A first group of applications is intended to provide **routing/navigation** services to visitors. In Derry the multimedia tour guide offers cultural or historical information to visitors while they move around a particular site (www.wirelessderry.org). The content is location-based, which means that they get relevant information according to their position. As stated by one respondent: "Multi-media cultural and heritage content has been developed and content produced is location sensitive and is delivered through six zones and twenty-six discreet pieced of content". This gives visitors the benefit of enjoying the trail at their own pace, as the content is visualized on a hand-held device. Interactive maps help visitors to find their way around the destination, guiding them to the most popular tourist hotspots and providing them with directions. Another group includes **business** applications such as mobile marketing and commerce. In Stratford-upon-Avon the mobile guide rented by visitors delivers location-relevant promotional content from businesses in the destination (www.btopenzone.com). The wireless network can therefore be utilized as the infostructure for developing an efficient marketing tool for local and customised promotions, offers and best deals that can be sent to visitors in a destination at broadband speed. Mobile payment for on-street parking is offered in the city of Boston to speed up operations and enhance accuracy of service.

Wireless applications can also support **mobile workforce** in a destination, especially field workers. Workers equipped with mobile handsets can benefit from enhanced communication with other field-workers and central offices. A specific application for mobile workforce is parking management. This was tested during the pilot phase of the Westminster's Wireless City Project (City of Westminster, 2006). During the trials, parking attendants were efficiently directed to critical parking situations by operators through the aid of CCTV cameras. The benefits lied in enhanced management of problems such as contraventions or obstructions. Benefits for local citizens and businesses consisted of a diffused perception of higher number of parking attendants and parking availability on the streets. Overall, mobile connectivity is highly beneficial to those workers who operate in the streets, like tour representatives, who usually have to go back to their offices after the visit. By sending their notes over wireless networks and perform reservations, complaints and transfers on the go, they can save time, go straight to the next task and improve the productivity of the entire travel group. Technologies offering true mobility such as mobile WiMAX deployed in Jackson Hole also potentially allow employees to send video, audio, voice or data content anytime and anywhere in the destination from their vehicles. Safety can also be greatly enhanced in a destination through wireless applications. Police officers may take advantage of this application by sending real-time videos when patrolling a destination or in certain emergency situations.

A final group of applications are aimed to facilitate **the provision and exchange of tourist information**. City-wide wireless networks destinations such as the ones in Westminster and Minneapolis make use of Wi-Fi to provide information and broadcast real-time events at destinations. However a significant shift in this respect may be marked by WiMAX. The Jackson Hole case study shows how the marked

tourist character of a destination may propel the implementation of a WiMAX network infrastructure. The destination has been defined as a great "showcase for mobility" because of the high number of visitors (Telephony Online, 2008). The technology used in Jackson Hole is the mobile standard 802.16e-2005. Mobile WiMAX offers real mobility, as it allows access to the Internet even at very high speeds, such as 120 Km/h (Lee, 2007). This allows real-time sending of information, which may be valuable for travellers as they can send pictures and videos while visiting destinations whilst tour leaders can upload media rich information whilst on the road. The mobility features offered by mobile WiMAX also allow streaming and TV-like programmes on vehicles moving at fast speeds such as buses, trains, subways etc, which would not be possible with traditional wireless technologies. Through this wireless network infrastructure booking and transaction capabilities can also be offered without the users having to leave the channels, with tangible benefits in terms of reduced search time and safety of payments. A key strength of WiMAX is in fact that the technology supports an advanced encryption standard and built-in VLAN, which make use of advanced Privacy Key Management capabilities, guaranteeing high protection of data being transmitted between subscriber station and base station (Yarali et al., 2008). This is a great benefit in terms of safety of electronic transactions and will favour mobile commerce. Similar to WiMAX, the WiBro commercial service was launched in 2006 in some areas of Seoul, providing wireless Internet connectivity on the move at reported speeds of 100 Km (74 miles) per hour (EE Times, 2006). The technology was tested at high speeds into cars in highways and subways. An application tested through WiBro was Internet Protocol Television (IPTV). A real-time Web broadcasting channel of MBC TV was launched on the main South Koran artery, while the Bloomberg Web TV channel was launched on an intercity highway (The Korea Times, 2008). The network overall performed well, showing the potential of the technology. IPTV is an application with great potential for the tourism industry as a promotion tool, as real-time events or location-based promotions and advertisement can be streamed and reach both a global and a local audience in an effective manner.

6 Case studies analysis: business models

Business models are as critical as the technical capabilities in this area. A number of business models have been identified in the literature concerning city-wide wireless networks, identifying the primary stakeholders and governance models (Table 3). Each of these different business models is characterized by distinctive features. While a government owned and operated model may be preferred if "social consciousness" aspects are primary, a private model can benefit from the providers' expertise in the market, although in this case social aspects are likely to become secondary and logics of profit are likely to dominate. Sponsoring and donations are often provided by state and federal governments to jumpstart projects, especially for small communities addressing social improvement and digital divide goals (Mandviwalla et al., 2008). However forces are increasingly joined, risks are shared through strategic alliances and a greater balance in risk exposure is increasingly pursued between the different stakeholders involved. A common model for instance is the one where a municipality partners with the private sector to deliver end-to-end services to consumers, by

providing access to specific sites owned by private operators to install equipments such as antennas, following a sort of "real estate" model (Sirbu and Gillett, 2004). This framework has been utilized in order to assess the business models of the case studies analyzed in this paper. The majority of the case studies show a privately owned and operated business model, with varying degrees of public sector's involvement, as illustrated in Table 4.

Table 3. Business models for city-wide wireless networks

Government owned and operated/Retail model	**Government owned and privately operated / Franchise model**	**Joint power authority or public utility / Civic wireless model**	**Non-for-profit owned and operated**	**Cooperative wholesale model**	**Enterprise/ Private Consortium owned and operated**	**Privately owned and operated**
Network owned and operated by the government	Network owned by the public sector; operations subcontracted to a private party	Utility model, operates on a non-profit basis	Non-profit model	Network owned by government, sold at wholesale to private parties	Network Owned and operated by private operators, revenue-sharing model wi government	Network owned and operated by private party

Source: Sirbu and Gillett (2004); Breitbart and Lakshmipathy (2007); Mandviwalla et al. (2008)

Table 4. Business models in the case studies analyzed

BUSINESS MODEL				**OUTCOME**
Under consideration	**Non-profit owned/ Privately operated**	**Public utility**	**Privately owned and operated**	
	Boston (US)			- 1 hotzone activated - 3000 users so far - Average session length: 79 mins per user - Delays due to insufficient funds raised and technical problems - Subscription model: $9.95 per month (last updated 02/04/2008)
Derry (UK)				- Average users per day: Mon-Fri 125 – 150 Weekends 75 - 100 (last updated 22/07/2008)
		St. Cloud (US)		- Free access to users - 45% of customers in 2007 - Some expected difficulties related to maintenance costs (last updated 2007)
			Stratford-upon- Avon (UK)	Good acceptance by visitors (last updated 16 March 2006)
			Philadelphia (US)	- Initial problems due to poor technical performance and low customer base: 5034 regular residential and business subscribers and 908 customers

				under subsidized plan - Network currently being transferred to another private investor (last updated 14 May 2008)
			Jackson Hole (US)	- Network up and running - Subscription model: $40 per month, including rent of a WiMAX card - Visitor-based model: 1 week or 1 month (last updated 30/6/2008)
			Seoul (Korea)	- Rent of WiMAX card for 312$ - Subscription: 12-22 $ per month - 106000 subscribers in 2007 - Voice not supported because of Korean legal issues (updated 01/07/2008)
			City of Westminster (UK)	- Network working reliably - City as anchor tenant - Reduction of crime figures - Improved parking management operations (last updated 14-10-2008)
			Minneapolis (US)	- City as anchor tenant - Subscription model: 20$ per month - Currently about 8000 customers (updated March 18, 2008)

Not all these models can be assessed in terms of sustainability and profitability. The City of Derry for instance is still currently investigating its business model. The option considered by the City is a private-public partnership with a major and a local Internet Service Provider (ISP), offering users the possibility to enjoy complimentary Internet access for 30 minutes and at a cost with an ISP after that time span.

Business models which contemplate a network privately owned and operated show mixed results. The economic involvement of the public sector can be identified as a factor at the roots of these divergent results. In the cases not contemplating such involvement, negative outcomes such as use of poor technical solutions or unsuitable business strategies are evident. easily upgradeable such as proprietary technology used for the network in Philadelphia. This failed due to the fact that Earthlink, the Internet provider responsible for installing the network to be deployed in the City asked the permission to dismantle the network. The operator reported big economic losses, due to a much smaller number of subscribers compared to initial expectations (City & Local, 2008). Another factor is the fact that the same private operator may be deploying competing technologies and could not be willing to deploy effectively one of these in order not to incur in additional costs or conflict with another established market. Is this the case of the Korean operator SK Telecom, provider of the WiBro network implemented in Seoul, which was struggling to attract customers due to the competition with other, more established advanced 3G technologies such as High

Speed Downlink Packet Access (HSDPA), offered by the same operator SK Telecom (Fierce Broadband Wireless, 2007).

A different business model, which still contemplates a network owned and operated by the private sector, is represented by the City of Westminster. Here the public sector became the primary subscriber of a network built up by British Telecom (BT) the leading telecommunication provider. As indicated by a respondent: "I think the key to a successful network is making sure you have got a sustainable funding for the network going forward…it is about ensuring a continuing and sustainable revenue stream to pay for the network…unless you have got some ongoing revenues coming in to continue to maintain and operate the network, then the network ultimately is going to fail, that is what we have seen happening a lot, particularly in the United States". The network is now achieving good results in terms of usage and sustainability. The City of Minneapolis has also adopted a similar business model and the network is acquiring a solid customer base.

Other mixed business models are achieving divergent results. Boston adopted a cooperative model, with non-profit municipal ownership of the network, allowing wholesale access to Internet Service Providers (ISPs) to manage the network. It is still early to assess the network in terms of sustainability as it has started being operative only recently. The implementation of the network has been delayed due to funding problems as the non-profit operator was not able to raise the targeted amount of money to build the network (Xconomy, 2007). The St. Cloud case study is also significant, as it may show that a publicly owned and operated network, with free access to users is not viable in the long-term. The city adopted a "civic wireless" model, where the government owns the network and offers Internet access completely for free to end-users, as a public service (Breitbart and Lakshmipathy, 2007). While the network has proved to work reliably and has achieved a good customer base, issues have emerged related to maintenance costs which have been estimated too high for the city. This is why the City is now investigating a partnership model with a private operator (Aroundosceola.com, 2007). In these two case studies the government still retained an important role such as in the Westminster case, but failed to collaborate actively with the private sector, which has hindered the implementation of the network at an early stage in the Boston case, and it is threatening the network sustainability in St. Cloud.

At present, there are not many reported business cases of city-wide WiMAX deployments, especially mobile WiMAX, to be assessed in terms of probability and sustainability. Hitherto, service providers have mainly deployed fixed WiMAX networks and it is still early to evaluate the sustainability of these deployments. Figures are not available, although good results so far have been reported with some fixed WiMAX deployments, with some cases in the US of 20% penetration from customers migrating from DSL (Telecommunications Online, 2008). The service in Jackson Hole, deploying mobile WiMAX technology, is reported to have registered a good amount of demand, although definite figures are not available at this stage (Beta News, 2008). However, due to its technical features, WiMAX could mark a significant step forward to enhance performance of metro networks. The fact that

WiMAX is an open standard and that a large amount of certified products from a number of different organizations are already present in the market, while many more are going to be certified (Wimaxday, 2008), could make WiMAX a suitable technology for city-wide wireless networks. Networks can be easily upgraded ensuring a consistent quality of service, while a large number of WiMAX-certified products may help to overcome interoperability issues and allow systems to communicate with each other seamlessly. Moreover, a large number of WiMAX-enabled devices are predicted to be launched into the market and will offer users continuing roaming, as it happens with 3G-enabled devices. By virtue of these features, WiMAX may help to enhance the quality and performance of city-wide wireless networks. The technology can be a tool for destinations in order to provide residents and visitors with superior quality of service without having to rely on poor technical solutions usually offered by privately owned and operated networks.

While it is still quite early in some cased to assess the viability of the alternative business models available, it may be envisaged that a key success factors is the involvement of the public sector in terms of either ownership of the project or economic investment in the network, within a partnership framework with the private sector. Most of the respondents agreed that these developments need to be regarded as part of the infostructure development which will enable destinations to improve their competitiveness through gains in productivity, better marketing, use of location based services and offering a better and more customised experience. Hence the involvement of the public sector is critical for the successful development and implementation of this infostructure.

7 Conclusions

Although the road towards wide range Internet coverage is far from clear, it is becoming increasingly evident that regardless of the specific technologies and business models, this will be achieved soon. These developments will bring both opportunities and challenges for tourism organisations and destinations. Perhaps a new paradigm will emerge in the marketplace where both consumers and suppliers will be constantly connected, interacting dynamically, co-creating customised tourism products and experiences and exchanging value. A number of potential future streams of research can be envisaged. City-wide wireless networks, in most cases, are not yet implemented primarily to serve the tourist industry. Once such initiatives get more widespread, and emerging technologies offering true mobility such as the standard 802/16e are deployed intensively, it will be interesting to analyze in depth the economic impact of such infrastructures on the local tourism industries, in terms of visitors' adoption rates, economic benefits deriving from mobile commerce and so on. On the demand side, investigation of users' requirements and main drivers and barriers behind users' adoption and utilization of seamless networks and devices at destinations, will be necessary to identify suitable mobile applications and services.

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Personalized Mobile City Transport Advisory System

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Abstract

Mobile devices are becoming an inseparable part of our lives and personalized location-based mobile services are gaining more and more popularity. The scope of this paper is to illustrate the design choices, the implementation, and the testing, of a personalized mobile city transport advisory system (PECITAS), built for the citizens and city guests of Bolzano, Italy. Using PECITAS the user can obtain, directly on his mobile phone, recommendations for personalised paths between two arbitrary points in the city. The paths are illustrated by listing the various connections that the user must take to reach the destination using public transport means and walking. The recommendations are selected in a personalized way, using a knowledge-based recommendation technology, and for each user the suggestions are computed according to their travel-related preferences. The concepts of travel and user profiles are introduced in order to rank different routes in the city and provide the top ranked to a user. PECITAS has been evaluated with respect to its suitability and efficiency in solving the routing problem showing that it can become a useful tool for city visitors and citizens.

Keywords: travel recommendations; city transport; tourism; location-based services.

1 Introduction

Optimal route computation in road networks is a common function of any GIS (Geographic Information System), i.e., an information system for capturing, storing, analyzing, managing and presenting data which are spatially referenced (linked to location) (Longley, 2001). Indeed the optimal route problem, i.e., typically the shortest route between two points, has been explored deeply, and there are plenty of software products, which are available as Web applications or mobile services, offering assistance in choosing the best route between two arbitrary points in a road network (Medhi and Ramasamy, 2007). One of the most popular examples of such service is offered by ViaMichelin (www.viamichelin.com). The main function of this system is finding the best route for a single transport mean (e.g., car or foot) between two arbitrary points on the map. By default the system focuses on road safety and comfort while offering a good compromise between time and distance. Additionally the user can specify his preferences by selecting the recommendation of the quickest, the shortest or the most economical path. The ViaMichelin functionalities are also offered nowadays by portable GPS based navigation systems, where the user is also supported in following the route by voice indications and annotated map interfaces. However one of the most important requirements for personalized tourist guides is providing transport information (Beer et al, 2007; Schmidt-Belz et al., 2003; Stroobants, 2006). With that respect the recommendation of the optimal route in a

network, where the user is allowed to use *several* transport means, e.g. busses, walking, car, etc., is a relatively new problem. Such a network where a user can swap the transport means is called *transit network* and it can be defined as a network that bridges at least two other types of networks. According to Ruihong (2007) there is still a lack of effective and efficient schedule-based path finding algorithms for transit networks.

Another popular line of research and development involves the concept of mobile tourist guides, i.e. applications running on mobile devices (PDA, smart phones) aimed at selecting Points of Interests (POIs) and guiding the user through a visit to them. Several mobile tourist guides have already been developed, however they do not focus on routing and transport advisory. For instance, MobiDENK (Krosche et al., 2004) – German acronym for *Mobile Monuments* – provides tourists with information about monuments. It presents to tourists a map of their environment, which is dynamically loaded from a GIS server and provides tourism related content stored in an internal database. The mobile client of the TourGuide system (Haid et al., 2007) provides the user with multimedia content related to the specific places that are situated around his route. Despite the variety of information the user is given about the route, the system cannot recommend a route itself according to the preferences of the user. *m-ToGuide* (Kamar, 2003) has been developed to promote the use of 2.5/3G cellular networks with Location-Based Services (LBS) and offers information about POIs. XML technology is employed to integrate content from different providers. *mobil-i* (http://j2mobile.blogspot.com/ 2006/12/mobil-i.html) has been developed in collaboration with the Public Transports of Geneva (TPG), and uses a mobile phone, connected to a Bluetooth GPS receiver, to display a map of the closest bus stops, as well as time tables and information about the next departures and how to reach the chosen bus stop by foot. However despite the nice interface the travel advice is limited to simply showing the information about the closest bus stops, i.e. there is no option for asking for recommendations about how to move between two arbitrary points using the public means. For example if a user knows her travel destination she cannot provide this information to the system and obtain in response a travel proposal. Conversely, the user must browse through the available bus routes and the reachable points in the city, thus no optimal routing function is offered.

Another interesting mobile service is Atac Mobile that was developed for travellers in Rome, Italy. The system provides different information on timetables of public transport (busses, metro), traffic situation, accidents, and it also offers a route finding function ("Calcolo del Percorso"). The optimal route is calculated given two arbitrary end points as input to the system (street addresses). The output is a detailed textual description of the trip, involving the walking distances, the bus lines to be taken, their arrival frequency, the places where to change the transport mean as well as the estimated travel time. Although this system does compute the shortest path in a transit based network (in this case the network of the public transport in Rome), the user involvement in selecting their preferences is very limited (she is allowed to select just the start and the destination points of the trip) hence the route is not personalized. For instance, if the user is a visitor, currently located at the train station, who intends to go to the Coliseum, having plenty of time to reach the destination, the system will

suggest the same route that will be given to a citizen that is moving to the destination for working purpose (i.e. using the underground), whereas a good combination of underground and walking would better serve the Rome visitor.

As this example shows, in real life situations users are not always interested in the quickest way to travel from point to point and other aspects could be more important when deciding on a specific trip in a city. For example, the price of the ticket or the fare (e.g. for a taxi) of the transport mean might influence the user's decisions. Moreover especially the visitors of a city are rarely interested in reaching a specific place in the city as soon as possible, and a longer route leading through the most famous POIs of the city might be much more convenient for the user, even if, for instance, she has to walk a bit more and the trip may take longer. In this paper, we are arguing that taking into account more diverse user's preferences and needs, a personalized solution may provide to the user a better trip recommendation.

This personalization issue can be addressed by a Recommender System. Recommender systems are intelligent E-commerce applications that assist users in their information-seeking tasks by offering personalized product recommendations during an interaction session (Adomavicius and Tuzhilin, 2005; Fesenmaier et al., 2006). However the majority of mobile recommender systems targeted for tourists, as we mentioned above, address just the problem of POIs selection. None of them considers the routing and the transport mean as a factor to be considered, and therefore they do not manage the routing itself as the recommendable item.

To demonstrate the feasibility and usefulness of such a function, a personalized mobile trip advisory system, called PECITAS (Personalised City Transport Advisory System), has been implemented for the city of Bolzano, Italy. It provides to the citizens and city guests of Bolzano user recommendations for the best route between two arbitrary points in the city, using several possible transport means, such as bus, taxi and walking. In this paper we present the design choices, the implementation, and the testing of this personalized mobile city transport advisory system. Specifically, Section 2 provides a high level description of the system. Section 3 focus on the personalization issues describing how the user and travel model is represented and how travels can be ranked. Section 4 illustrates the system evaluation and finally Section 5 summarizes the results of this work and indicates future planned developments.

2 System Description

The target users of PECITAS are mainly the city guests and the citizens who usually need a recommendation when on the move, i.e. without having access to a PC or the city transport schedules. The system consists of several components each responsible for different tasks (see Figure 1). The user interacts with the system running an application on his mobile phone, i.e. the PECITAS Java MIDlet. The user starts the interaction with PECITAS by choosing departure and destination points, as well as the departure time for the trip. The input of the user comprises also other preferences

(more details on these will be provided later) such as the walking time, maximal number of changes of the transport means, latest arrival time, and the sightseeing possibility.

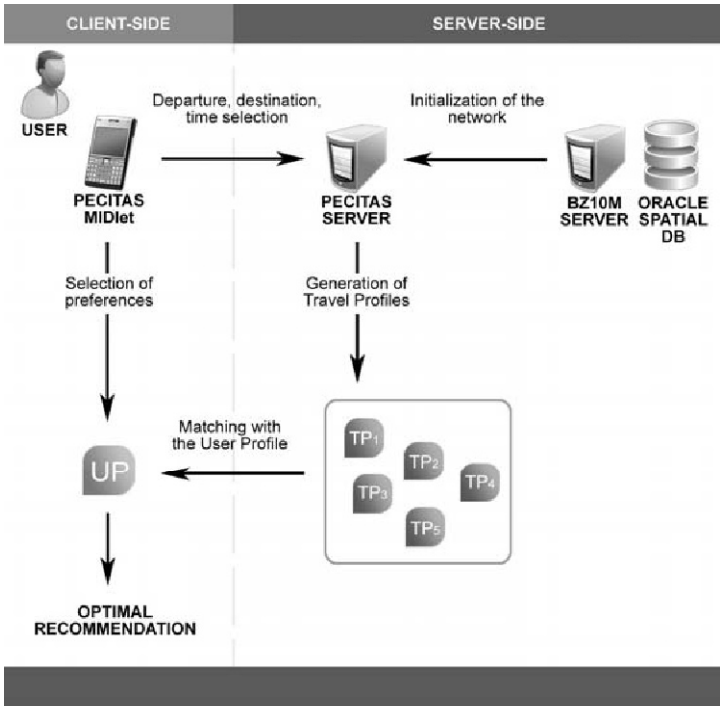

Fig. 1. System architecture

This information is sent to the PECITAS Server, where the transit network has been already initialized using the network data provided by another server, BZ10M server. This is an Oracle Spatial DB, and it is managing the data about the busses and roads of Bolzano. For each user request for a travel recommendation the implemented algorithm, running on the PECITAS server, computes some alternative routes, that we call travel profiles, since they can satisfy users with different travel preferences, and sends them back to the PECITAS client MIDlet. A travel profile is simply a description of a route, represented as a vector of travel features. The features describe the most important general characteristics of the route (e.g. length, number of POIs touched), that can be used to select the most appropriate travel for a given user. The travel profiles are then ranked (on PECITAS client) according to the specific travel preferences stated before (walking time, arrival time etc.). Finally the top ranked travel is recommended to the user, giving her detailed travel information. Figure 2 illustrates the GUI for entering the user preferences.

Fig. 2. PECITAS screenshots from the mobile device

3 Routing Personalization

As we mentioned above, the two main computations in PECITAS are performed by the routes generation and ranking algorithms. PECITAS routing algorithm is based on a single optimal route computation algorithm for transit networks (Ruihong, 2007). The main difference between PECITAS algorithm and that presented in Ruihong (2007), is that PECITAS generates *multiple routes* for a given departure and arrival points. PECITAS creates these multiple routes using some additional route constraints. The constraints were chosen in a way that the generated travel profiles are as diverse as possible, and at least one of them can match the preferences of the user collected in her user model. The following five types of travel profiles are generated by the PECITAS routing algorithm:

- TP_1 - the travel profile corresponding to the fastest route found by the algorithm
- TP_2 – the travel profile found by altering the departure time by +10 minutes
- TP_3 – the travel profile where the user is not allowed to take the busses in the city centre, therefore he is forced to walk through the central streets, increasing the number of touched POIs
- TP_4 – the travel profile where the user is not allowed to take any bus. The travel profile will consist only of walking
- TP_5 – the travel profile where the user is not allowed to use edges longer than 200 meters. The travel profile will clearly contain more walking, because the system is forced to choose shorter edges

The motivation for adopting this approach, i.e. to generate different travel profiles and then rank them, could seem inconvenient; why not immediately generating the best route, given the user preferences? There are two motivations for this choice. First, it was impossible to embed the user preferences as heuristics of the routing algorithm, because this is not a simple shortest path algorithm as it operates on transit networks. Secondly, users have rarely precise preferences at the beginning of the interaction, and preferences tend to be constructed during the interaction (Bettman et al., 1998). Hence, after the first recommendation is provided the user can decide to change her

travel preferences, such as the preferable arrival time, when seeing some possible travels. Having computed multiple travel profiles the system can easily update the recommendation, avoiding the calculation of a new travel profile.

The recommendation, i.e. the ranking of the generated routes, is based on the user preferences contained in the user model. To collect the user's preferences PECITAS poses explicit questions (optional) to the user (see Figure 2, for an example). Each time the user requests a recommendation for a travel she will be asked to specify her preferences. Four criteria with the following selection options are available when the user wants to get a recommendation:

- Walking:
  - I prefer walking
  - no longer than X minutes
  - as little as possible
  - I don't care
- Bus changes:
  - only direct busses
  - I don't care
- Arrival at the destination:
  - must before X o'clock
  - prefer before X o'clock
  - as soon as possible
  - I don't care
- Sightseeing:
  - I'd like to see nice views/objects
  - I don't care

These options are used to generate the user profile that is basically a vector of preference features. After different travels are generated at server-side, the resulting travel profiles, e.g. TP_1, TP_2, …, TP_5, are returned to the PECITAS client, where the final selection of the best travel profile is done. If there are two or more profiles having the same characteristics (e.g. TP_3 might be equal to TP_1 in a case when TP_1 consists only of walking) then fewer profiles will be ranked. The matching of the user model and the travel profiles, which follows a knowledge-based approach (Burke, 2007), is done using a set of predefined functions that map the values of the attributes of TP_n ($n=1, \ldots, 5$) to a satisfaction score for the user (see later). To collect the user preferences and obtain the travel recommendation the human-computer interaction follows these steps:

- *Identify the start point.* This can be done by either choosing a place from a list of predefined places (such as the stations, hotels, squares, shops etc.), or by choosing an existing bus stop or simply by choosing the current location (using the GPS information).
- *Identify the destination point.* This, as illustrated before, can be chosen either from a list of predefined places, or by selecting a bus stop.

- *Select the departure time.* The default option is to select the current time of the user query, although the user has the possibility to plan the travel with a departure time different from the current one. We must note that choosing a different departure time might dramatically influence the recommendation results of the system, depending on the schedules of the busses and the locations of the departure and destination.
- *Select the travel preferences.* The travel preferences, described below, are used to construct the user model and personalize the recommendation.

The user model comprises six attributes $(u_1, u_2, \ldots, u_6)$ that are determined by four general travel preferences: walking, bus changes, arrival at the destination, and sightseeing.

1. Walking preferences are used to set u_1 and u_2. u_1 is a nominal attribute taking one of the following four values:

- *w* - if the user has selected that she prefers walking,
- *mw* - if the user wants to walk no more than some specified amount of minutes,
- *lw* - if the user wants to walk as little as possible and
- *na* - if the user does not care about walking.

In case the user selected the *mw* option, u_2 is a numeric attribute representing the maximum number of minutes the user is willing to walk.

2. Bus changes preferences are used to set u_3. This is a nominal attribute with two possible values. The value *d* is assigned if the user prefers to use only direct busses. If the user does not care about this option, the *na* value is assigned to this attribute.

3. Arrival at the destination preferences are used to set u_4 and u_5. u_4 is a nominal attribute, describing the user's preferences with respect to the arrival time at the destination. The value *bt* (*pbt*) means that the user would like to be at the destination strictly (or possibly) before the specified time. The value *asap* stands for "as soon as possible". Finally, if the user does not care about the arrival time the value *na* is assigned.

In case the values *bt* or *pbt* were chosen for the u_4 attribute then a fifth numeric attribute u_5 represents the latest preferred arrival time.

4. Sightseeing preferences are used to set u_6. This is another nominal attribute, showing the user's interest in seeing the most interesting POIs in the city. The *y* value is assigned if the user has chosen that she would like to see nice views/objects, otherwise its value is *na*.

Thus, the user profile is composed of the six attributes $UP = (u_1, u_2, \ldots, u_6)$. As we mentioned above, the recommendation algorithm first computes some routes connecting the departure and arrival points and then scores them by matching them to

the user model description. To match the user profile with a route, this is represented as a travel profile $TP_n = (t_1, t_2, t_3, t_4)$ consisting of four attributes. The attribute t_1 represents the walking time in minutes, the attribute t_2 is the number of busses used in the travel, t_3 stores the time of the day when the destination is reached, and finally t_4 represents the number of POIs that are touched by the travel. It should be noted that the walking speed is set to 5km/h that is an average human walking speed.

The overall satisfaction score for a travel profile TP_n is defined as follows:

$$S(TP_n, UP) = \frac{\sum_{i=1}^{4} f_i(TP_n, UP)}{\#of f_i \neq \emptyset}$$

where TP_n is a travel profile, UP is a user profile, and f_i are the functions mapping each one of the four general travel preferences (walking, bus changes, arrival at destination, sightseeing) to the appropriate satisfaction score of the user for the travel profile TP_n. Each of the four functions $f_1(TP_n; UP)$, …, $f_4(TP_n;UP)$ operates on the different travel preferences and behaves differently according to the user preferences.

A complete description of all the four f_i functions would require too much space. We illustrate one example to illustrate the general approach. So, if the user has said that she prefers walking, the function depicted in Figure 3 will determine the value of $f_1(TP_n; UP)$. Let us assume that the user prefers walking but not more than 90 minutes, in this case we also assume that he would be pretty satisfied walking at least 30 minutes. This is shown by the fact that in this case f_1 increases linearly in the range from 0 to 30 (minutes), and reaches the maximum of 1 at 30. Then, walking more than 90 minutes would linearly decrease the satisfaction, even for the user who likes walking. When the walking time reaches 180 minutes the satisfaction score will get the minimum value of 0. Therefore, the maximum satisfaction score will be given to the travel profile where the user has to walk between 30 and 90 minutes.

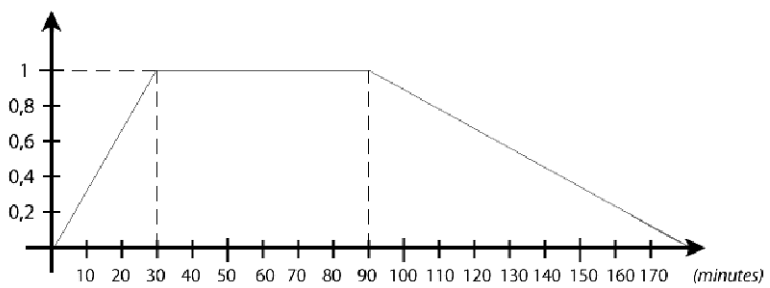

Fig. 3. Scoring function for the walking preference in case the user likes walking

Note that the function $f_1(TP_n; UP)$ considers the different user preferences and it would behave differently if the user has chosen that she does not like to walk or she has chosen any other different walking preference.

We have defined similar functions for all the four general travel preferences after a series of trial and test experiments. Obviously, the optimal definition of these

functions could be a matter of further studying, improvement, and learning, as the system is used by a population of users.

4 Evaluation

We tested PECITAS using the data of the transport network of Bolzano (Italy). This network has 2.815 nodes, 3.526 links, 17 bus lines and 15.382 bus departures. In order to test the speed of the recommendation process 50 different queries were run, each one with a random selection of the departure and destination points, and departure times. The average running time of the algorithm to compute the five different travel profiles TP_1, TP_2,…, TP_5 was 8,4 seconds. The test was performed on a PC with a 1,6 GHz CPU and 512 MB of RAM. We must observe that in some cases some of the generated travel profiles were identical. For instance, if the fastest path does not lead through the city centre, then the travel profile ignoring the possibility to use the bus in the city centre, is the same as the fastest path profile. Or, when the departure and destination points are close enough, the fastest route is by walking, hence TP_1 is equal to TP_4 , i.e. the travel profile that ignores the busses.

We tested the usability and efficacy of the system with some students of the Computer Science Faculty of the University of Bolzano, without raising major usability issues. Here, to illustrate the usage of the system, we run an example usage scenario for a particular recommendation. Imagine that a couple of tourists are in the train arriving to Bolzano in 10 minutes, and the current time is 18:03. Using PECITAS on their mobile phone they query the system for the optimal way to reach Piazza Gries leaving from Bolzano train station, using the public city transport. They select the departure and destination points and specify the departure time to be in 15 minutes. With respect to their travel preferences they state that: they do not want to walk more than 30 minutes; they want to take only direct busses; they want to arrive at the destination as soon as possible; and they want to see nice places and objects.

After these preferences are sent to the server, PECITAS starts generating the possible travel profiles. The TP_1 profile suggests going to bus stop 3, waiting 6 minutes, at 18:25 getting on the bus number 10A, at 18:32 boarding off at Piazza Gries bus stop and walking additional 90 meters to the destination. The TP_2 (travel profile with the altered departure time by 10 minutes) suggests walking to the same bus stop 3, at 18:29 getting on the bus number 2, getting off in Piazza Walther at 18:30, getting on the bus number 10A at 18:46, at 18:52 getting off at Piazza Gries bus stop and walking to the destination. TP_3 (the travel profile that ignores the possibility to use the bus in the city center) suggests walking 1481m to the Vittoria bus stop, at 18:48 getting on the bus number 10A, at 18:52 getting off at Piazza Gries bus stop and walking to the destination. TP_4 (ignores all busses) suggests walking 2650m to the destination. TP_5 (ignores the streets longer than 200 meters) in this case is identical to TP_1, because on the fastest path there are no street segments longer than 200 meters.

After the matching between the retrieved travel profiles and the user profile was done, TP_3 travel profile was recommended to the user, because it has the highest satisfaction

score among all travel profiles. This is a logical recommendation, because TP_3 suggests passing by three interesting points and the arrival time to the destination is relatively early, therefore the selected profile provides the best trade-off among all the user preferences.

5 Conclusions and Future Work

In this paper we have presented PECITAS, a system that helps users to find a personalized path connecting two arbitrary points of a city using the city transport means and walking. While assisting the user in travelling in a city using public transport means has been already offered by other systems, most of these applications cannot suggest the best way to travel between two points taking into account the user preferences. In fact, a particular itinerary could, for instance, be shorter in time but could require the user to change line several times, or could be just a bit faster than walking. A user may prefer one of these solutions taking into account other preferences in addition to that related to time minimization. PECITAS is targeted to users of mobile devices and provides a location-based service recommending the optimal path, based on the specific user preferences. To implement PECITAS, we designed and implemented a fastest-path algorithm for transit networks, and a route ranking methodology based on a particular user model and a route model. In the experiments that we conducted, we used the full data set of the busses and roads of Bolzano. Because of the size of the database and the number of queries performed, we observed that the initialization of the algorithm would require 4-6 minutes, however this is done just once and after that the fastest path finding algorithm can be run by different users without any further delay. We have also shown that a solution of the user problem can be found on average in 8,4 seconds. And this includes the route computation, path ranking and client-server communication times. This is acceptable and makes the solution feasible in a real mobile scenario.

There are several aspects that would deserve some further work. First of all the system can be extended to support other transport means, such as cycling, taxi, etc., not restricting the user by only walking and bus means. The visual description of the result on a map would be a feature that allows an easier interaction with the system. In addition, the generation of a reasonable diverse and meaningful set of travel profiles still has to be explored better. The algorithm should be improved in order to retrieve more reasonable travel profiles, which are diverse enough from each other, so that the recommendation would be more precise and could better satisfy the user needs. Finally we plan to conduct a user study, to test the usability of the proposed solution with a real set of citizens and visitors of Bolzano.

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Intelligent Routing System for a Personalised Electronic Tourist Guide

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Abstract

When tourists are at a destination, they typically search for information in the Local Tourist Organizations. There, the staff categorizes tourists' profile and restrictions. Combining this information with their up-to-date knowledge about the local attractions, weather and public transportation, they suggest a personalised route for the tourist agenda. This paper presents an intelligent routing system for a Personalised Electronic Tourist Guide to fulfil the same task. This system improves the automatic route creation functionality of existing PETs to solve better the needs of tourists in several aspects: i) it includes public transportation, ii) it takes varying travelling times into account, adapting to real circumstances as rush-hours, iii) it calculates routes in real time to react to unexpected events, iv) it applies last generation heuristics from Operations Research to create routes efficiently, even in destinations with a large number of point of interests and a dense public transportation network.

Keywords: Personalised Electronic Tourist Guide, Team Orienteering Problem Time Windows, public transportation.

1 Introduction

Nowadays, the creation of on-site personalised tourist routes that take into account the profile and other restrictions of tourists and up-to-date tourist information is a time consuming task that is often done by the staff of the Local Tourist Organizations (LTOs).

When tourists are at a destination and search for information in the LTO, the staff categorises their profile (cultural, romantic, family …) and restrictions (time, money,

transportation means…). Combining this information with their knowledge about local attractions (location, prices, timetables, how appealing they are for a certain tourist profile…), they suggest a personalised route for the tourist agenda. However, this route does not take into account new circumstances that may happen during the visit (longer time in the visit of an attraction, changes in the weather, delay in transportation …).

The problem a tourist faces (Brown & Chalmers, 2003) is to decide which attractions to visit or to filter and to select what activities to do. The next step is to time-sequence these attractions or activities and to decide how to move from one attraction to the following one. Tourists solve this problem many times during the trip due to deviations from the original planning.

Among others, a Personalised Electronic Tourist Guide (PET), which is a mobile hand-held device, should perform the same task fulfilled by the LTO (Vansteenwegen & Van Oudheusden, 2007), solving the problem summarised by Brown and Chalmers (2003). A PET should provide an integrated solution for route planning that adapts to new circumstances. Furthermore, transportation information was identified as one of the most appreciated functionalities of a PET (Beer et al, 2007; Schmidt-Belz et al., 2003; Stroobants, 2006).

This paper presents an intelligent routing system for a PET, which gathers information about the profile and context of the tourists and attractions. It combines this information, using a novel algorithm capable of creating personalised tourist routes. Such routes react to events in real time, taking into account public transportation to improve the mobility of tourists. The system can target large destinations with an important number of attractions due to the application of efficient algorithms from Operations Research (OR) (Vansteenwegen et al., 2008).

This paper has been organised as follows. Section 2 summarizes the related work. Section 3 introduces the system, including the final validation scenario. At section 4 the details of the system and the algorithm are presented. The paper concludes with the evaluation of the system and some conclusions.

2 Related work

2.1 Mobile tourist guides

As power capabilities, network technologies and portability of mobile devices have improved, several applications aiming at creating mobile tourist guides have been implemented. They have been named Mobile Tourist Guide (MTG), Personal Navigation System for tourism (PNS), Electronic Tourist Guides (ETG) or Personalised Electronic Tourist Guides (PET). There are several reviews of existing PETs available for interested readers (Kramer et al, 2007; Souffriau et al., 2008). Table 1 summarizes the routing capabilities of many prototypes.

Table 1. Routing capabilities of existing PETs (based on Vansteenwegen, 2008)

	HIPPIE	HyperAudio	Cyberguide	Gulliver's Genie	GUIDE	CRUMPET	Taeneb	Mobility Agebt	eNarro	etPlannet	DTG	PNS
Location awareness	x	x	x	x	x	x	x	x	x	x	x	x
Personalised	x	x	x	x	x	x	x	x	x	x	x	
Standard tour available					x				x			
Navigation guidance between attractions	x		x		x	x		x			x	x
Selection assistance	x		x		x	x	x	x		x		
Automated selection										x	x	
Route creation			x		x			x	x	x	x	x
Integration of selection and route creation											x	
Multiple days												
Public transport												

Dynamic Tour Guide (DTG) (Kramer et al., 2007) is the most advanced and mature PET found in the literature. The system allows strong personalisation based on ontologies. Moreover, it creates routes in real time (less than five seconds) grouping attractions into Tourist Building Blocks (TBB). However, the algorithm applied in DTG for routing creation is very simple and it has important restrictions. It can only create proper solutions for a small number of TBBs and one day routes. No public transportation is taken into account.

PNS (Maruyama et al., 2004) applies a genetic algorithm to calculate routes. Nevertheless, tourists have to manually enter the attractions they want to visit with their details (visiting time, duration and value). The system needs nearly ten seconds to obtain a route for just twelve attractions.

2.2 Routing algorithms

The routing algorithm presented in this paper is based on extensions of the Orienteering Problem (OP) (Tsiligirides, 1984). In the OP, several locations with an associated score have to be visited in order to obtain a total trip score. Each player can visit each attraction only once. The objective is to obtain a total trip score as high as possible without violating a time restriction. Its generalization to multiple players is known as the Team Orienteering Problem (TOP). When locations have an associated time window, the problem is called TOP with Time Windows (TOPTW) (Savelsbergh, 1985). The Multi Constrained TOPTW (MCTOPTW) extends TOPTW adding multiple constraints such as money budget or travelled distance.

The Time Dependent OP (TDO) (Fomin & Lingas, 2002) is an extension of the OP where the time needed to travel from a location i to a location j depends on the leaving time from location i. Finally, the proposed algorithm Multi Path TOPTW (MPTOPTW) extends the previous algorithms including multiple paths to go from

one location to another. The duration of at least one of these paths is dependent on the departure time. MPTOPTW is valid to simulate public transportation.

To the authors' understanding, there is no algorithm able to solve MPTOPTW out of the extensions of OP. In the field of public transport, an algorithm to calculate optimum itineraries in an urban public transport system has been proposed, including a stop at an intermediate point (Zografos and Androutsopoulos, 2008). In Hong-Kong, a similar system was tested using a different approach (Chiu, Lee and Leung, 2005). Both of them were designed to be used as standalone solutions. Thus, they are not suitable to be used within a wider algorithm required to solve the MPTOPTW, which has to calculate several times the best way to move from one place to another.

3 Objectives of the system

The objective of the system is the improvement of the route creation functionality for PETs using the latest advances in OR. The system goes beyond the state of the art in route creation functionality, as none of the existing PETs apply the latest OR algorithms to solve similar problems. Moreover, although the inclusion of public transportation has been identified as functionality with a great added value for tourists, this has not been achieved in current PETs.

The intelligent route creation system proposed in this paper calculates routes in real time (less than 5 seconds) according to the profile and restrictions of tourists (time, money, travelled distance …), weather conditions and public transportation. Routes are updated in real time when necessary (longer visit to an attraction, weather change, missing a bus). The system will be validated using the latest technological developments, both on client devices and web technologies.

It must be mentioned that the work presented in this paper focuses on the route creation functionality. The creation of tourists' profile is kept as simple as possible due to great advances on this area such as DTG Planner (Höpken et al., 2006).

3.1 Application scenario: San Sebastian

San Sebastian is a beautiful city located at the North of Spain, just 20 kilometers away from France. San Sebastian's picturesque coastline makes it a popular beach resort, being one of the most relevant tourist places of the North of Spain. The villages near the city are easily reached and they offer amazing cultural, gastronomic and architectural experiences. Due to the small size of the Basque Country (less than 200 km long in any direction), the system assumes that tourists do not change their accommodation during the days of their stay. Thus, the starting and ending location for each day are the accommodation of the tourist. The maximum tour length is 3 days, leading to an actual average stay of a tourist in San Sebastian of 2 days.

Fig. 1. Overview of the public transportation network of San Sebastian

San Sebastian has around 200.000 habitants and it is best visited combining public transportation with short walks. The public transportation (see Figure 1) offers a good bus service with a fixed timetable through a dense network.

3.2 Use cases

As it has been mentioned before, the system targets tourists that are in the destination. Evaluations of existing PETs (Kramer et al., 2007) showed that although tourists are accepting these systems, they also enjoy ignoring the plan. In this case, they use the system to access information about the destination while they explore it. The proposed system offers tourist both choices with the following options:

- Creation and edition of the tourist profile, restrictions, attractions to be visited, and the location of the accommodation.
- Creation and adaptation of the route anytime. The system will update the route when new events are detected, after confirmation by the tourist.
- Visualization and exploration of the route, viewing and evaluating the attractions in a GoogleMaps-based interface.
- Free browse of the destination, accessing information about attractions and public transportation.

4 System overview

4.1 System architecture

The system is based on a thin client architecture (see Figure 2). There are three differentiated elements: client, agents and server. The client provides the interface (see Figure 3) for the final user and communicates the position of the tourist to the server. The HTML based client has been developed using Google Web Toolkit (GWT) and Google Gear. GWT allows developing web applications using native Java code, automatically transforming this code into HTML and JavaScript. Thus, the

developer is isolated from browser specific issues. New versions of GWT make the existing code compatible with new browser versions. Furthermore, Google Gears is an Open Source project that enables more powerful web applications. Gears allows among others, to access the location data of the client. The interface is based on Google Maps to display geo-referenced information.

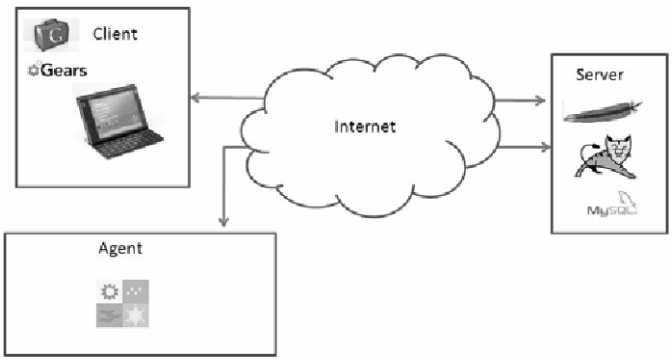

Fig. 2. Architecture of the system

Agents are responsible of detecting changes in the context and communicating them to the system. Each agent tracks a specific variable (weather, traffic jams ...) and updates its state on the server. The current prototype has only one agent that periodically queries a public weather Web Service to check for changes in the weather. The agent looks for the forecast within three days, so that weather is taken into account when creating routes. Future versions will tackle more aspects of the context such as the state of the traffic, demonstrations, long queues at attractions,...

Finally, the server collects all the information sent by the client and the agent. It combines this information with the rest of the data to create and update personalised tourist routes in real time. The server side is based on an Apache web server with a Apache Tomcat application server and a Mysql database manager. The prototype has been tested on a HTC X7500 Advance device, which has built in WiFi, 3G and GPS functionalities.

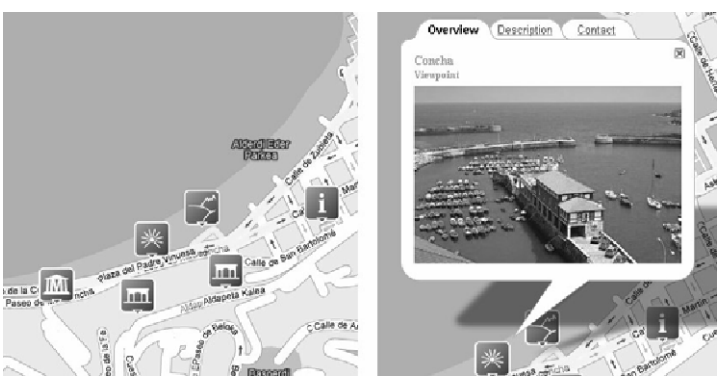

Fig. 3. Screenshots of the client

4.2 Data model

All the information required by the system has been modelled to be stored on a database. The main entities the system stores are the attractions, public transportation, the context and the routes. LTOs are responsible for updating this information, which is a crucial factor to create high quality routes. In order to help in the management of this information, a simple authoring tool based on questionnaires has been developed.

Attractions

Attractions are composed by places to visit (museums, buildings ...) and activities to do. Different types of data are stored for each attraction:

- Descriptive information: name, description, image, location, opening hours, prices and a link to a web page with additional information.
- Customization information to assign a different value to each tourist profile. Each attraction has a value between 0 and 100 for each profile. Some attractions can be clustered into groups, so that each group includes similar attractions, for example, museums of a similar topic and layout. Each time a tourist visits an attraction, the system records the visit and asks for feedback to compare the expected value to the real value. Tourists can rank visited attractions within four categories: dislike a lot (0-25), dislike (26-50), like (51-75), or like a lot (76-100). When a tourist expresses he/she has liked or disliked an attraction of a group, the value of the rest of the attractions of the group is increased or decreased multiplying it by a different percentage: dislike a lot (50%), dislike (75%), like (125%), like a lot (150%). If a tourist has explicitly marked he wants to visit or omit an attraction, its value is changed to 100 or 0 automatically.
- Adaptation information to change the default value of the attraction to react to the context. The relation between each context condition and the attraction value is represented by a percentage. For each attraction, the context conditions that are taken into account are the weather (sun/rain), and the hour of the day (dawn, morning, midday, evening, nightfall, night). For example, a nice viewpoint will be much more appealing on a sunny dawn than on a rainy afternoon.

Public transportation

Public transportation has been modelled taking into account that service frequencies vary according to the day of the week (working day, Saturday, Sunday, special days) and that there are different time windows within a day, each one with different frequencies and different travelling times.

The database stores the information in a human friendly way, keeping it simple to update and to fix errors. At night, a batch procedure is executed to transform this information into a more complex format specifying the travel times between attractions for the next three days. The algorithm accesses the transformed data to improve its execution speed creating new routes.

Context

Context stores information about the weather forecast for the following three days. The forecast is obtained from Yahoo Weather public Web Service. The forty eight weather condition codes reported by Yahoo are mapped into two simplified states: rainy (freezing rain, showers, snow ...) and sunny (clear, fair, sunny ...).

Routes

Each route is stored in the database, including the attractions visited each day and the time required to go from one attraction to the next one. Details about each movement are saved (detailed travelling times, origin, and destination).

As routes adapt in real time to the behaviour of tourists and changes in weather conditions, they must be recalculated while tourists are on the destination. When a new route is calculated, the previous one is taken as the basis template from the starting time of the visit till the current time. Then, the system creates a new route starting from the current position and taking into account that some attractions have been visited and that some resources (time and money) have been consumed. Tourists can customize the proposed route inserting, moving or deleting attractions.

4.3 Multi Path Team Orienteering Problem with Time Windows

The planning problem that needs to be solved is modelled as a Multi Path Team Orienteering Problem with Time Windows (MPTOPTW). A MPTOPTW requires the following input data: a list of attractions (ID, position, customized value for each day, opening and visiting times, cost); information about the public transportation network; preferences of the tourist; the current position of the tourist; and the available resources (time and money). Based on this information, the algorithm creates a personalised route with an ordered list of attractions to visit, including the details to move from one attraction to the following one.

The algorithm applies Iterated Local Search (ILS) (Lourençco, Martin and Stützle 2002) to solve the MPTOPTW. ILS is a metaheuristic method based on iteratively building sequences of solutions generated by an embedded heuristic called local search. This leads to much better solutions than repeating random trials of the same heuristic. The solution found by the local search is perturbed to create a new solution. Then, the best solution is taken as the new starting solution for the local search. The process is repeated until a termination criterion is met. The ILS metaheuristic can be summarized as in Figure 4.

The implemented local search heuristic is based on an Insert Step that tries to add new visits to a route, one by one (Vansteenwegen et al., 2008), using two main concepts. The first one is *Wait*, the time a tourist has to wait for an attraction to be opened. The second one is *MaxShift*, which represents the maximum delay in the arrival to an attraction without causing a route alteration. For each attraction *i, MaxShift* is calculated as the sum of *Wait* and *MaxShift* of the next location *i+1*, unless its time

window ends earlier. For a feasible insertion of a new attraction *j* between visits *i* and *k*, besides not violating any of the constraints, the total time consumption of visit *j,* named $shift_j$, should be limited to the sum of *Wait* and *MaxShift* of visit *k.* Thanks to *MaxShift* and *Wait*, it is not required to check the time windows of all other visits in a tour, to determine the feasibility of a given local search move.

```
s0 = GenerateInitialSolution
s* = LocalSearch(s0)
while termination condition not met do
|     s' = Perturbation(s*)
|     s*' = LocalSearch(s')
|     s* = AcceptanceCriterion(s*, s*')
end
```

Fig. 4. Diagram of ILS

For each visit that can be inserted, the smallest insertion time (*shift*) is determined. For each of these visits a ratio, which ponders the value of the attraction with the cost (time, money and distance) required to visit it, is calculated. Among them, the one with the highest ratio is selected for insertion. Then, the Insert Step is repeated until no attraction can be inserted.

After an insertion, all other visits should be updated. Visits after the insertion require an update of the waiting time (*Wait*), the arrival time, the start of the service, the leave time and *MaxShift*. Every time a visit requires a waiting time, the time shift for the end of that service and all following services is reduced by this waiting time. Visits before the insertion may require an update of *MaxShift*.

To calculate the cost of going from one attraction to the next one, the algorithm chooses the fastest mean between public transportation and going on foot. The walking time only depends on the position of the attractions. However, when using the public transportation, there is a walking time to and from the nearest stops, a waiting time till the transport arrives and a traveling time (including possible transfers). Knowing the leaving time from the departure attraction and the details of the public transportation network (starting time of the services, frequencies, locations of the stops, traveling times between stops), it is possible to calculate all the traveling times and to choose the best option.

The perturbation phase (Figure 4) is based on a shake movement that removes consecutive attractions from a tour. After the removal, all visits following the removed visits are shifted forward as much as possible, in order to avoid unnecessary waiting. A list containing attractions removed recently avoids removing a previously removed visit without first trying to find a different visit.

Although it is possible to include advanced acceptance functions which use the search history to decide on the best solution, in this case the new solution obtained by the shake movement is always accepted (Acceptance Criterion in Figure. 4). The heuristic always continues the search from the perturbed solution, it never returns to the best

found solution to continue. This is called iterated local search with a random walk acceptance criterion (Lourençoet al. 2003). Of course, the best found solution is always kept on memory. Once the termination criteria is met (maximum number of iterations without improvement or maximum allowed time), the system returns the best solution found.

4.4 Example

Table 2 shows a simplified example of a tour proposal for a sunny morning. For each attraction the travel times are summarised. The waiting time refers to the waiting time at the bus stop. When public transportation is required, detailed information is available as follows: i) walk 3 minutes until you reach the bus stop at Sancho El Sabio street number 1, ii) wait for 5 minutes and take bus 27 for 5 stops (10 minutes) until you reach the stop at Avda Zumalakarregi number 3, iii) walk 7 minutes until you arrive to the destination.

Table 2. Route for a sunny morning

From	To	Travel time				Visit Duration	Score	Money
		total	walking	waiting	bus			
Hotel Amara	Peine Vientos	25	10	5	10	30	90	0
Peine Vientos	Concha	20	20	0	0	75	85	30
Concha	Urgul	15	15	0	0	90	85	0
Urgul	Hotel Amara	20	5	5	10	0	0	0

If suddenly the weather changes and it starts raining, the value of some attractions changes, mostly the outdoor ones. The weather agent notifies this change and the server recalculates the route taking into account the new values. In the previous examples the value of Peine de los Vientos and Urgul (outdoor locations) would decrease to 40 and some other attractions would be more attractive. Table 3a shows the composition of the new route.

Table 3. New route for a rainy morning (a) and extended visit (b)

From	To	Travel time	Visit Duration	Score	Money
Hotel Amara	Concha	25	75	85	60
Concha	Kursaal	30	75	75	30
Kursaal	San Telmo	15	90	75	0
San Telmo	Hotel Amara	20	0	0	0

(a)

From	To	Travel time	Visit Duration	Score	Money
Hotel Amara	Concha	25	75	85	60
Concha	Kursaal	30	135	75	30
Kursaal	San Vicente	15	10	55	0
San Vicente	Hotel Amara	20	0	0	0

(b)

While following the proposed route, if the tourist expends more time than expected in an attraction, the route is recalculated again. On the previous example, if the tourist leaves Kursaal later than expected, the previous route would become infeasible. Thus a new route would include a shorter visit before returning to the hotel. Table 3b shows this route.

5 Evaluation

Although the real final evaluation will be held at the LTO of San Sebastian during the summer of 2009 offering the system to real tourists, the prototype has been tested on the laboratory. All computations have been carried out on a personal computer Intel Core 2 Quad with 2.40GHz processors and 2 GB Ram.

First a version of the algorithm not including public transportation has been tested. It has been compared against the exact method proposed by Boussier et al. (2006) for the Selective Vehicle Routing Problem with Time Windows (SVRPTW). Problems with 50 and 100 points and up to 10 routes have been solved. The average gap with the optimal solution is around 5% and the average execution time is around 2.5 seconds. The total time for the whole test set (90 problems) is 150 seconds, while it took around two hours for Boussier's algorithm and it was not able to solve all the problems with its exact solution.

Moreover, new custom test sets have been designed based on the available test sets for the TOPTW. This test set is composed by 68 problems of up to 288 locations; 1 and 2 constraints; and 1 and 2 routes. For 68 problems with one route and two extra constraints the average gap with the best results is only 2.2%, and the worst gap is 8.9%, and with the upper bound 3.1% and 12.3 %. The average computation time is 0.1 seconds. Adding one route the gaps are 0.8% and 6.8% with the best results, and 11.8% and 25.30% with the theoretical upper bound. The average execution time is 0.4 seconds. Authors expect the detailed results of both tests to be published in 2009.

Regarding the inclusion of the public transportation, problems initialised with data about the main bus lines and attractions of San Sebastian are solved in less than 1 second. Authors are working on extending the custom test set to include public transportation in a general way. Once this final custom test set is finished, the development and test of new approaches for MPTOPTW will be possible.

6 Conclusions and future work

Current devices meet the technical requirements of a PET, such as combining computational power, location and communication capabilities. Although some PETs are already available, none of them is able to create personalised routes automatically in real time, on a medium or big destination, including public transportation.

This paper presents an intelligent routing system for PETs based on a novel algorithm that is able to create personalised routes in real time for large destinations taking into account public transportation. Moreover, it reacts to the actions and behaviors of tourists, events and weather changes. The PET is based on a thin client architecture and it takes advantage of the latest technological advances. The evaluation of the system will be held during the summer of 2009 at the city of San Sebastian.

Future work targets three areas. The first one is the implementation of the system on a larger destination. The second one focuses on increasing the algorithm‘s speed, applying parallelisation techniques, and its functionality: supporting scenic routes/walks, different lodgings and supporting groups of tourists traveling together. The final one is the improvement of the social aspects of the system, storing, sharing and adding travel experiences to better help tourists on the destination.

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Acknowledgements

The authors would like to thank the Basque Government for partially funding this work through the neurebide and etourgune projects and to the Centre for Industrial Management of the Katholieke Universiteit Leuven for hosting Ander Garcia as a guest researcher during 2008. Pieter Vansteenwegen is a post doctoral research fellow of the “Fonds Wetenschappelijk Onderzoek- Vlaanderen (FWO)”.

Designing Online Virtual Worlds for Cultural Heritage

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Abstract

The spreading of online Virtual Reality environments and related technologies is likely to open new important opportunities to enhance tourism, enabling the possibility of creating compelling virtual adventures set in the context of artistic and natural beauties. We are exploring these challenges in the context of the TiE project, and developing tools to build enriched virtual environments where the player can explore faithfully reconstructed places and live there information-rich, contextualized experiences. This paper aims at presenting the design choices of the TiE platform, with a particular focus on a technique for an efficient 3D modeling of extended urban areas and on a mechanism to enrich the environment with contextualized, embedded games/quizzes. In general, we intend to analyze the relevance of the concept for the promotion of tourism through an innovative valorization of a territory's culture and resources.

Keywords: Cultural Tourism, Virtual Heritage, Virtual Worlds, Serious Games, 3D Modelling.

1 Introduction

A careful promotion of a territory is a key concern for several local communities, companies and institutions. There are a number of aspects that characterize a territory and may be of interest to a variety of people. These include its cultural and natural heritage, buildings, history, typical products, food, accommodations, sport resorts, values of its people. This promotion of a territory has an important commercial aspect and should favor the encounter between people.

New Information and Communication Technologies (ICTs) are quite useful in this view [Arnold, 2008]. In particular, the Web 2.0 technologies are providing tools (e.g. Social Networks, Forums, Interactive Maps, Travel Recommender and Booking Systems, Instant Communication Support, Conversational Digital Agents [Conrady, 2007]) that are greatly improving the services offered to tourists and citizens. An important step for the next future - it is already named Web 3.0 - is likely to be in the direction of online 3D Virtual Worlds (VWs). Next generation websites will feature virtual environments able to provide the user a more compelling and involving experience [Brutzman, 2007]. VWs are already popular among videogamers, and wide user communities have already established around famous Massive Multiplyer Online Games (MMOGs), such as World of Warcraft [Blizzard, 2008]. Not

differently than for other cases (e.g. the hardware video-chips), it is likely that technologies and tools developed for videogames will be used also in other application fields.

We are exploring these opportunities and challenges in the context of the "Travel in Europe" (TiE) project [Bellotti, 2008], which aims at implementing an innovative means to promote and divulgate the heritage. TiE is building a platform that will provide tools through which third parties content developers will be able to build online 3D VWs where users will live challenging and compelling experiences by interacting with virtual representations of the European heritage. From a business point of view, that has been analyzed in an early survey phase of the project, the TiE platform intends to meet the ever growing demand for advanced interactive systems able to promote the heritage on a wide scale (e.g. through the Internet) and keep a deep root in the local territory.

In particular, we observed that the platform should be able to meet three major needs from cultural and tourist stakeholders:

- Promotion of a territory (the system can be thought of as an evolution of the current advertising of resorts/regions on TV/magazines/journals).

- Support for a geographic-context based knowledge acquisition. The exploration is not purely virtual, but it is strictly connected with the real world. The approach intends to support knowledge acquisition/analysis of the reality, also with history-related experiences.

- The resulting environments and users' virtual travels are not intended as a substitute for visits to real places. A real visit is rather invited, as in current TV promotions that stimulate the user's desire to visit the real places, thanks to the presentation of some important and nice features. The interaction should make users aware that the cultural trip presented through virtual reality is a reproduction of the real heritage that can be visited in European cities. It should stimulate the user to develop and exploit an effective method to take the most of her/his travels (e.g. by showing the importance of adequately preparing a travel, and then of the emotions lived and/or items known there), and should give motivations to a real visit – this is very useful for regions and destinations that, for various reasons, are not yet popular. Finally, TiE aims at meeting the further, ever growing demand for advanced interactive systems able to promote the heritage on a wide scale (e.g. through the Internet's showcase) and keep a deep root in the local territory, by geo-referencing cultural and historical adventures (that will be available to the user during the virtual exploration) in the current urban/country landscape. This promises to be important to promote the knowledge and the resources (e.g. handicrafts, food) of a local territory.

Based on these principles, the TiE platform aims at enabling new kinds of interaction, that link a present territory with its history and resources. This means using a 3D map and a reconstruction of a territory (e.g. a city, a region) as the reference system for a

pleasant virtual visit of the place, joining present and historical features. This is very similar to a real visit, where the tourist goes through a city, and learns about it and its history (e.g. by visiting museums, churches, looking at palaces). In the new approach, any user is able to explore this 3D environment, through a simple web-browser's plug-in. During the exploration, the user can get more in-depth information and/or live contextualized experiences (e.g. videos, games, quizzes) that are embedded in the environment.

This paper aims at presenting the design choices of the TiE platform, showing the relevance of the concept for the promotion of tourism through an innovative valorization of a territory's culture and resources. The remainder of the paper is organized as follows: next session presents some related work on 3D Virtual Worlds, while section 3 shows details of the TiE framework. In section 4 we present a sample from the Genoa prototype, and draw the conclusions in the last section.

2 Related Works

VWs are computer simulated environments where users are represented as avatars [Hughes, 1997]. Originally conceived with a 2D graphics, nowadays, they are ever more set in 3D environments. Typical successful samples of VWs include MMOGs where millions of players interact in real-time [Blizzard, 2008]. Virtual worlds are not limited to games, but involve other applications such as chat, conferencing, entertainment and e-commerce [Kock, 2008].

VirtuyMall is a 3D mall now online in a beta version [VirtuyMall, 2008]. The site allows visitors, represented as avatars, to walk through the halls and corridors, use lifts and escalators, chat between each other, look at the shop windows and also try shoes and clothes. The site involves 40 commercial activities and expects to reach the number of 400 units within the next two years.

Second Life (SL) [LindenLab, 2008] is a 3D virtual environment created by Linden Labs, which has gained wide popularity, in particular on the mass-media. SL is organized as a set of VWs, structured as islands, where user avatars live a variety of experiences. Several islands have been built and used for several various purposes, such as education, tourism, marketing, fantasy adventures and pure entertainment. The OpenSIM project is attempting to develop a similar VW environment that can be run on any server and would be free of any "for-profit" entity's control [OpenSim, 2008]. The approach of TiE is more specific, as it targets fruition of real cultural heritage. Coherently, TiE provides specific mechanisms, procedures and tools aimed at support building culturally valid and realistic user experiences in an entertainment context, as we will show later in the paper. More generally, the founding concept of the TiE platform is strongly rooted on a realistic, geo-referenced representation of the reality. This approach should be more appropriate for a credible promotion of a territory.

3 Virtual World design

TiE involves reconstructing a number of urban areas - they are usually culturally-relevant cities and villages - throughout the whole Europe. This is a huge, long-term effort that required defining some fundamental principles since the design phase in order to be time and cost efficient [Watson, 2008]

A 3D reconstruction of a city or a region for education/cultural aims within an interactive environment is a process that requires a careful trade-off between the models' photorealism (in order to provide a highly impressive and culturally correct and meaningful experience) and the models' complexity and weight (in order to allow interactive real-time online exploration).

The first term of the trade-off stresses the importance of having high-detail 3D reconstructions in order to realize a sound reconstruction of the heritage. The second term highlights the performance problems that the TiE online environment has to overcome in order to provide users with a playable and enjoyable system. Moreover, complex systems are costly to implement, both for the 3D modeling aspect and for the need to create proper textures (which requires taking pictures, rectifying and equalizing them, and composing in the final textures that can be managed by the graphic engine at runtime).

In a highly interactive system, such as a 3D exploration/game, the details of the reconstructed environment are not fundamental to display, as the player moves rapidly there. However, in the case of a cultural heritage game, the player - playing as a sort of art detective - has also to carefully examine also the particulars, where relevant.

In order to meet the above stated requirements, we have designed the reconstruction of each covered place (e.g. a city or several areas inside a city) as it follows:

- The 3D model is completely geo-referenced. The ground is elevated from a local 3D vectorial map. So, the placement of the buildings in the model is precise. This also allows exploiting synergies with various Geographic Information Systems (GISs). This last point is very important in the current scenario where the combination of the powers of "Web 2.0" technologies for user-generated content with open GIS APIs (e.g. Google Maps and Microsoft Virtual Earth) has made easier than ever to implement location-based services [Christensen, 2007] . And some of these services are becoming ever more popular. As a basic implementation, the TiE models now integrate a 2D map interface where the position of the player is shown in real-time on the corresponding real city map (see Fig. 1).

- In each covered area, a few Point-Of-Interests (POIs) are implemented. These buildings are rigorously reconstructed at a high level of detail. We use this approach for culturally meaningful buildings. For instance, the cathedral, the theater, a Renaissance palace.

- The textures for all the rest of the palaces are built dynamically by the TiE system using a statistical template-based algorithm. Since several zones within a city are typically characterized by relatively homogeneous buildings (one or few more building "styles"), the idea is to exploit a statistical description of the architectonic parameters and build the buildings' virtual models accordingly, using a limited set of parametric building models and of textures that are instances of the architectonic features representative of that area. We have implemented this concept through the Random Building Area (RBA) automatic algorithm.

Fig. 1. A snapshot of the player's GUI with the integration of a Microsoft Live Maps with the indication of the player position

In this way, on the one hand the effort to cover extended urban areas is reasonably manageable - in any case, the model developer has the choice of defining the number of buildings' models, textures and architectonic parameters. On the other hand, the reconstructed environment allows users live experiences somehow similar to a real visit of a city, where a visitor typically perceives the feeling of being in a precise place but usually does not perceive/remember the particulars of each distinct building. We refer to this approach as based on an *architectonic-style likelihood* principle.

Moreover, the buildings that are particularly meaningful from a cultural point of view – the above mentioned PoIs - are reconstructed with high detail and with their own

specific real textures (i.e. not statistically defined). These buildings may be the subject of a more attentive analysis by the player, as suggested by the game plot and rules.

The proposed approach allows an efficient set-up of an extended urban 3D environment where virtual cultural and tourist experiences are made possible. Modeling efficiency is further targeted by the TiE platform through the TiE Urban Creator, a visual tool, now under development. A content developer can exploit this tool by providing the 2D map of an area, specifying its building models and the statistical distribution of the architectonic parameters (e.g. types of windows, roofs, number of floors, etc.), and inserting the relevant textures. The tool processes these input according to the above mentioned *likelihood* algorithm and provides as output the 3D model of the whole area.

3.1 Modelling monuments

While several Virtual Worlds represent urban landscapes, a significant leak is represented by monuments, that are key features of a urban landscape, but are awkward to represent. Currently, there are two major approaches for monument modeling. The first one consists in the actual polygonal reconstruction of the monument, and is mostly used for cultural reconstructions. The resulting model can be very precise, but achieving high quality usually requires defining a huge number of polygons that are heavy to load at runtime, and it takes time to build. The second approach is the *billboard*, that was developed for representing natural trees in videogames. This solution is mostly used in real-time videogames, that cannot afford long loading (and model development) times, and consists in attaching a photo of the monument to a flat plane that is continuously rotated by the system so that is always in the frontal view of the player. This, as it is apparent, limits the realism and the quality of the implementation, which is not suited to a cultural experience.

In order to overcome the mentioned drawbacks, we have developed a new algorithm based on an enhancement of the billboard approach by using multiple textures (photos of the monument) that are displayed at different viewing angles. This keeps the simplicity of implementing the monument as a flat plane, but allows to see different pictures from different viewing angles, instead of looking always at the same picture, independently of the angle of view. For each monument, it is necessary to provide a set of N (we have acceptable results already with N=4) pictures taken with the camera's line of sight perpendicular to the monuments and spaced every 360°/N on the equator line (see Fig.2). You can imagine the monument as if it were surrounded by a sphere and the digital camera placed in N positions in the sphere equator. The camera lenses are directed towards the center of the sphere.

Through this approach, we keep the development of 3D models of monuments within reasonable times and allow virtual-worlds explorers to have a culturally valid and realistic view, which is an important feature for promoting contextualized experiences of the cultural heritage.

Fig. 2. An example of a set of pictures of a monument in the Genoa (Italy) city centre

3.2 TiE microGames

Plots and game rules are important aspects to drive the user experience and support a proper fruition of the reconstructed heritage. But, beside these aspects, that are external, superimposed to the environment (they define the logic of a particular game built on top of the TiE environment), we are interested to identify and analyze mechanisms to be embedded inside the 3d environment itself, so to enrich it and further increase its educational value (i.e. give more detail of particulars, provide more in-depth information, present related local products and/or historical facts) and, possibly, the entertainment of the users.

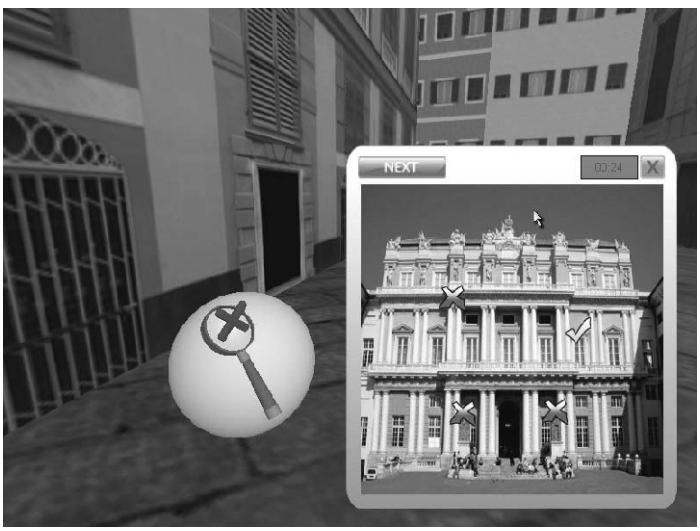

Fig. 3. A snapshot of a Details mG

Investigating this issue, in TiE, we have proposed the concept of microGames (mGs). mGs are short games that focus the player's attention on a particular item that she/he finds during her/his exploration of the 3D world. mGs are typically taken from well

known game models, such as Puzzle, MemoryGame, FindTheWrongDetails (see Fig. 3). mGs are typically, but not necessarily 2D, and are embedded in the 3D environment. The user can activate them (and thus participate to the related experience) by clicking over an associated icon or collecting a representative symbolic object. The concept of mGs is described in detail in [Bellotti, 2008].

Here, it is important to highlight that by embedding mGs inside a 3D world exploration, we can realize something like the "digital analogy" of a real visit of a city/region (which is typically enhanced by visits at museums, galleries, churches and other important buildings and/or memory places), which is the traditional way through which a number of people - from common tourists to specialized scholars - have elevated their spirit by appreciating foreign artifacts, habits and people, and developing knowledge about history, art, and geography – in other words, by discovering the world.

4 Example: Genoa City Center

As a first demonstration of the technological platform, we are implementing the TiE online game, a sort of cultural virtual treasure-hunting games through European cities. We are currently developing the environments for the cities involved in the TiE project consortium: Genoa, Strasbourg, Prague, Tomar, Plovdiv, Cuj-Napoca, Arousa-Norte and Maribor. For the sake of example, we show here the case of Genoa.

Genoa historical city center is one of the largest medieval urban centres in Europe. It consists of around 1.000 m2, with around 80 buildings. Buildings are thin and tall, separated by narrow pedestrian streets, namely "Carruggi" (see Fig. 4). They show typically homogeneous features that we could efficiently model and process through the TiE likelihood algorithm.

Fig. 4. The player in the narrow street of Genoa ("Carruuggi") with typical shops and restaurants

Fig. 5 shows an aerial view of a RBA reconstructed in the model. Inside the historical city, there is Strada Nuova, an area that contains outstanding palaces from the

Renaissance and Baroque age, when Genoa bankers had a key role in the European financial panorama. Strada Nuova was designed as the representative quarters for such families. Given their outstanding artistic and architectonic value, these palaces are implemented as PoIs. Fig. 6 represents the reconstruction of "Palazzo Rosso" (an important museum in Strada Nuova) and "Palazzo Tursi" (the prestigious seat of the municipality of Genoa).

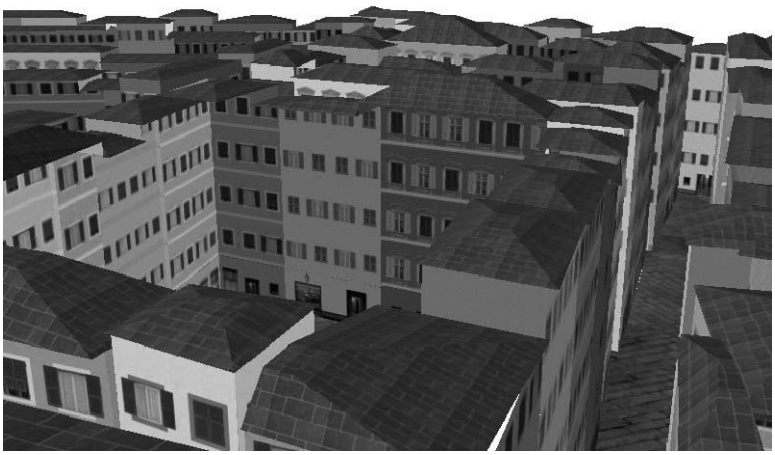

Fig. 5. Aerial view of a RBA in the Genoa model

Fig. 6. The reconstruction of two PoIs: on the left there is the reconstruction of the Museum of Palazzo Rosso, on the right it is visible the Municipality Palace (Palazzo Tursi) and in foreground an avatars.

5 Conclusions

The spreading of online Virtual Reality environments and related technologies is likely to open new important opportunities to enhance tourism, and in particular cultural tourism, given the possibility of creating compelling virtual adventures set in the context of artistic and natural beauties.

We are exploring these challenges in the context of the TiE project, and developing tools to build enriched virtual environments where the player can explore faithfully reconstructed places and live there information-rich, contextualized experiences. The whole should be perceived as a compelling, exciting and culturally meaningful story/adventure in which the player can get familiarity with items somehow available in the territory.

Extended user tests are necessary – and already planned in the context of the project – in order to achieve an appropriate assessment of the proposed approach. However, preliminary informal tests have suggested that the approach is valid and also allowed us to define guidelines for third parties to collect and provide material and contents to efficiently realize models of cities and regions. Moreover, the TiE's enriched 3D environment supports a contextualized promotion of artefacts, products and services (e.g. implemented as mGs), which is an important growing demand from institutions and enterprises that are interested in valorising the resources of a territory.

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Acknowledgements

TiE is partly funded by the European Union, under the Culture 2000 Programme.

An Automated Approach for Deriving Semantic Annotations of Tourism Products based on Geospatial Information

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Abstract

High quality product data is a necessary prerequisite for supporting efficient browsing and recommendation procedures on e-commerce platforms. This is especially true for the tourism domain where an abundance of information can easily overwhelm users. Although classification data such as to which category (e.g. accommodation, restaurant or sight) a tourism product belongs is usually directly available, qualitative information, such as proximity to a lake or opportunities for dining or shopping, is rarely provided in a structured way. As a consequence, users can not restrict their search on these criteria; rather, it would require costly manual information acquisition efforts. In this paper we propose an approach that automatically associates such qualitative concepts with tourism products based on their geographic coordinates and their spatial proximity. An initial evaluation of the approach that considered automatically generated annotations within different regions suggests that it can be used as an alternative to domain experts.

Keywords: Data extraction, semantic annotation, geospatial information, recommender system

1 Introduction

Due to the ever increasing abundance of information available on the Web, users are quickly overwhelmed if they are not sufficiently supported in their decision making processes. Search tools and recommender systems help users to narrow down choices

and support the online exploration of large item sets. However, the interaction experience with such tools depends heavily on the quality of the underlying data. For instance, when looking for appropriate accommodation simple categorical information like the hotel class or the price range is usually insufficient for making a decision. Rather, so called *soft* criteria, such as appropriateness for specific tourist types (e.g. families) or specific interests (e.g. art or nightlife) need to be considered (Miles et al., 2000). However, the majority of this qualitative information, although relevant for the user's judgement of tourism products in the consumption decision is not available in a structured representation, thus is unable to be utilized by parametric search tools or knowledge-based recommendation systems. With the advent of the geospatial Web and the wide distribution of GPS devices (Scharl & Tochtermann, 2007) geo-tagging (i.e. adding geospatial context information) has become popular and can now be considered common for tourism products. However, although geo-tags ease the exploration of a tourism destination with the help of GIS like Google Earth, they do not reduce the information overload experienced by users. Thus, the need for adding value to online decision support systems by integrating derived semantic knowledge remains.

Therefore, we propose a computation scheme that exploits the geo-tags of different tourism service providers, general POIs (points of interest) and user-generated content to automatically derive semantic annotations. The approach builds on the rather obvious assumption that spatial proximity transfers semantic meaning from one object to the other. For instance, if an object is located close to public transportation infrastructure like a railway or a subway station it is considered to be easily accessible. However, in this work we are less interested in quantifying such fuzzy concepts like *easy accessibility*, but in exploiting the relative difference between two or more objects with respect to such concepts. Let us assume two hotels where one is located closer to a subway station, then the closer one will be considered *ceteris paribus* as possessing more of a fuzzy concept like the *easy accessibility with public transportation* than the one farther away. Though the approach appears quite simple at first glance, to the best of our knowledge it has neither been proposed nor put into practice in the tourism context until now. However, online users could profit enormously by narrowing down the product space by using automatically derived, semantic information such as *neighbouring shopping*, *sunbathing* or *recreational facilities*, respectively. Currently, qualitative product information like "a hotel recommendable for those who like to go shopping" can only be derived if multi-dimensional community ratings are available as discussed in the section on related work.

The following sections introduce a motivating example and formalize the technical approach. We then report on our experiences from a preliminary evaluation. Finally, we explore related work and present our conclusions.

2 Motivating example

To illustrate our approach, we consider a motivating example that ranks different accommodation offers based on their proximity to restaurants and bars. Let's assume a hedonistic couple that wants to spend a few days on vacation may choose between three different hotels of the same category and with comparable service characteristics. The preferred leisure activities of the two are dining out, going to bars and enjoying the nightlife. Therefore, an additional characteristic that quantifies the aptness of each hotel for those that like to go out and enjoy the nightlife, i.e. the *nightlife factor*, would be of great help. However, such qualitative information is rarely available on tourism online platforms. One possibility would be to compute such semantic annotations based on the geo-coding of the hotels and those objects related to the nightlife factor. Table 1 lists the available geographic information with Cartesian coordinates.

Table 1. Product catalogue

Name	Type	Coordinates (x/y)
1	Hotel	(0/0)
2	Hotel	(2/2)
3	Hotel	(4/-1)
A	Restaurant	(-1/0)
B	Bar	(1/-1)
C	Bar	(0/2)
D	Restaurant	(-2/-2)

The goal is to compute a utility score for each of the three hotels based on their proximity to restaurants and bars. In addition, a maximum Euklidean distance is assumed that restricts which items are considered as being in the neighbourhood of an item (Chajed et al., 1993). Note that an offline pre-computation of real distances between objects based on road maps and a route planning algorithm is recommended in practice. The setting of such a limit depends on the concept under consideration and what is generally considered to be acceptable in this respect. For instance, dining out or having a drink is obviously more sensitive to distance than visiting different cultural sights as in the first case one would probably prefer to take a taxi or walk instead of driving a car. In practice, this distance parameter could be either chosen based on expert opinions, empirically researched or dynamically set by online users themselves. Figure 1 presents the different items in a two dimensional space where hotels are depicted as rectangles and restaurants and bars as triangles. The circles denote the neighbourhood of each hotel with an assumed maximum distance of 2.5 units.

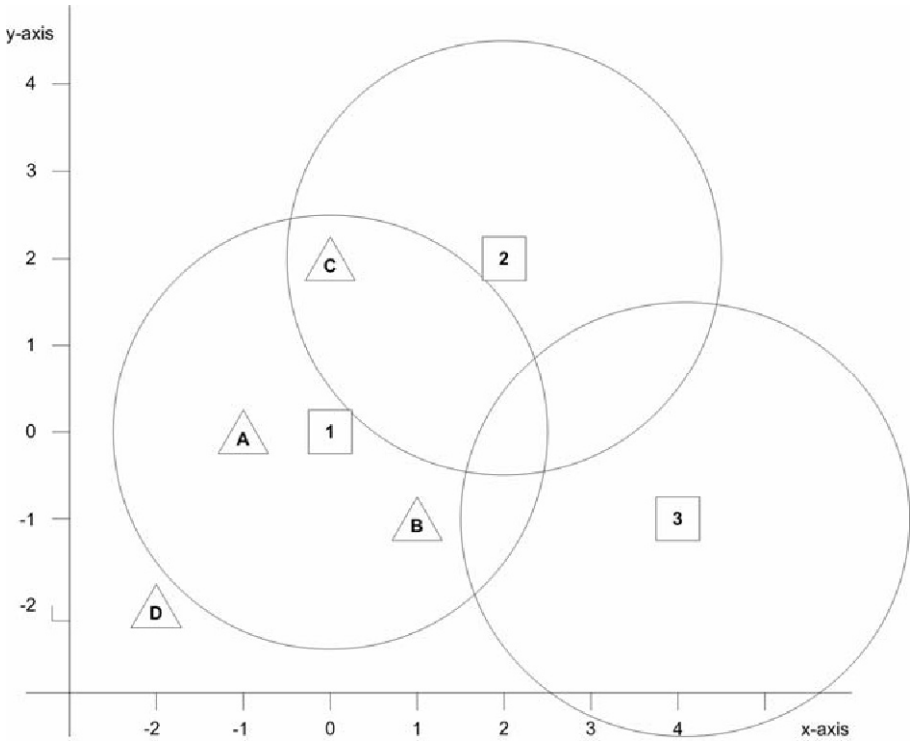

Fig. 1. Motivating example

Without any further computation it can be quickly observed that Hotel 1 is the most ideally located for going out as three of the restaurants and bars are in its neighbourhood, while only one bar is in the neighbourhood of Hotel 2 and none is close to Hotel 3. In light of this example, we will present a more generic computation algorithm in the following section.

3 Semantic Annotation based on Geospatial Information

The task of associating semantic concepts with tourism products builds on the following prerequisites:

- A set of uniquely identifiable products *P* (e.g., see Table 1)

- An initial taxonomy *T* that allows the differentiation of *P* into different product types (i.e. *type(1) = 'Hotel'*)

- Geographic coordinates (i.e. *coord(1) = 0/0*). Note that we used simple Cartesian coordinates (2D) from which distances can be easily computed. In practice, geographic coordinates are typically given in a geographic frame of reference, such as GPS or Lambert. However, these latitude and longitude angles can always be transformed into a planar space with some error. For

further information on spherical trigonometry and transformation functions the reader is referred to the Mathworld Encyclopedia (Weisstein, 2008).

- Semantic concepts *C* including domain knowledge to be able to define each concept on the basis of its proximity to different product types in *T*. The *nightlife factor* serves as a motivating example for concept *C* in Section 2, while restaurants and bars are the product types relevant for proximity computation.

The goal is to compute for each item *p* in *P* and concept *c* in *C* a degree that tells the confidence for *c* to be a characterising property of *p*.

First, we define the function *nh(p)* that returns all items that are in the neighbourhood of item *p*:

$$nh(p) = \{q \in P \mid type(q) \in types(c) \wedge dist(p,q) \leq \max dist_c \quad (1)$$

$type(q)$	type of a tourism product
$types(c)$	function returning the set of product types that when in the neighbourhood support a concept *c*
$dist(p,q)$	Euklidean distance between two items *p* and *q*
$\max dist_c$	constant that sets the maximum distance for a concept *c*

Example: Let concept *c* be the *nightlife factor* and the maximum distance be 2.5. Furthermore, the concepts supporting *c* are consequently: *types(c) = {restaurant, bar}*. As a result *nh(1) = {A, B, C}*, *nh(2) = {C}* and *nh(3)={}*.

In a next step, the proximity between two items is defined:

$$proximity_c(p,q) = 1 - \frac{dist(p,q)}{\max dist_c} \quad (2)$$

Example: *proximity(1,A)= 1–1/2.5= 0.6*, *proximity(1,B)= 0.43*, *proximity(1,C)= 0.2*

Equation (2) uses the inverse of the linear distance and normalizes it on the interval [0..1]. However, for different concepts different proximity functions might be sensible such as, for instance, penalizing distance on a logarithmic or an exponential scale. Furthermore, road maps and route planning algorithms could be used to compute more exact distances between two geographic locations.

Finally, the confidence for a *tuple (p,c)* can be computed as given in (3). In (4) it is normalized relative to the maximum confidence of any product *r* in *P* for concept *c*.

$$confidence(p,c) = \sum_{q \in nh(p)} proximity_c(p,q) \times w_q \qquad (3)$$

w_q optional weighting factor for product *q*

$$confidence_{norm}(p,c) = \frac{confidence(p,c)}{Max_{r \in P} confidence(r,c)} \qquad (4)$$

Example: We assign uniform weights to all products in the neighbourhood of a hotel. However, based on domain expertise it could be decided to assign higher weights to bars than to restaurants as they might contribute more to the *nightlife factor* in general or to let the users parameterize on their own. Thus, the following table contains the resulting confidence values:

Table 2. Confidences for *nightlife factor*

	Confidence	**normalized confidence**
Hotel 1	1.23	1.00
Hotel 2	0.20	0.16
Hotel 3	0.00	0.00

Again, alternate implementations of this confidence function would be permissible as long as they support the partial ordering of the product base with respect to a concept *c*. Although we have not yet evaluated different designs of the proximity and confidence functions, this base approach was validated as a first proof of concept as outlined in the next section.

4 Evaluation

The proposed approach was applied to the product catalogue of an Austrian tourism destination that includes approximately 9.500 different accommodation service providers that are structured into 16 regions in the winter season and 17 regions during summer season. In addition, we utilized several thousand geo-tagged points-of-interest (POIs) and tourism service providers that are classified according to a three-level taxonomy that extends the Thesaurus on Tourism and Leisure Activities of the World Tourism Organization (World Tourism Organisation, 2002). As a result, 10 different concepts were defined based on this classification scheme (see Table 3).

Table 3. Definition of concepts

Nr.	Concept	Description	*types(c)*	$maxdist_c$
1	Art & Culture	For art lovers and the culturally aware.	Ruin or tower, church, archeological site, music festival, exhibition, architectural house, atelier, museum,…	35km
2	Downtown factor	For those who want to stay close to the centre.	Municipal office, city hall, market town	1km
3	Nightlife factor	For those who like to go out and party.	Bar, disco, wine bar, local scene, night spot, live music, pubs	7km
4	Fine food	For aficionados of fine food and the savoir vivre.	Gourmet restaurant, steakhouse, excellent cuisine á la carte, ethnic cuisine, fish specialities,…	15km
5	Golf	For golf players.	Golf course, driving range	15km
6	Shopping	Addresses shopping enthusiasts.	Shopping centre, fashion boutique, major town centre	15km
7	Sights/ Leisure activities	Encompasses all types of sights and leisure activities	Movie theatre, museum, zoo, amusement park, castle, waterfall, gorge, national park, scenic road,…	35km
8	Summer sports and activities	All types of sports and activities carried out in the summer season.	All water sports, biking, trekking, climbing, walking, high trails, sky diving,…	15km
9	Sunbathing, swimming and water sports	For those wanting to relax and enjoy the water.	Open air bath, beach, hot springs, thermal bath, nudist area, boat renting, waterski, sailing, canyoning, …	35 km
10	Winter sports and activities	All types of sports and activities carried out in the winter season.	Skating, skiing, ski tours, cross country skiing, iceclimbing, icehockey, horse slide rides,…	15km

For each accommodation service provider and each concept a normalized confidence value was computed and plotted on a map, where higher confidence values appear as points in a darker shade of grey. Figure 2 visualizes the concept *sunbathing, swimming and water sports* and allows a first plausibility test of the approach.

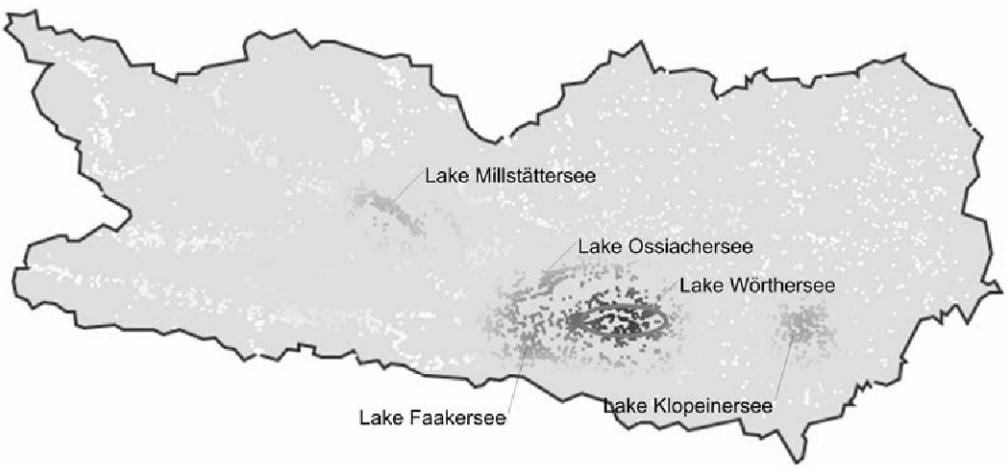

Fig. 2. Confidence for the concept s*unbathing, swimming and water sports*

Carinthia is often referred to as Austria's Riviera and, therefore, it is not astounding that the map is well covered with accommodation providers supporting water-related activities (see Figure 2). However, from the map it quickly becomes clear that the most well-known lake of the country, Lake Wörthersee, is the 'centre of gravity' of this concept and the service providers around the lake reach highest confidence values. Furthermore, other lakes with significant water sport and fun infrastructure can be spotted in Figure 2.

For evaluation purposes, regional tourism managers were asked via a questionnaire to name those regions that are in their opinion recommendable to tourists interested in each of the specific concepts. In addition, the system computed the average confidence for all accommodation providers for each concept and for each specific region. Subsequently, we compared the regions recommended for each concept by the experts with those regions that were ranked above average by the system (i.e. the Top 7 regions). If the experts' recommendation was also top-ranked by the system we considered this to be a *hit* and a *failure* otherwise. The Recall of the system was then computed as the ratio between hits and the total number of expert recommendations (Herlocker et al., 2004).

Table 4. Evaluation results

Recall	Concepts
100%	5, 6, 10
at least 66%	1, 3, 7, 9
at least 50%	8

As can be seen from Table 4, 7 concepts had a Recall of at least 66%, one was only above 50% and two concepts could not be validated due to missing answers from the experts. Only three regional tourism managers have filled out their questionnaires so far, while some others argued that all regions do equally well fit the needs of all tourists and that such weaknesses and strengths profiles for regions are not sensible. Consequently, the need for automated objective mechanisms to derive semantic descriptions of tourism products becomes even more evident. Alternative evaluation scenarios will have to be developed as part of future study work. Furthermore, the concept annotations for POIs will be reviewed in cases where the system's predictions differed from the expert recommendations, to detect inconsistencies in the data. As most expert recommendations included an additional argument as to why they considered the region to be suitable for tourists with specific interests, the concept definitions need to weight higher those POI types that are considered more influential on the tourist's decision. For instance, a large ski-resort deserves more weight than a local skating ring with respect to the concept *winter sports and activities*.

5 Related Work

In the field of geographic information retrieval, a variety of techniques can be used to extract the geographic position of Web resources, such as from the IP address of the

webserver or from the content itself (geo-tagging). For instance, Wang et al. (2005) developed an approach that analyzes the content as well as link information (i.e. web structure). Dickinger et al. (2008) gave an overview of geo-tagging research within the scope of e-tourism. By contrast, the work presented in this paper assumes the existence of already geo-tagged informational resources and analyzes their neighbourhood to extract additional semantic knowledge. Reeve and Han (2005) give an overview on different platforms that automatically extract semantic information.

As a second step the extracted knowledge could be exploited by intelligent systems to support tourists in their decision making process (Werthner, 2003). Knowledge-based recommender systems (Burke, 2000, Felfernig et al., 2006, Zanker et al. 2007) build on explicit domain and product knowledge to relate users' specific preferences to suitable product items. Examples of commercial recommender systems that have been successfully fielded in the e-tourism domain include DIETORECS, a European project that researched the requirements for efficient decision support for tourists and proposed several different modes of interaction (Fesenmaier et al., 2003), Trip@dvice (Venturini & Ricci, 2006) and ADVISOR SUITE (Jannach et al., 2007).

In contrast to the aforementioned knowledge-based systems, collaborative filtering-based recommenders do not require such explicit knowledge as the extracted semantic knowledge could also be derived from collected user opinions. Adomavicius et al. (2005) worked on context-aware recommender systems that collect multidimensional user ratings. In addition to giving their opinions on a destination, they also disclose what they were actually looking for. As a result, considering the example of the *nightlife factor*, if most users that wanted to have fun and to go out during their vacations liked a specific region, it is probable that the *nightlife factor* for this region is relatively high. However, in reality such context-aware systems suffer from cold-start problems. Thus, a sufficient number of users must provide their feedback to the system before it can return sensible recommendations. Furthermore, the dimensionality of ratings must be low enough to prevent user confusion.

Future work by the authors will further develop recommendation algorithms to exploit the semantic annotations of geo-tagged objects for personalizing the interaction with maps based on Zanker (2008).

6 Conclusions

This paper presented a computation scheme for automatically deriving semantic knowledge for tourism products based on their geographic neighbourhood. A first preliminary evaluation showed that the knowledge gained could be used as an alternative to expert opinions that are usually quite expensive to acquire. This additional information can be exploited for bootstrapping a kowledge-based recommender system which is on our agenda for future work. Furthermore, different learning strategies will be explored in order to automatically improve the concept definitions themselves.

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Acknowledgements

This work was partly supported by FFG grant MAPREC nr. 814294 – "Map-based recommendation services for e-tourism applications".

RFID-Based Action Tracking for Measuring the Impact of Cultural Events on Tourism

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Abstract

Organization of cultural events in a tourist destination often demands large investments. For this reason, authorities, tourism managers and operators need data to support their decisions, define their strategies and, in general terms, they are interested in measuring the economic impact of such events on tourism. In this paper, we propose a lightweight framework that can be applied to gather data on the places tourists visit during an event. The framework is based on an action tracking system that exploits RFID technologies on an existing city card circuit. The main choices necessary to design a system that allows to satisfy technical, organizational and budget constraints are described referring to its application to two important recent festivals – Trento FilmFestival and the Festival of Economics – characterized by very different content, history, and targets.

Keywords: Cultural events, RFID; City card, action tracking, economic impact, tourism.

1 Introduction

Cultural events play an important role for the offer of a tourist destination and are often planned regularly, for example, annually or biannually. This kind of events can demand large resources in terms of investments, permanent staff and office, and are frequently sponsored by public funds donations. They may also include a number of initiatives and activities of different nature, e.g., expositions, talks, film demonstrations, and others. To this end, there are many financing and planning decisions involved: on the renewal of the event, definition of the program, involvement of tourist operators and volunteers, etc. These decisions are usually based on data related to the previous editions – statistics on the number of visitors,

events, website's visits, TV broadcast – and on data about the participants' preferences obtained from questionnaires (Research Resolutions & Consulting Ltd., 2005). However, for comprehensive evaluation of the economic impact of cultural events on the tourism of a destination, more specific information must be collected. In particular, it is important to obtain actual statistics on the visits of the attendees to the places that contribute to the cultural, 'oenogastronomic' – food and wine – and commercial tourist offer of the destination.

To gather behavioral data and quantify the economic impact of a given cultural event on tourism activities within a destination, we developed an action tracking framework that includes both technical and organizational design. The framework is based on two main decisions: a) exploiting the RFID (Radio Frequency Identification) technologies; b) tracking the visits on the places in a destination using a city-card circuit. The RFID applications are based on devices that use radio signals to exchange data and they enable automatic identification (Abe et al., 2007). Thus, RFID can be utilized to register the presence of tourists by providing them with RFID tags and installing readers in the points of interest within the destination. To avoid creating an ad-hoc network of readers, we propose to use the circuit created for a city card. City cards allow tourists for a fixed price for a certain period to travel on the local public transportation, get discounts in most of the places of attraction, shops, hotels and restaurants. The use of a city card circuit permits to set up an action tracking framework with reduced complexity and economic and organizational costs.

In this paper we introduce the RFID based action tracking framework, determine the design parameters for the framework and define the technology selection criteria. We also analyze alternative technologies, as for example frameworks based on GPS (Global Positioning System) or mobile protocols, and provide rationales of the adoption of an RFID based system. The framework represents a lightweight approach because it was designed to optimize the cost-benefit ratio. To illustrate main characteristics of our system, we describe two applications to different types of cultural events: the Trento FilmFestival (http://www.trentofestival.it [Sept. 1, 2008]) and the Festival of Economics (http://www.festivaleconomia.it [Sept. 1, 2008]). The applications fall under the "RFID for Festival" project financed by the Municipality of Trento. We analyze the methodological issues on the applicability of the approach and provide some preliminary results on the data collected with the RFID based action tracking based system.

The paper is structured as follows. Section 2 provides an overview of the related work. Section 3 analyzes the problem and discusses the design of the RFID based action tracking framework. Section 4 describes the details of the application of this framework to the "RFID for Festival" project. Section 5 draws conclusions and lessons learned.

2 Related work

Cultural events represent an important growth area within the tourism industry. Many cities organizing such events expressed their interest in measuring the economic

impact of these events on the city. For instance, in Italy the Festival della Letteratura in Mantova (12th edition in 2008), Festival della Mente in Sarzana (5th edition in 2008), and International Film Festival in Locarno (61st edition in 2008) have been all recently analized to evaluate such impact (Guerzoni, 2008), (Istituto Regionale di Ricerca della Lombardia, 2006), (Istituto di Ricerche Economiche, 2005).

Models to measure the impact of specific activities – like cultural events – on tourism have been proposed in (Costa & Manente, 1993), (Dwyer, Forsyth & Spurr, 2004), (Manente, 1999), (Mathieson & Wall, 1982), (Mugellini, Rubegni & Khaled, 2007), (Tyrrell & Johnston, 2006). Other studies confirmed the relation between the expenses of attendees of cultural events and economic impact (Research Resolutions & Consulting Ltd., 2005). The common approach to measure the economic impact of a cultural event is based on data obtained in two main ways: (a) estimating participants of the previous editions using statistics on the number visitors, events, website's visits, TV broadcasting; (b) collecting data on the preferences or intentions of the participants obtained essentially from questionnaires (Research Resolutions & Consulting Ltd., 2005). However, obtaining behavioral data on visits of tourists in a destination would highly improve the results of economic impact models.

To this end, in this paper we propose an approach that uses RFID technologies on a city card circuit to gather actual data from a sample of attendees in order to track their actions: museums they visit, restaurants and bars they go to, and other activities.

RFID technologies have been applied in a number of different sectors, from retail to logistics (Roussos, 2006), and more recently for luggage management systems in airports (Fung L. C. et al., 2007). Other successful applications include access control, toll collection, manufacturing, animal tracking and transport. Critical points of RFID technologies have also been investigated by many authors. In particular, these points include costs related to systems that have to guarantee a high level of precision for the identification of single places (Chen et al., 2007), privacy concerns for data related to customers' behaviors (Angeles, 2007), and technical limitations of the different RFID cards and readers (Curtin, Kauffman, & Riggins, 2007), (Evjemo & Schurmann, 2007), (Finkenzeller, 2003).

Focusing on the tourism sector, the RFID applications can be illustrated in four major subgroups based on different aims of use. The first group of applications is mainly designed for human tracking and control (Zach, Gretzel, & Fesenmaier, 2008). The second group is used for tracking purposes and also to control assets and valuables rather than human beings. RFID-tagged casino chips and luggage tracking systems can be grouped in this subtopic. Contactless payment systems, including contactless billing and paying, are the third main subtopic of RFID applications in tourism. RFID-based toll collection systems and public transport cards are the major examples of this kind of applications. RFID-based information devices are the last group. Most of these systems are designed to inform the user by giving information about nearby objects. For example, the PDA or mobile–phone integrated systems are already widely used in museums to inform the users about the exhibited piece (Danks et al., 2007), (Deguchi et al., 2007), (His, 2003).

To monitor tourists' movements within a destination, other technologies have been recently applied, namely those related to Bluetooth protocol and GPS systems (e.g., Wiki City Rome project, see http://senseable.mit.edu/wikicity/rome [Sept. 3, 2008]). Although wireless devices could be adopted for an action tracking system, for the purpose of our project, they are too expensive, compared to the RFID technologies (the cost-benefit analysis is given in the next section). Moreover, mobile technologies also involve major privacy issues.

3 The RFID based action tracking framework

Gathering behavioral data to measure the impact of cultural events or other initiatives on a tourism destination is a major challenge (Roberts, 2006). Though the estimation of the number of participants of the initiatives in the program of a given cultural event and the number of tourists present in the destination during the events is relatively easy (Costa & Manente, 1993), (Manente, 1999), it is difficult to obtain actual data on tourist activites. Traditional surveys based on questionnaires are useful to get an estimation of different tourist activities in terms of intentions or preferences; however they do not represent behavioral data. Recent developments in mobile and tracking technologies can help to cope with this issue. A systematic monitoring project has to be planned taking into account requirements and characteristics of a specific destination, and cost-benefit analysis of the technologies available.

The main requirements for the monitoring of large cultural events are the following:

- define the number and the kind of places to monitor according to the tourist offer of the destination;
- identify the number and the profiles of participants to be involved starting from data of previous edition of the events;
- identify a technology taking into account economic and organizational costs.

There are two main technologies that can be considered given these requirements:

- mobile technologies that can be used for action tracking, i.e., Bluetooth and GPS devices such as cellular phones or GPS Bluetooth receivers;
- RFID technologies.

As regards cellular phones and PDAs technologies, they were suitable for our purposes; however, despite a good proliferation, they do not satisfy the initial requirements. In particular mobile devices' precision of tracking is limited to 10-20 m, while the Festivals could have several points of interest within such an area. Moreover, usability, privacy issues and costs in case of providing tourist such devices make them unaffordable for the project (Table 1). Therefore, our framework considers the RFID technologies as the most suitable for fulfilling the goal and satisfying the requirements of the project.

There are several devices with different technical specifications in the RFID market. These technical details and device alternatives makes the RFID technologies selection a multi-criteria decision making problem (Oztaysi & Mich, 2008). RFID equipments are generally manufactured for utilizing in a specified band of frequency according to their potential usage environment: low frequencies, less expensive and with low reading speed are applied to access controls or for animal identification; intermediate frequencies are used for smart cards, or for library and shop controls, high frequencies RFID, with a longer read range and higher reading speed are also more expensive and are applied for example for vehicle tracking (Roberts, 2006).

An RFID system consists of two main components; a *reader* and a *tag,* also called label or transponder. The reader queries the tag, obtains information, and then takes action based on that information. That action can be displaying a number on a hand held device, passing information on to a POS system, creating an inventory database, or relaying it to a backend payment system with middleware software. There are two basic types of tags according to their working principle: *passive* and *active*. *Passive* RFID tags do not contain a power source; therefore, they must wait for a signal from a reader and the tag must be relatively close to the reader in order to work. Instead, *active* tags, containing a battery to power the radio circuitry, can actively transmit and receive on their own. The reader can have an integrated antenna, as in handheld units, while larger systems usually separate the antennas from the reader. Basically, the reader retrieves the information from the RFID tag. A reader may record the information internally; or, it may transmit it to another information system. Both, readers and their antenna arrays can be different sizes, from postage stamp-sized to large devices with panels that are several feet wide and high. The reader point is composed of equipment that does not necessarily need human surveillance to guarantee its correct use and functionality. The reader records the data – a card identifier (ID) and timestamp. Working in the stand-alone mode, thus, it does not need to be connected to the network. In some cases, several readers can be connected to a network, for instance, for big museums.

Table 1. The trade-offs in using different technologies

		Precision	**Usability**	**Privacy**	**Costs**
Mobile (GPS, Bluetooth)		Up to 10 m	Depends on device	Require explicit authorization	High
RFID	Active	Few meters	High (non intrusive)	Low	High
	Passive	about 10 cm	Low (intrusive)	Medium	Low

The active type has advantage of being less intrusive for its owner than the passive one, because this card does not require bringing it close to the reader and providing indications of the reading points. However, the cost of this technology is much higher and unacceptable for the purposes of our research project. For this project, we propose to use the RFID proximity cards that use passive technology. These cards are personal and anonymous thus allowing comparison of the data on tourist actions with his or her profile, obtained from a questionnaire.

Table 2 summarizes estimated costs of the RFID-based passive technology application needed for one event and shows that a frameworks using ten readers costs at least € 18,000. In general, we can distinguish: (a) costs of acquiring or renting of hardware and software; (b) expenses of the personnel of three roles, i.e., information technician, statistician, and marketing specialist; in addition to other eventual expenses for the control operators.

To reduce the costs, our framework foresees to exploit the presence of the city card circuit of Trento (http://www.apt.trento.it/en/Services/Trento_Card/Trento_Card.htm [Sept. 1, 2008]). This circuit uses RFID proximity cards for tourists and has an extensive network of 116 RFID readers around the city in the places of attraction, shops, hotels and restaurants. Collection of the action data can be thus realized through the readers of the circuit using the cards distributed among a sample of participants. Moreover, the circuit allows involving a larger number of the locations compared to those that could be checked in case of using another technology.

Table 2. Cost analysis for a framework based on an ad-hoc solution

Expense Item	Unit Cost €	Total Cost €
Rent of 10 reading RFID terminals	550	5,500
Proximity cards (1,000)	2.2	2,200
Offset printing in 4 colors with a personalized layout	450	450
Personal notebook with the SW for data registration and analysis	850	850
Software for RFID cards and readers	1,000	1,000
Human resources for cards distribution, communication with tourist operators, and collecting the data	-	8,000
Total		**18,000**

4 Application of the framework in the "RFID for Festivals" project

The "RFID for Festival" project focused on two events: the Trento FilmFestival (http://www.trentofestival.it [Sept. 1, 2008]) and the Festival of Economics (http://www.festivaleconomia.it [Sept. 1, 2008]) that represent two major cultural events of Trento. Both events, albeit having different traditions (Trento FilmFestival approached its 56th edition in spring 2008, while the Festival of Economics is only at the 3rd), get together a large number of people. Taking into account their great public success, systematic evaluation of the economic impact of the two Festivals on the city becomes highly important.

To estimate the economic impact of these Festivals of Trento, we needed to collect the data related to the visiting cultural, oenogastronomic – food and wine – and commercial points of the city by the participants of the Trento FilmFestival and the Festival of Economics. The locations to monitor were selected on the basis of the following criteria: (a) places of cultural interest where the Festival's events were scheduled; (b) touristic sites important for strategies of the destination; (c) places

where it is possible to use a reader in such a way that it is easily accessible by the participant and can be controlled (human control is not necessary for the work of detector, however, for security reasons, it is not recommended to install detectors in an uncontrolled environment). The data was collected from tourists that came to Trento for the Festival staying at least for one night. We counted neither same-day visitors (i.e., excursionists), nor residents.

4.1 The festivals

Trento FilmFestival is recognized as the largest international festival of films about the mountains, adventures, and exploration. Apart from the cinematographic program, it provides collateral events, such as meetings, exhibitions, performances, and "MontagnaLibri", international book exhibition. Table 3 presents the number of visitors during the last 5 editions, while Table 4 provides additional information for year 2008.

Table 3. Visitors of Trento FilmFestival (2006 – 2008)

Year	Cinema	Events	Montagnalibri
2006	3,151	2,072	about 10,000
2007	3,800	3,300	about 14,000
2008	5,271	5,488	about 17,000

Table 4. Additional Information about Trento FilmFestival

Edition 2008	Over 40.000 visitors in 13 days 128 films presented 328 works from all parts of the world 32,571 website visits, 307,521 pages visited

The Festival of Economics consisted of two main sections, meetings and discussions, together with events in the streets, initiatives for children and youth, ArtInFestival, the library of the Festival, movies and performances. Table 5 presents the summary of the main data of the first two editions and the edition of 2008 that provide an idea of the Festival's success.

Table 5. Data on the Festival of Economics (2006 – 2008)

	2006	2007	2008
Duration	4 days	5 days	5 days
n. of events	35	42	69
n. of international events	12	15	-
Speakers	130	252	196
Journalists registered	200	360	412
Participants	50,000	More than 60,000	More than 70,000
Website visits	1,000,000	More than 1,200,000	1,723,832

4.2 The monitoring project

The action tracking framework assumes accomplishment of the following tasks: identification of locations important for measuring the presence of Festival participants, selecting the means of participant detection, realization of the measurements, and analysis of the data.

Identification of locations to monitor. To apply the action tracking framework we first checked that the circuit of Trento card guarantees the necessary coverage; the three criteria, specified in Section 3, have been applied to select the first list of 116 locations of readers. From this list we eliminated places of little tourist interest, as for instance, hairdressers and fur coats shops, and places located far from the city center. Moreover, we added to this list some central restaurants that are not included in the circuit then, the local Municipality administration checked the commitment of collaboration in each of the points. As the result, 48 places were fixed comprising 10 museums, 18 restaurants, 18 shops, and 2 bars. In order to make the detectors visible to the participants, proper indications were provided, more specifically, a sticker with the logos of both events and the RFID card in the middle (see Fig. 1).

Fig. 1. The indicative sticker for the two events and the picture of the card given to the participants

Definition of the sample and distribution criteria. To guarantee the representativeness of the sample, we set the maximum number of cards equal to 800 to distribute at two festivals (400 per each event) among a random sample set.

The cards had been distributed in different locations in order to intercept all the types of participants, from accredited visitors to those that participated only in the recreational types of activities. Furthermore, some hotel structures were involved in the collaboration, and, in the case of the Trento FilmFestival, the information office of the city as well. Distribution points comprised press accreditation office, conferences, meetings and evening events, information offices of the tourist boards of Trento, Monte Bondone and Lakes Valley. The distribution was realized in the first days of the events: first 3 days for the Festival of Economics and a week for the Trento FilmFestival that has a longer duration. Some difficulties were encountered in the distribution of the cards due to the presence of many excursionists and residents. However, the number of cards distributed was large enough to estimate population

frequencies through sample frequencies; we have obtained a sample size so that a desirable level of precision is guaranteed (in our case, the difference between the population and sample frequencies does not exceed 5%).

Table 6. Number of cards distributed during the two Festivals

Event	Cards Distributed
Trento FilmFestival	284
The Festival of Economics	416
Total number	**700**

The cards distributed during the two festivals were anonymous and for individual use only; a card's ID was linked to a profile of the person. The profile was extracted from a questionnaire given to the participants at the moment of card emission. The questionnaire asks for information about the origin, age, sex, period of stay, type of lodging, the means of booking, and the loyalty to the destination (novice or frequent visitor). Along with the questionnaire, the participant was given a brochure explaining the general goal of the project, how to use the card, and listing the reading points with a map of the city. Unlike the TrentoCard, though utilizing the same circuit, the card of a participant of the project was free and did not provide any discounts. As an incentive to motivate the participants to use the card, the local tourist board provided 10 free week-ends in a hotel with half board to be extracted among the participants.

Main results. In this section, we provide some preliminary statistics based on the data collected with the RFID-based framework. The final results of the analysis will be published in a future work describing the assumptions, external data, and theoretical model to use data obtained with the RFID-based action tracking system for measuring economic impact of cultural events.

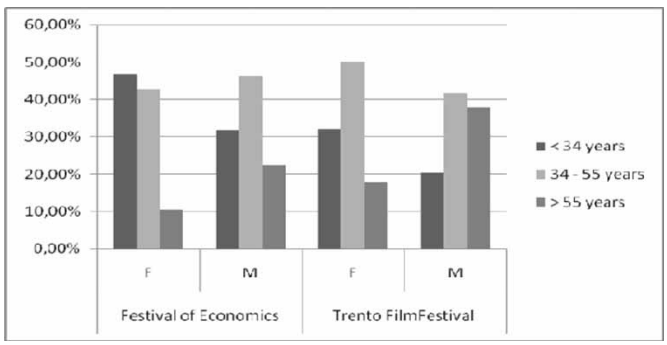

Fig. 2. Visitors profiles for two Festivals

Fig. 2 and 3 provide statistics on the profiles of the participants of the two Festivals obtained from the questionnaire. The first diagram shows a high presence of middle-aged people in both Festivals. From Fig. 3 we can see that most of the visitors came from the nearest regions, i.e., the North of Italy. Interestingly, Trento FilmFestival

attracted a larger fraction of foreign visitors then from the Center or South of Italy, while the Festival of Economics demonstrated a smaller fraction of foreign visitors.

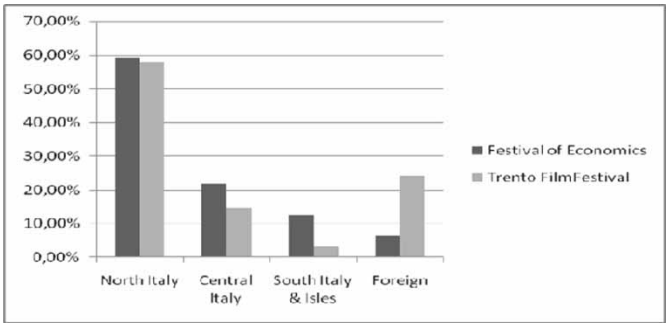

Fig. 3. Origin of visitors for the two Festivals

Fig. 4 provides an insight on the places visited by the festivals' participants. During the Festival of Economics the catering structures of Trento benefited the most, given that more than 55% of the participants had also visited restaurants and almost 25% visited bars. In contrast, a greater number of the FilmFestival participants visited local museums (about 37%).

Thus, even from the preliminary figures we can draw some conclusions on the differences in the tourist fruition of the two Festivals on the destination. Further analysis will be realized to identify the reasons of diversity of tourists' actions and eventually derive recommendations for the next Festivals' editions. In particular, we expect to find out how the operators that so far benefited the least can increase their profits.

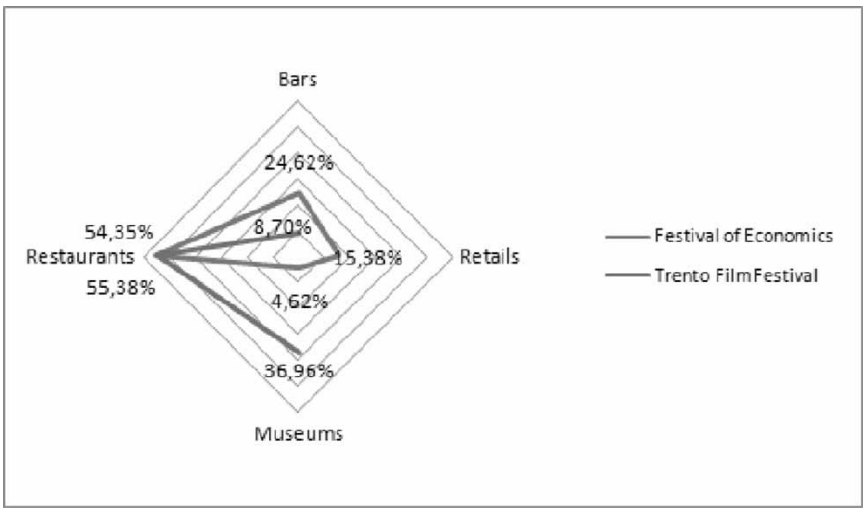

Fig. 4. Action track data of visitors for the two Festivals

5 Conclusions

The action tracking framework proposed in this paper allowed to efficiently resolve the cost-benefit trade-off related to collecting data on large cultural events. In fact, compared to the other solutions that were technically possible, the proposed solution guarantees the collection of behavioral data with relatively small costs.

The contributions and lessons learned in the two projects described in this paper can be summarized in the following points:

- RFID technologies allow to address the trade-off costs vs. precision of the data only if all the actors involved are committed to cooperate; in particular, (a) tourist operators, as owner of the restaurants, shops and museum ticket boxes, must promote the initiative at an adequate level, exposing the sticker and readers in such a way as to facilitate the card utilization even in rush hours; (b) technical partners have to support the data collection process starting from the very early phases, when off-line readers have to be checked, on-line data have to be stored in a database so that it is then possible to recognize visit to the location from those due to the normal use of the city card; (c) the local office of tourism promotion in charge for the city card circuit has to commit the chosen members to participate in the monitoring initiative and to sponsor it.
- Our solution of using a specific card on the basis of the city card circuit allows to overcome the limitations of the original Trento card: the cost of the real card, the predefined validity time, fixed number of monitoring points in the circuit and difficulty of extracting data of participants to the events. Moreover if participants were given the full city card, which provides discounted entrance in most of the cultural places and shops – data could be affected by opportunistic behaviors. Though introduction of specific cards raises costs, it allowed monitoring locations not included in the city card.
- The most critical phase of the entire monitoring process is the distribution of the cards. The solution identified in this paper was to engage tourists mainly at the reception of the hotels and during inaugurations. However, as the number of cards distributed in this way was lower than expected, distribution points comprised also press accreditation office, conferences, meetings and evening events, information offices of the local tourist board.

Finally, as for the application of the proposed framework in a new destination, it is recommended to fulfill a test that monitors a minor event to verify possible critical points and situations. Such issues are important to anticipate because each city has its specific cultural, oenogastronomic – food and wine – and commercial offer, and each cultural event has a different target. In our project, we used as an applicability test the Trento FilmFestival.

Results obtained from the statistical analysis confirmed that the global design of the framework was adequate to accomplish the final goal: collection of behavioral data on the places visited by tourists during the Festivals. These data represent a new input towards the application of effective models for measuring the impact of cultural

events on the tourism and better focusing future decisions for the Festivals' funding and organization.

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Acknowledgments

We would like to thank the sponsor and the collaborators of the varied stages of the project: Municipality of Trento, Algorab, Tourist board of Trento, and other agencies that helped to identify and verify alternative technologies. We also thank the anonymous reviewers for their valuable comments and corrections.

VRUM™: A Tool for Modelling Travel Patterns of Self-Drive Tourists

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Abstract

This paper describes a geographic information system (GIS) developed to visualise the road routes selected by self-drive visitors to outback Australia. These visitors are typically on multiple destination trips. While existing data sets describe locations of overnight stops, they do not show the locations visitors come into contact with between overnight stops. The Visualising Relatively Unpredictable Movement (VRUM™) system imputes complete travel paths for self-drive visitors, allowing destinations and businesses to assess where they fit in trip itineraries. VRUM™ has proven valuable as a tool for visualising changes in travel patterns over time. The system may be readily adapted to other destinations.

Keywords: self-drive tourism; tourism GIS; multiple destination travel; dispersal; touring routes.

1 Introduction

Self-drive modes of transport continue to be the most commonly used by tourists in Australia and many other countries. Despite the focus of tourism transport research has mainly been on air, cruise, coach and rail travel (Carson and Waller, 2002). The mode of transport used by tourists is a critical determinant of how far they travel and how much they see and do during their trips (Prideaux, 2000a). Mode of transport facilitates different levels of pre-trip and in-trip decision making (Prideaux and Carson, 2003). Self-drive transport often represents highly independent travel, and in many cases, self-drive tourists can choose from a set of alternative routes to get from one location to another. Consequently, it can be difficult for businesses and destinations to predict the travel patterns of multiple destination self-drive tourists (Shih, 2006).

There have been some attempts in Australia to improve techniques for reporting on the dispersal of multiple destination travellers (see, for example, Tideswell and Faulkner, 1999). These attempts have been largely based around analysis of the location of overnight stops. While very useful, they show only some of the locations where tourists interact with local economies and environments. The Desert Knowledge Cooperative Research Centre has developed a geographic information system (GIS) which helps in Visualising Relatively Unpredictable Movement (VRUM™) such as that of multiple destination self-drive tourists. VRUM™ uses a set of route assignment algorithms to show the locations of activities such as overnight stops, the routes used between locations, the direction of travel, and the length of stay in each location. Integrating data from the National Visitor Survey (NVS) and the International Visitor Survey (IVS), VRUM™ can display changes in travel patterns over time and differences between market segments (for example, domestic versus international travellers).

This paper commences with a discussion of the need for an application such as VRUM™. It then describes the high level VRUM™ architecture, and provides an example of its application in outback Australia. The paper concludes by identifying some strategies for both improving the performance of VRUM™ in the Australian context and applying the technology to other destinations.

2 Issues

Self-drive modes of transport (private or rented automobiles, campervans and motorhomes, motorcycles etc.) were used in more than 74% of tourism trips in Australia in 2006 (Tourism Research Australia 2006a, 2006b). Self-drive transport was more common for domestic (75% of trips) than international (65%) travellers. It was more common for leisure trips (80%) than business or other types of travel (59%). It was more common for trips involving multiple destinations (85% compared with 73% for single destination trips). There is some evidence that similar patterns apply in parts of Europe (Vogel, 2005; Carson and Waldhoer, in press), the United States (Eby and Molnar, 2002), and South Africa (Lourens, 2007).

Prideaux and Carson (2003) noted that self-drive travel confers the possibility of greater independence in choosing the time of travel, the speed of travel, the suite of possible destinations, and the routes that may be used to reach those destinations. Self-drive travel also confers a psychological sense of independence, with the potential for travellers to change their minds about where they are going and what they are seeing and doing. Such unpredictability is increased in the case of multiple destination (i.e. involving overnight stops in more than one location) self-drive trips. Multiple destination trips are particularly important for smaller and more remote destinations in Australia. For example, research in the Flinders Ranges in South Australia revealed that 57% of visitors there in 2006 were on multiple destination trips (Schmallegger, 2008).

Leiper's (1979; Lawrence, 2005) widely used tourist system model can deal with just one destination, with other locations visited relegated to the role of 'transit region'. Prideaux's (2000b) resort development spectrum describes how multiple destination travellers might first choose to engage in the iconic or 'must do' activities in a destination, and then disperse more widely as time passes. In between these ideas are the typologies of trip patterns proposed by Lue, Crompton and Fesenmaier (1993), Mings and McHugh (1992) and Lew and McKercher (2002). These typologies allow for different destinations to play different roles within the trip. They allow trips to include a number of destinations which are more than transit stops but less than 'the' main destination.

Knowledge about trip patterns can be vitally important for a number of destination and business management functions including marketing, product distribution, product packaging, product development, transport/ access planning, policy and research (Carson and Holyoak, 2008). Trends relevant to outback tourism in Australia include rising fuel prices (Banfi, Filippini, Hunt, 2005), an increase in fly-drive travel (Williams and Balaz, 2008), growth in the 'seniors' travel market (Reece, 2004), changes in international source markets (Pan et al., 2006), and implementation of cross-jurisdictional initiatives such as national touring routes and collaborative marketing campaigns (Desert Knowledge Australia, 2005).

There have been some attempts to use GIS to visualise trip patterns (Wu and Carson, 2008; Lau and McKercher, 2007; Becken et al., 2004). In general, they have provided visualisation of stopover locations, but not travel paths. Where travel paths have been mapped, they have been those described by fixed air, rail or cruise routes, or simply attached to the nearest major road route. Since multiple destination self-drive travellers may choose alternative routes, a GIS application should include activity locations (destinations), length of stay, direction of travel AND actual routes used. This last is unlikely to be achieved by simply applying least-cost methods as in the 'travelling salesman problem' (for example, Marcotte et al., 2004). Rather, the problem is more akin to the selection of walking routes in National Parks (Campbell, 2006), museums or city precincts. Such modelling is relatively easy to do when the data sets capture the actual path travelled (see Lew and McKercher, 2006; Xia and Arrowsmith, 2005; Van der Knaap, 1999; Itami and Gimblett, 2001), but few tourism data sets have such detail. Increasingly sophisticated transport modelling applications present new possibilities for working with incomplete data (Holyoak et al., 2005).

3 Procedures

3.1 Data and Data Issues

The base data for VRUM™ is drawn from the International Visitor Survey (IVS) and the National Visitor Survey (NVS) (2000 – 2006), both administered by Tourism Research Australia (2006a, 2006b). Each survey included approximately 25 000 respondents each year from 2000 to 2004 and 40 000 respondents in 2005 and 2006. Respondents were asked where they spent each night on their trip (in order), transport

used to access each of these stopovers, and how many nights they spent in each location.

The surveys also include a wealth of additional data about the respondent and the trip itself. Respondent data includes age, sex, lifecycle stage (e.g. singles, couples, families etc), country of origin or place of residence in Australia, income and employment status. While trip variables change each year, regularly collected data includes size and composition of the travel party, purpose of travel, accommodation used, major attractions visited, activities undertaken, and expenditure. Linking unit records to the trip matrices allows VRUM™ to create trip pattern analysis for different groups of tourists based on individual or trip related variables.

There are some important limitations in the base data, beyond the fact that specific travel routes are not recorded. While the surveys are large, detailed regional analysis often results in very small sub-samples of people recorded as visiting specific locations. Data also has to be weighted because, while the international and domestic visitor samples are similar in size, international travellers account for just 5% of all visitor nights in Australia each year. Finally, the data is subject to variable interviewer and data entry error over time, particularly in the order of stopovers. Standard analysis of the data sets produced by Tourism Research Australia does not include reporting on the order of stopovers, and as a result, people capturing and entering data have not always been incentivised to accurately record order. This seems to be particularly the case in older data sets where the errors appear greater.

To address some of the limitations of the base data, VRUM™ uses a range of validation techniques. These include techniques to check for errors in the Tourism Research Australia data. For example, a filter is applied so that self-drive travel segments (i.e. travel from one stopover to the next) must be no more than 1500 kilometres (the maximum travel distance in one day). Various filters are also applied to check that recorded locations correspond with actual locations.

Additional data has been sourced from the Departments of Main Roads (and equivalent) in several States. They collect counts of traffic at various intersections within the road network. Similarly, the national Survey of Tourist Accommodation (administered by the Australian Bureau of Statistics) provides occupancy data for a range of accommodation businesses reported at quite small geographic area level. Other local tourism data collections (surveys at Visitor Information Centres, for example) can also be used for validation purposes.

3.2 VRUM™ architecture

The VRUM™ architecture employs the TransCAD (Caliper, 2004) transportation planning software, SQL server, and ArcGIS software (Price, 2008) to establish and visualise the road routes selected by self-drive visitors to regional Australia. The TransCAD software package is a key addition to the modelling process, with a combination of transportation modelling capabilities and a GIS in a single platform. It has a variety of transport planning modules available for many travel demand

forecasting applications which in this case are utilised to interpret tourist movements and assign trips to the road network. The GIS engine within TransCAD contains special extensions for transportation enabling an accurate and efficient model development process. The GIS interface provides a graphical solution that is easily interpreted and allows the user to perform many different types of spatial analysis.

In Figure 1, the SQL server is used to query NVS and IVS survey input data to check the database format and to identify errors or erroneous information requiring correction. This process is followed by a filtering routine to identify the self-drive tourists and associated travel movements to be included in the trip matrix and stopover analysis. The matrix creation and stopover summaries are developed simultaneously, detailing the dispersal of the multiple destination trips.

The road network development and filtering processes include the identification of zone centroids from a total of 475 potential destination points. These centroids range from capital city locations to large and small regional centres. The transport network is composed of many road links ranging from major highways to desert tracks. The trip matrix is assigned to the road network with the use of a cost minimisation assignment routine with stochastic inclusion (Hensher and Button, 2002) to estimate the route choice decisions of the tourists. TransCAD traffic assignment and supporting modules are employed in this process.

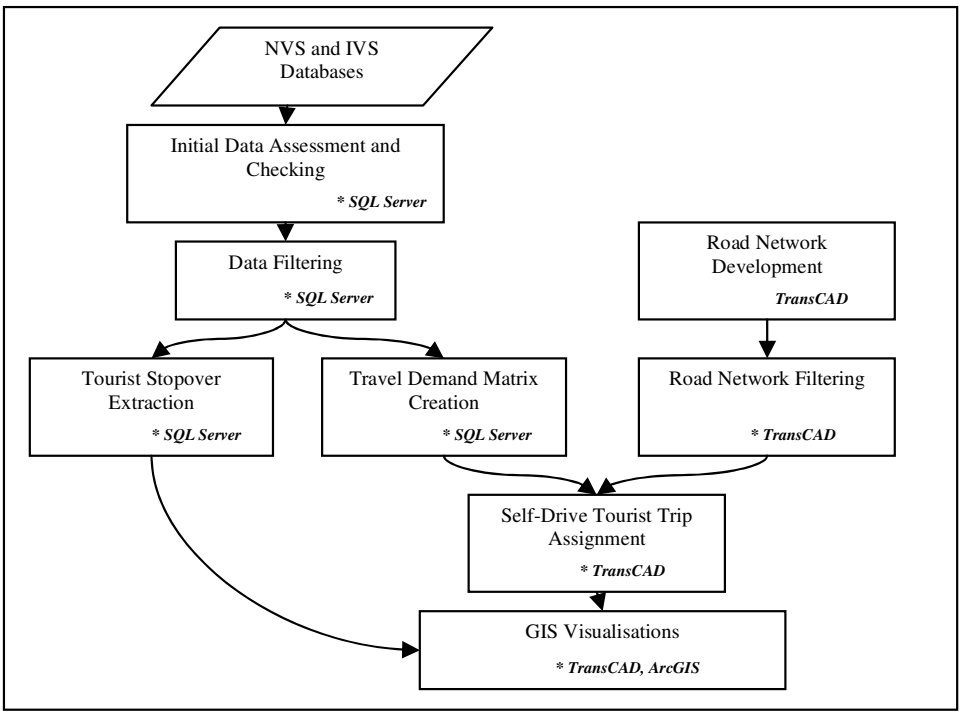

Fig. 1. Flowchart for modelling self-drive tourist movements.

Subsequent visualisations of the results are performed in both TransCAD and ArcGIS. The traffic flow results are displayed directionally and with a range of bandwidth and thematic mapping types to display the assignment results. Additional GIS layers are included to provide a better visual representation of the results. The introduction of ArcGIS allows for advanced GIS analysis such as including fly-through type animations and extensions for linking model results to Google Maps ™.

4 Results

Figure 2 shows the trip patterns of self-drive tourists in Australia 2004-2006. The Figure includes international and domestic visitors, but only includes trips where at least one stopover was in a desert or 'outback' region (the greyed area of the map). Grey lines show the proportion of all trips that included use of specific road segments. Thicker lines represent a higher proportion. Direction is represented by the thickness of the line on the left hand side of the road, and proportions travelling in either direction can be attached to the map as layers (see Figure 3). Circles represent locations of overnight stops. The size of the circle indicates the proportion of trips which included an overnight stop in that location. This map does not include length of stay information (for clarity), but this is normally represented by the depth of colour of overnight stop points (darker points indicating longer length of stay).

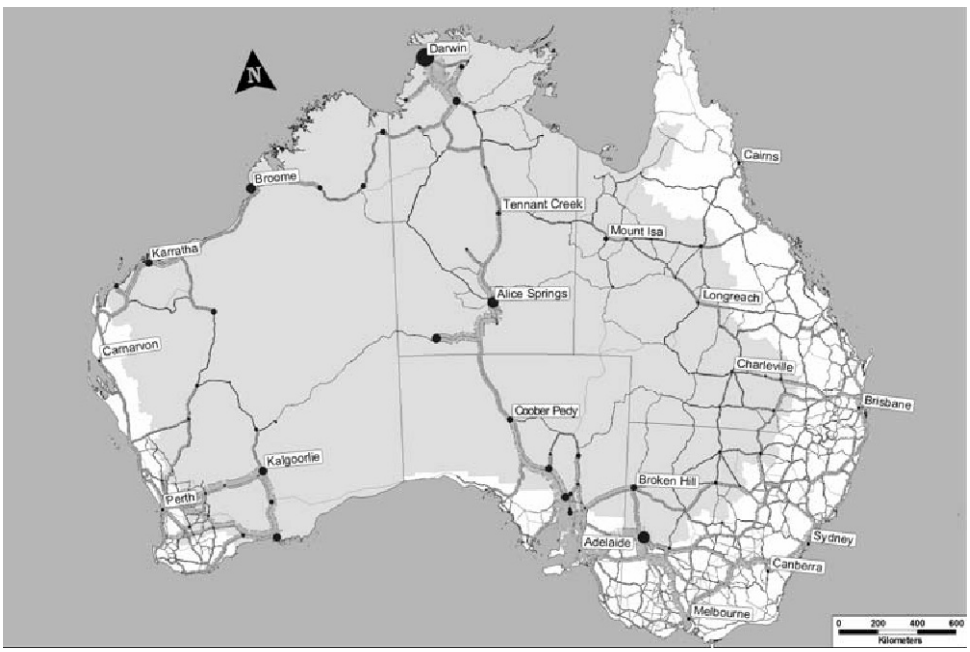

Fig. 2. Self-drive travel paths in 'outback' Australia 2004-6.

Figure 2 highlights stopover hubs in locations such as Darwin (in the far north), Alice Springs, Uluru (to the west of Alice Springs), Kalgoorlie, and Mildura (south of Broken Hill). Road routes converge on the three State capital cities in closest

proximity to the outback regions – Darwin, Adelaide, and Perth. There is also a clear 'hotspot' of travel between Alice Springs and Uluru. Figure 2 also emphasises the important role played by the east coast, non-desert regions as launch points for desert/ outback trips. Australia's resident population is largely clustered along the south east coastal strip, so many desert drive trips include some coastal segments. Figure 2 indicates predominant direction of travel through the desert as south to north. There was a west to east link between Broome and Darwin (and some southerly flow from Darwin), but the east to west flows mainly occur in the far south outside of the desert regions. Destinations deep in the desert in the east are largely bypassed, even though there are road routes through Mt Isa and Charleville among others. There are far fewer west to east road routes.

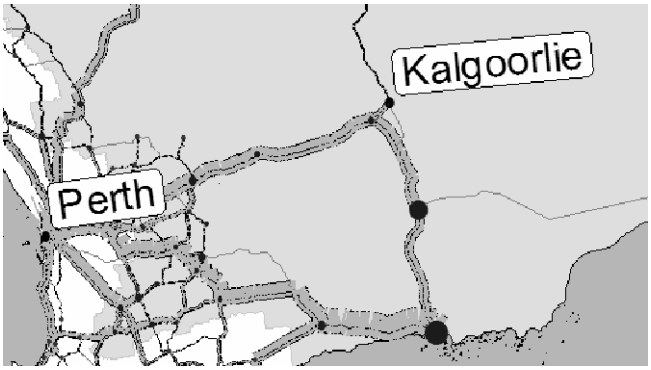

Fig. 3. Direction of travel, south west Western Australia 2004-6.

Figure 3 shows direction of travel for part of the Figure 2 map. Direction is implied by the left hand side of the road. The Perth to Kalgoorlie route, for example shows a higher proportion of trips travelling west to east than east to west. Figure 4 maps out the differences in trip patterns for the self-drive tourists represented in Figure 4 for two time based cohorts – 2000/2 and 2004/6. The grey lines indicate an increase in traffic, and the black lines a decrease in traffic.

The changes in patterns over time are quite dramatic in many places. The most obvious change is the substantial decrease in traffic in the south east corner leading out from Sydney to Broken Hill. Other decreasing areas, although far less dramatic, also cover east to west travel and particularly the route from Brisbane through Charleville, Longreach, Mt Isa and on to Tennant Creek. Travel around the three capitals of Darwin, Adelaide and Perth has increased, with the Perth region (and out to Kalgoorlie) experiencing the greatest increase. It is also interesting to note that traffic south to north from Adelaide to Alice Springs and Uluru has increased, while traffic north to south from Darwin to Alice Springs and Uluru has decreased.

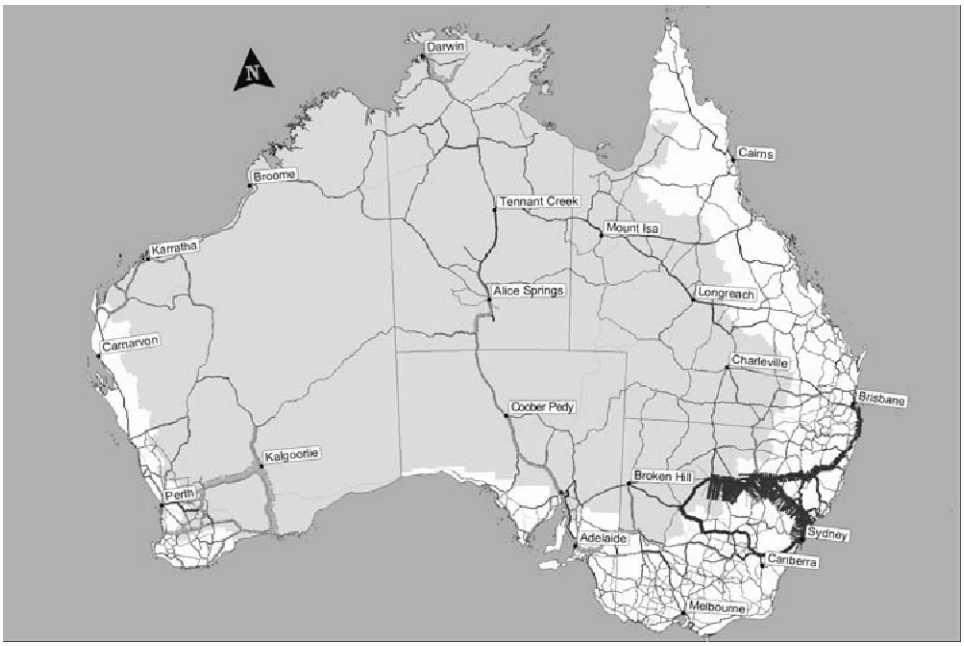

Fig. 4. Difference plot of travel paths in 'outback' Australia 2000-2 and 2004-6.

It is not in the scope of this paper to interpret the causes of change in detail. However, possible explanations may include the increase in low-cost air traffic between the cities within the densely populated south east corner, which may have its corollary in decrease in road traffic in that part of the country. The increase around Perth may reflect rapid population growth there attributed to the current resources boom, and consequent increase in local market. The increase around Darwin may reflect an increase in fly-drive visitors, which could also explain why the routes into Darwin (particularly north from Alice Springs and west from Charleville) have experienced decline. That Adelaide has not been isolated from Alice Springs/ Uluru to such an extent as has Darwin is an interesting outcome that warrants further investigation. Future research will have to address the issue of how to integrate additional data that can help interpret and explain changing consumer behaviour.

5 Conclusions

The example in Figure 2 and 3 demonstrates how VRUM™ can take existing data about events in point locations (e.g. overnight stops at a hotel, refuelling at a service station) and model the impact of those events throughout the road transport system. The technique can also be used, of course, to model impacts of other forms of transport and consequently on other systems. While the isolated point data may well be 'known' by end users, the visual representation has the potential to enhance that knowledge by revealing how tourists link various locations in their multiple destination itineraries and how changes in one part of the system influence other parts.

There are three enhancements to VRUM™ that will be made over the next twelve months. Given the limitations of current data sets used, the first is to increase validation through the incorporation of additional data sets. Validation is currently largely a manual exercise and occurs in response to research team members identifying potential anomalies in the output. An example was the misallocation of traffic between sealed and unsealed highways running east-west in the north east of Australia. Identification of the anomaly arose from a researcher's personal experience working in that part of the country. More formal validation methods are possible with existing data, and this paper has indicated some of these sources.

The second enhancement is to allow trip matrices to be generated based on scenarios for future conditions. For example, further population growth may be projected for Perth, or a new international airport may open in Broome or Karratha. VRUM™ could project trip pattern changes arising from such scenarios. Other scenarios of interest may include continuing increases in fuel prices, marketing investment in specific touring routes, development of new attractions and so on. VRUM™ has the capacity to produce scenario based visualisations, but research is required to underpin any assumptions made in such projections.

The third enhancement is to model trip patterns for day trips that occur around locations with relatively long lengths of stay (following Prideaux's resort development spectrum). This would require substantially more local level data identifying where primary attractions are, common routes for local tours and so on.

VRUM™'s advantages over other GIS developed to model visitor flows include its ability to impute actual travel paths (in this case road routes) and the modelling of flow volumes, direction, stopovers and lengths of stay in a single system. It has been developed initially for analysis of activity in Australia's regional destinations, but the architecture allows it to be applied to any destination where there is adequate visitor data and where the set of potential travel paths can be described. As global travel continues to increase, and tourism continues to be promoted as a means of regional economic development, the applications for a system such as VRUM™ will become more urgent.

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Acknowledgements

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Programme through the Desert Knowledge CRC; the views expressed herein do not necessarily represent the views of Desert Knowledge CRC or its participants.

MPEG-7 Compliant Indexation Tool for Multimedia Tourist Content

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Abstract

A growing amount of multimedia data is produced, processed and stored digitally by Destination Management Organizations (DMO). Therefore, the current main challenge is to index this data in order to make it searchable and reusable. This requires the multimedia content to be annotated in order to create metadata which contains a concise and compact description of the features of the content. Metadata descriptions may vary considerably in terms of comprehensiveness or granularity depending on the tools used. In this paper, we present a new metadata description annotation tool for handling tourist multimedia content based on existing standards. In order to illustrate the performance of the ZERBITUR annotation tool, we designed a prototype and tested it on a relatively small database.

Keywords: Annotation tool; multimedia tourist content; MPEG-7; Destination Management Organizations.

1 Introduction

MPEG-7 is an excellent choice for describing multimedia content in many applications, mainly because of its flexibility. The standard comprises a large set of tools for diverse types of annotations on different levels. The flexibility of the MPEG-7 standard makes it appropriate for many application areas without imposing strict constraints on the metadata models of these sectors. Its flexibility relies strongly on the structuring tools and allows the description to be modular and on different levels of abstraction. MPEG-7 supports fine grained descriptions, allowing the attachment of descriptors to arbitrary segments on any level of detail. Two main problems arise in the practical use of MPEG-7: complexity and limited interoperability. As a result, learning MPEG-7 is time-consuming and this may cause hesitance in using this standard in products. Moreover, it is quite difficult to implement tools for working with MPEG-7, and the resulting lack of tools and implementations enhances the hesitance mentioned before.

On the other hand, current multimedia information management systems in the tourism sector face several difficulties: distributed databases that store growing quantities of multimedia content; great diversity of formats from the most traditional

ones such as brochures up to advanced multimedia codecs; and what it is most important, lack of tools to allow content exchange among tourist agents.

Therefore, this paper presents the implementation of a user-friendly tool for MPEG-7 compliant indexing so that Destination Management Organizations (DMO) can index their multimedia content in a simple, standard and accessible way. This content will be then available for browsing and sharing with other institutions. The paper is organized as follows. Section 2 describes some concepts and projects related to the applicability of the MPEG-7 standard. Section 3 describes deeply the ZERBITUR annotation tool, including the description of each of the five panels that have been programmed. A brief situation of the evaluation process is presented in Section 4. Finally, Section 5 presents some conclusions and future work.

2 State of the art

2.1 Definition of a standard metadata model

When defining the metadata model of the ZERBITUR tool, we wanted to build it as much as possible on existing standards for the description of multimedia data. The main reasons are to facilitate interoperability with other systems and also, simply not to reinvent the wheel. There is a number of standards that are candidates for being used as the basic of the model, such as the Dublin Core Metadata Initiative (DCMI) (ISO, 2003), the EBU P/Meta (EBU, 2003) or the MPEG-7 standard. After reviewing their strengths and weaknesses, MPEG-7 has been selected.

MPEG-7, "Multimedia Content Description Interface", is an ISO/IEC standard developed by the Moving Pictures Expert Group (MPEG) (MPEG-7, ISO/IEC JTC1/SC29/WG11). The MPEG-7 standard is used for describing multimedia content data that supports some degree of interpretation of the meaning of the information. This description allows indexing, searching and retrieving information about the described content. MPEG-7 does not target any application in particular; rather, the elements that MPEG-7 standardizes support as broad range of applications as possible.

The standard includes three main elements: Description Tools, Description Definition Language (DDL) and System Tools. The Descriptions Tools define the syntax and the semantics of each feature (metadata element); and specify the structure and semantics of the relationships among their components. Furthermore, the DDL is the language which defines the syntax of the MPEG-7 Description Tools. Finally, the System Tools support binary coded representation for efficient storage and transmission, transmission mechanisms, multiplexation of descriptions, synchronization of descriptions with content, or management and protection of intellectual property in MPEG-7 descriptions.

2.2 Annotation tools based on MPEG-7

There are numerous annotation tools available for the creation of MPEG-7 documents. Ryu, Sohn and Kim (2002) have proposed an MPEG-7 Metadata Authoring Tool for video description compliant to MPEG-7 specifications.

A very prominent research project is Marvel, an MPEG-7 based video retrieval system which can extract automatically up to 200 different semantic concepts from video streams (IBM, 2004). IBM had already demonstrated its MPEG-7 knowledge and commitment in the research project VideoAnnex (Lin, Tseng and Smith, 2003), which allows the manual annotation of video segments after automatic segmentation of the video stream.

Within the Intelligent Multimedia Database IMB project, which focuses on video data, semantic annotation is supported through the integration of parts of Caliph, a "Common and Lightweight Interactive Photo" annotation tool (Lux *et al*, 2003) (Lux *et al*, 2005), which allows the creation of MPEG-7 descriptions for digital photos. Besides the ability to describe textually the content of the photos, an editor for semantic descriptions based on the MPEG-7 Semantic Description Scheme has been integrated. Some of the annotations have to be made manually, while others are automatically extracted. Finally, Saathoff *et al* (2006) have developed the M-Ontomat-Annotizer, which provides means for the annotation of images and videos. The system supports the use of ontologies for the annotation of high level features.

Destination management systems are a perfect application area for Semantic Web technologies as tourism information dissemination and exchange are the key-backbones of tourism destination management. Authors can mention several projects which have developed novel ontologies for tourism destinations, such as the LA_DMS project (Kanellopoulos and Panagopoulos, 2007), the EU Tourism Harmonization Network (Missikoff *et al*, 2003) or the OnTour project (Prantner, 2004). However, there are not many projects that deal with the semantic annotation of multimedia content in DMO to the authors' best knowledge. One of the examples found is the TBAS system (Bressan *et al*, 2008), which automatically adds metadata to the traveller's photos based both on a Generic Visual Categorizer (visual keywords) and on exploiting cross-content web repositories (textual keywords).

3 The ZERBITUR annotation tool

A growing amount of multimedia data is produced, processed and stored digitally by Destination Management Organizations (DMO). Therefore, the current main challenge is to index this data in order to make it searchable and reusable. This requires the multimedia content to be annotated in order to create metadata which contains a concise and compact description of the features of the content. Metadata descriptions may vary considerably in terms of comprehensiveness or granularity depending on the tools used.

DMO browse large collections of multimedia content in order to select appropriate files to be included in promotional brochures, Web pages and other publications. Usually, files are searched using specific criteria including technical aspects and the things depicted on the photos. DMO appreciate retrieving files using filter conditions such as "*all the documentary photos taken during the nineties that depict children in San Sebastian*".

In order to define the metadata associated to the ZERBITUR Indexation Tool, the georeference of the tourist resource is one of the most important metadata to be annotated. Other metadata include content personalization depending on the profile of the user, and visual appearance of the content in relation to colour (B and W or colour) and the final visualization device.

Personalization of the content refers to the type of information that will be provided to the visitor depending on his/her profile. Therefore, a taxonomy of profiles of visitors has been defined so content is personalized taking into account some demographical and sociological aspects. Thus, personalization parameters include the preferred language, so that audio-visual content will be indexed and only retrieved when the corresponding language is selected. Finally, basic low-level features are used, as for example audio-visual content may be B and W or coloured. Figure 1 displays the tools selected from the MPEG-7 Standard for the ZERBITUR Indexation Tool.

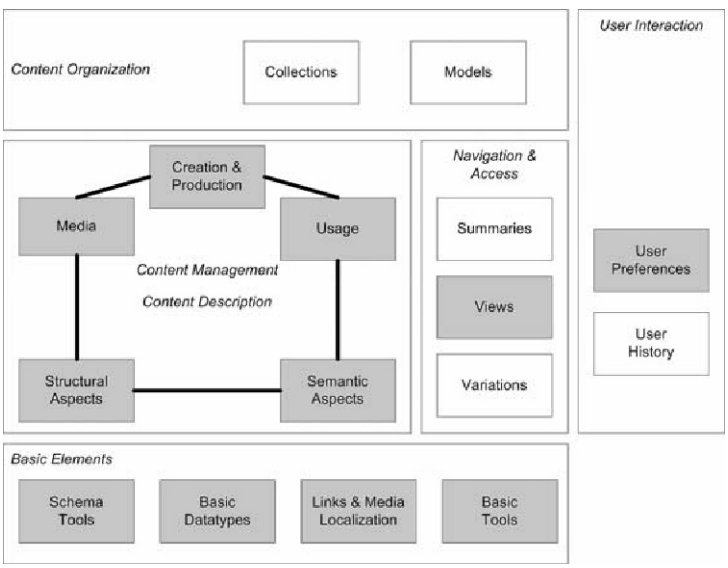

Fig. 1. Overview of the MPEG-7 schema with the tools selected for ZERBITUR highlighted

An MPEG-7 compliant annotation tool has been implemented so that non-expert users from the Destination Management Organizations (DMO) can index their multimedia content themselves. After analysing the state of the art, it was decided that the Open Source tool Caliph serves as the basis for the requirements of the project, as it allows the creation of MPEG-7 descriptions for digital photos. It must be also mentioned that

even though Caliph supports automatic pre-annotation of sets of images, the indexation process will be manually carried out within the ZERBITUR annotation tool. Although it may be time-consuming, it is very important that the DMO providing the content has overall control over the annotation process in order to efficiently search and retrieve the content in a further stage.

The indexation tool stores the data captured through the graphical user interface in MPEG-7 compliant XML files. Moreover, Caliph has been extended to fulfil the requirements of the DMO. This extension has modified the user interface and the module that generates the MPEG-7 XML code, so that it creates new tags related to the information required by the DMO.

Based on the Graphical User Interface (GUI) of Caliph, the ZERBITUR annotation tool includes five panels to describe both semantically and structurally the content, namely the "Image Information" panel, which displays the EXIF tags and values, and holds the creator of the multimedia content; the "User Preferences" panel to describe user preferences pertaining to the consumption of the multimedia content; the so-called "Rights" panel for defining Intellectual Property Rights (IPR) and usage conditions for each piece of multimedia content; the "Image History" panel to trace the usage of the content; and the "Versions" panel to download different formats and qualities of the content.

3.1 "Image Information" panel

Figure 2 shows the graphical interface of the "Image Information" panel. In order to select the content that is going to be indexed, the user can navigate through a tree structure on the left top of the interface until finding the desired file (point number 1 in the Figure). This file is pre-viewed at the bottom of the tree structure.

In the middle column of the interface (point number 2 in Figure 2), the StructuredText Descriptors include four categories related to basic information about the content:

- Who: description of the people or animals of the content selected;
- Where: location of the image or the places shown;
- When: date when the multimedia content selected was recorded;
- What Action: the events, actions, etc. displayed in the content selected.

The same information can be typed also just under the StructureText description, in a free text description area.

In case it is available, the EXIF information (point number 3 in Figure 2) is extracted and converted into MPEG-7 Descriptors. This metadata records the parameters of the camera at the point a photograph has been taken, including aperture setting, focal length of the lens, exposure time, time of photo, flash information, camera orientation (portrait/landscape) and focal distance. The tool is able to automatically extract existing annotations from images and convert them into valid description. Moreover, GPS data can be recorded live in EXIF, so location-based content could be retrieved.

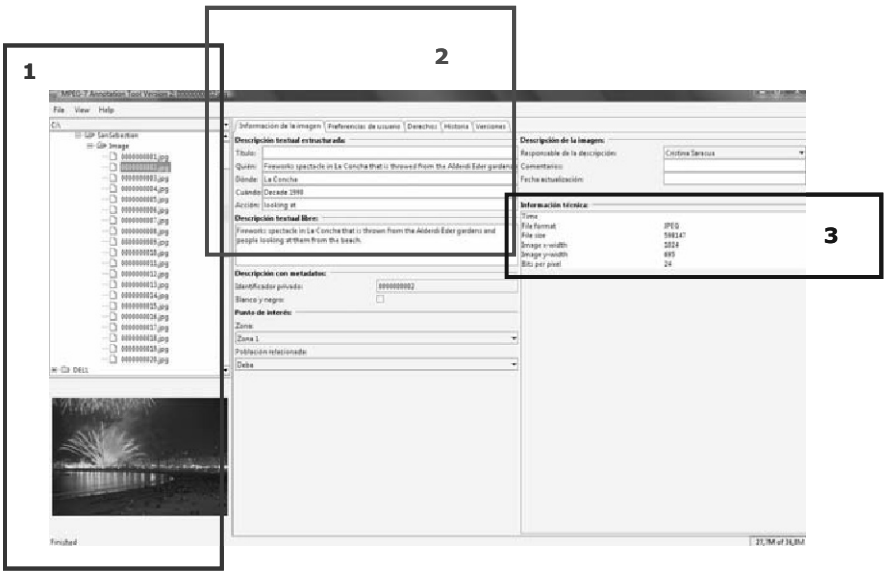

Fig. 2. The "Image Information" panel of the ZERBITUR annotation tool.

The ZERBITUR tool also includes other extended metadata that have been proved important for the DMO in order to retrieve the multimedia content afterwards. For example, the system includes a descriptor for the colour of the multimedia content (B&W or coloured), as DMO may want to search for B&W content for some destination promotion campaign (point number 5 in Figure 3).

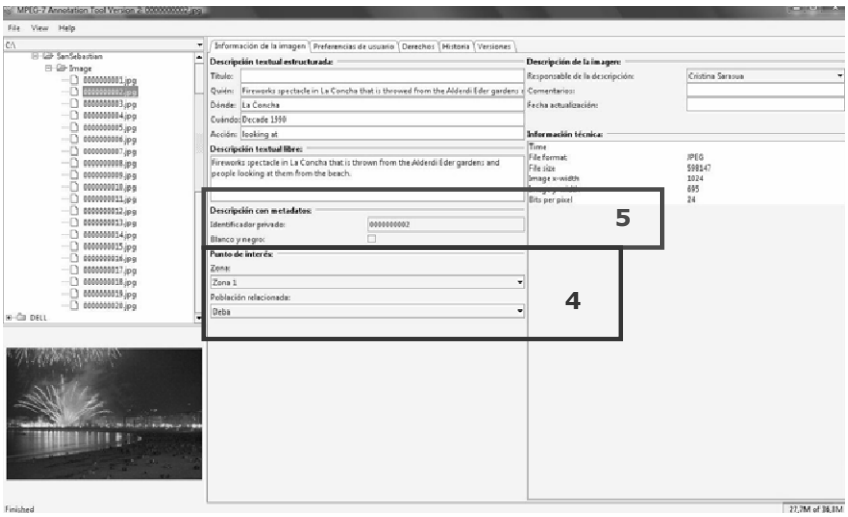

Fig. 3. Some new extensions of the ZERBITUR annotation tool.

A further section called Related POI-City is also an extension of the ZERBITUR project. A Point of Interest (POI) can be considered as any part of the city with some tourist and/or Cultural Heritage attractions (point number 4 in Figure 3), e.g. La

Concha beach in San Sebastian. In such a way, different tourist resources in the nearby of a location can be considered as a unique location for further retrieval.

3.2 "User Preferences" panel

One of the unique features of the ZERBITUR annotation tool is the addition of a "User Preferences" panel dedicated to user preferences metadata (Figure 4). The user profile is the key to personalize services and to obtain tailored information. Two users asking the same request at the same location and at the same time should have different answers according to their profile. The user profile contains personal data and the preferences or interests of the user.

As it is shown in Figure 3, this panel is divided into two main issues. On the one hand, the CreationPreferences description scheme (point number 1 in Figure 4) is used to specify users' preferences related to keywords, the time when the content was created or the geographic data. On the other hand, the Classification Preferences description scheme is used to specify users' preferences related to subjects (point number 2 in Figure 4).

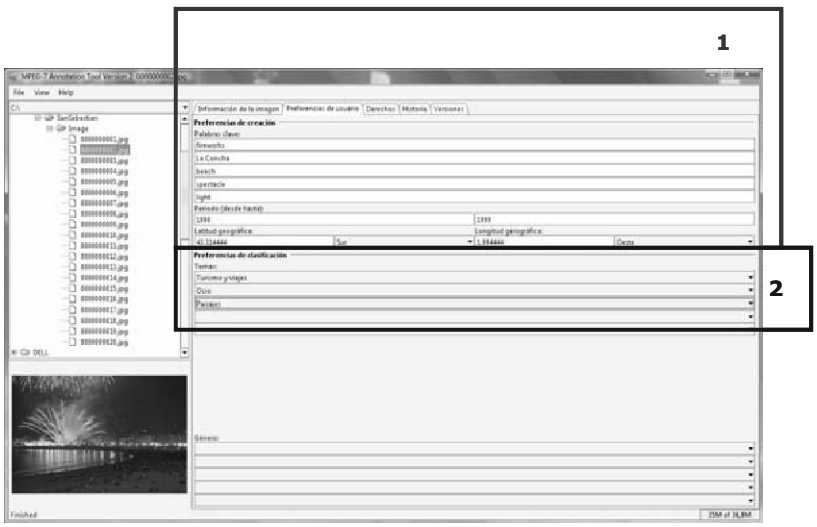

Fig. 4. The "User Preferences" panel of the ZERBITUR annotation tool.

User profiles are of major importance to provide intelligent and personalized tourist location-based services. In order to retrieve personalized content, several keywords related to the content can be defined by the DMO within the CreationPreferences description scheme. For example, keywords such as fireworks, beach, La Concha, spectacle or light have been defined for the displayed content (point number 1 in Figure 4). Further refinement of the content is achieved using the period descriptor, which allows defining the period when the content was created. This descriptor may be very important for DMO, as they may have content that is already old-fashioned.

Moreover, the location information (geographical latitude and longitude) is necessary to geographically locate the audio-visual content selected (point number 1 in Figure 4). This information can be extracted from Google Earth, for example. Regarding the ClassificationPreferences (point number 2 in Figure 4), several indexes (subjects and genres) have been added to select classification preferences information, which will be used later in the retrieval process.

3.3 "Rights" panel

One of the main panels of the ZERBITUR annotation tool is the so called "Rights" panel, which defines Intellectual Property Rights (IPR) and involves information about the copyright, the image creator and rights holder, the restriction of use and contact points. This panel is very important for DMOs, as they invest huge amounts of money generating content for their promotion campaigns. Sometimes, this content includes a copyright from the author, specifying for instance, the type of media (web, brochure) and where they can be used. Therefore, DMOs must be aware of the license related to the indexed content and the type of actions that can be performed with the digital items.

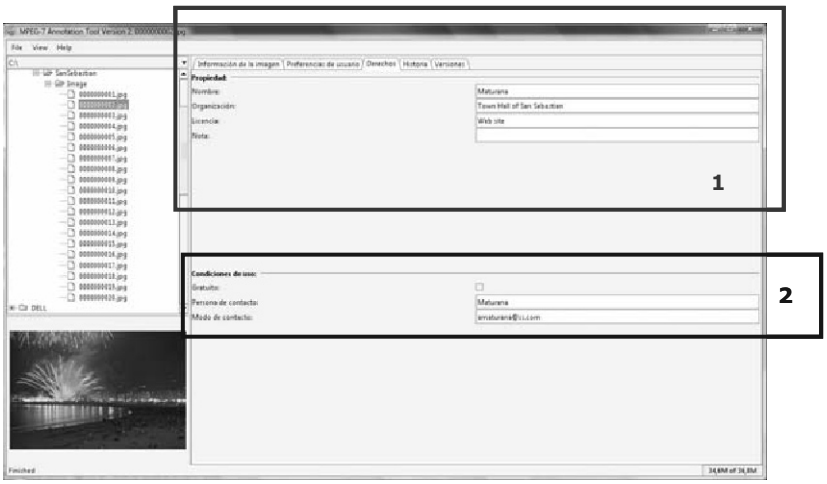

Fig. 5. The "Rights" panel of the ZERBITUR annotation tool.

The "Rights" panel includes two main sections that include the previously mentioned concepts. On the one hand, the first section deals with property parameters (point number 1 in Figure 5), such as the name of the owner of the content, the organization to which he/she belongs, the type of publication for which the organization has rights (Web, brochure) and any final remark. On the other hand, the usage conditions are specified (point number 2 in Figure 5), including the name and contact of the owner and whether the content is free or not.

3.4 “Image History” panel

The “Image History” panel traces the usage of the content, so that the history of the images can be tracked (Figure 6). This knowledge is important for the DMO in order to avoid repeated in the guides. Therefore, several parameters have been defined, such as the type of campaign where the picture has been used (brochure, newsletter, magazine, portal) and the name of the publication.

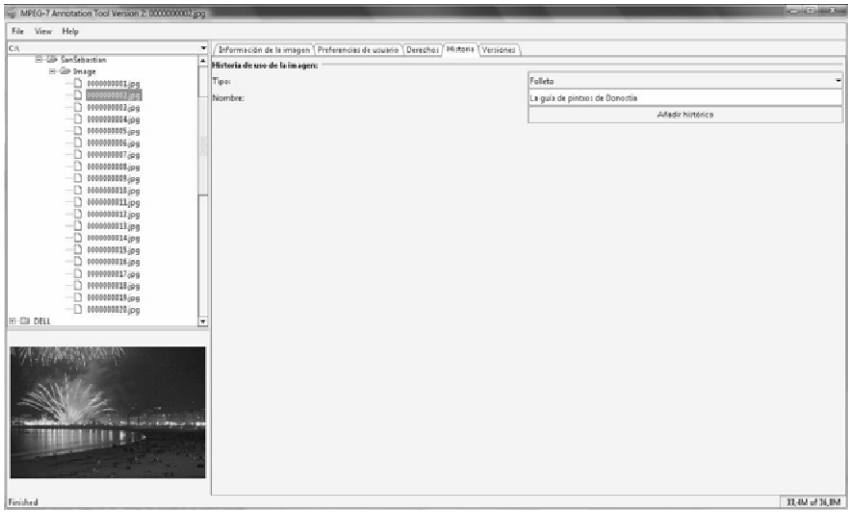

Fig. 6. The “Image History” panel of the ZERBITUR annotation tool.

3.5 “Versions” panel

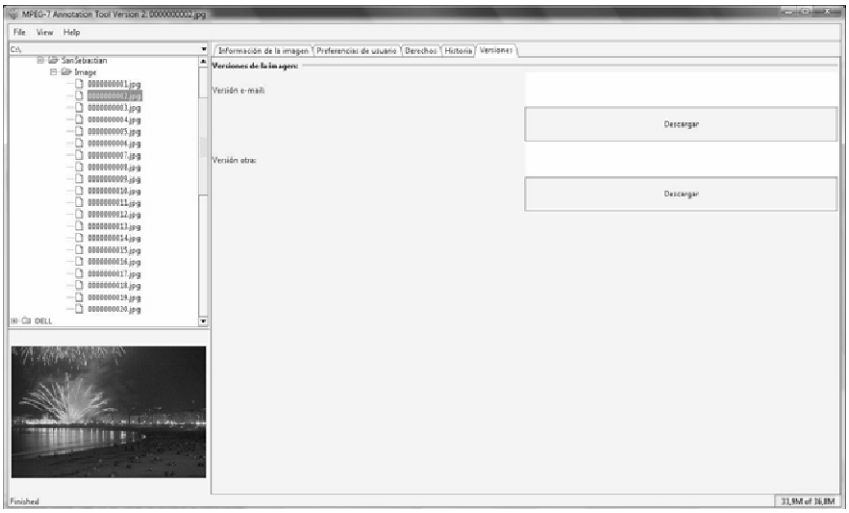

Fig. 7. The “Versions” panel of the ZERBITUR annotation tool.

As multimedia content can have several versions, including different formats or sizes, it is necessary to have a record of versions, so that all the versions can be stored in a simple way (Figure 7). Each version includes a brief description of the technical characteristics such as its resolution, format and size, as well as a button to click in order to download the multimedia content.

4 Results

When designing the ZERBITUR annotation tool, we gathered a significant understanding of the DMO domain along with the problems that characterize requirements of multimedia content to develop promotion campaigns of their destinations. Two problems that arouse were the copyrights of the pictures generated by some external artists and the prevalent colours of those pictures.

In order to illustrate the performance of the ZERBITUR annotation tool, we designed a prototype and tested it on a relatively small database. A dataset from the city of San Sebastian containing current and historical multimedia data has been used, including 22 images from San Sebastian. Contents are related to the surrounding area of the Town Hall and Alderdi-Eder gardens (PoI1 in Figure 8) and La Perla spa (PoI2 in Figure 8). The average time to index an image was nearly half an hour for the historical contents and 15 minutes for modern pictures.

Fig. 8. Geographical distribution of the contents for the evaluation.

Several instructions were provided to the personnel of the DMO in order to install the annotation tool and to understand the meaning of each of the metadata. Despite not being experienced in data processing in general and in semantic web technologies in particular, they were successful in installing and using the tool. However, initial feedback from end-users indicates that some descriptors may be difficult to understand. For instance, the titles of some sections (e.g. Structured Text Descriptions

and Meta Data Descriptions) seem to be too technical for non-experts users. Therefore, some type of online help will be added to the tool.

Moreover, users suggested that the "User Preferences" panel should be changed in order to both reduce the number of keywords associated with some of the descriptors (keywords, subjects and genres) and to make it more user-friendly and easily accessible, using for example check-boxes instead of combo-boxes.

Finally, it must be mentioned that the ZERBITUR indexation tool is a working prototype and a full usability assessment of the prototype has not been conducted yet in a scientific way.

5 Conclusions and further work

Standard-based annotations are needed when building interoperable multimedia applications. Although various annotation systems and methods have been developed, the question of how to easily produce metadata in the destinations still remains unanswered. We have tackled the problem by first identifying the major requirements of the ZERBITUR annotation tool. As a practical solution, the annotation tool was designed and implemented to support distributed creation of tourism metadata. It has been designed to be easily used by non-experts in the Computer Science domain.

This paper describes the implementation of the ZERBITUR annotation tool which enables indexing multimedia content for DMO. Since an important part of the ZERBITUR metadata concerns the description of multimedia content, the MPEG-7 standard has been selected as the development framework.

After analyzing the existing approaches for multimedia annotation, the Open Source tool Caliph has been selected as the basis for the work developed within the project. The annotation process is manually carried out within ZERBITUR, as it is very important that Destination Management Organizations providing the content have overall control over the definition of the Descriptors in order to efficiently retrieve the content in a further stage.

Regarding the annotation tool, several extensions have been added to the basic Caliph software in order to fulfil the requirements of the application domain. Several panels have been added, such as the "User Preferences" panel to describe user preferences pertaining to the consumption of the multimedia content; the so-called "Rights" panel for defining Intellectual Property Rights (IPR) and usage conditions for each piece of multimedia content; the "Image History" panel to trace the usage of the content; and the "Versions" panel to download different formats and qualities of the content. All the panels have been explained in this paper.

Concerning future work, the ZERBITUR annotation tool will be distributed among the final users, analysing the viability of such tools in order to annotate audio-visual content. Although the tool has not been widely used by the non-experts from the

DMO, first feedbacks are quite positive towards the new tool. Moreover, the tool will be extended to be used in other sectors dealing with large multimedia digital libraries such as cultural heritage sectors.

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Acknowledgements

The authors would like to thank the Basque Government for the funding provided through the ETORTEK strategic project eTourgune.

The Adoption of Fingerprint Payment Technology Mechanisms at the Customer End

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Abstract

Biometric technologies such as fingerprint and facial recognition systems are becoming more commonplace; a phenomenon many think is largely driven by security concerns. However, the applicability of these technologies is now expanding beyond security domains to areas such as service augmentation and customization. The purpose of this study is to identify the key factors determining customer acceptance of fingerprint payment technologies. Findings indicate that perceived risk, personal innovativeness and convenience are key factors involved in the adoption of fingerprint payment technologies. Findings and implications are discussed.

Keywords: payment technology, perceived risk, personal innovativeness, biometrics, convenience

1 Introduction

The technologies that empower biometrics have been around for a number of years and it has been used in hospitality industry as well for many purposes (Kang, Brewer & Bai, 2007). Systems that use biometric technologies are rapidly becoming an everyday part of modern life and accepted by commercial and governmental entities because they assure improved security and identification (Langenderfer & Linnhoof, 2005). Biometric technologies offer numerous benefits over usual recognition methods (Trocchia & Ainscough, 2006). First applications of fingerprint technology have been adopted by forensics as a dependable method to verify the identity of an individual for more than a hundred years. (Rotella, Abbott, & Gold, 2001).

Regardless of the tremendous majority of applications focusing on simply improving security, the benefits that biometric technology offer might potentially run much deeper (Heracleous & Wirtz, 2005). Biometric technologies have substantial potential for food service operations as they are fast becoming a global trend in access control, payroll, and point-of-sale purchases across several industries and have proven to be a viable IT investment for increasing profits, reducing costs, and improving speed of service. Several retail services such as restaurants, movie theatres, and supermarkets have implemented or are contemplating the implementation of biometrics as a form of payment.

The purpose of this study is to analyze the crucial determinants of the adoption of fingerprint payment technologies in two distinctive settings: a relatively protected university setting wherein students have integrated accounts to extract food service facilities and public domain Quick Service Restaurant (QSR) settings wherein students do not have any specific integrated relationships.

2 Review of Literature

Technology is one of the most significant competitive advantages for any hospitality company in contemporary fast changing environment. Technology is rising so fast and predictions of the experts show that biometric technologies will have a significant role in the near future (Floyd, 2003; Rinehart, 2000) due to several reasons such as reduced cost of the technology and increased consumer acceptance. The acceptance and use of biometric technology has grown quickly. Revenue from the sale of biometric technologies is estimated to increase to $4-6 billion by the end of 2008 (International Biometric Group, 2005).

Biometric technologies use unique physical or behavioral characteristics such as voice, fingerprints, or irises to verify identity. Recently, the applicability of these technologies is gradually expanding beyond security domains into the world of commerce in areas such as service augmentation and customization. They are gradually appearing as payment solutions in sectors such as retail, restaurants, fitness centers, and amusement parks. Password-based security systems are more likely to be forgotten, stolen, or they could be guessed, on the other hand, verification by biometric is a trustable method which cannot be stolen, guessed or forgotten. Since biometric authentication has those advantages over the traditional methods, they are becoming more popular as an alternative method (Desmarais, 2000).

While the promise of this technology is enormous within the context of service delivery (Hercaleous and Wirtz, 2005), its pace of deployment has not been as rapid (Reily and Kliest, 2005). Given its backdrop of recent use in law enforcement such as tracking criminals, border security etc, consumers do not understand how biometrics information would be used and stored (Reily and Kliest, 2005). In addition, financial institutions have not been willing to tackle the infrastructure challenges pertinent to the storing of the relevant customer biometric data such as fingerprints.

2.1 The Evolution of Biometrics

Biometric technologies use unique physical or behavioral characteristics such as voice, fingerprints, or irises to verify identity. Table 1 gives examples and features of biometric identifiers – both physiological and behavioral. Fingerprint biometric allows identity to be verified by matching the ridges and furrows which take place on the surface tips of a finger. Hand geometry is based on the dimension of the entire hand that includes the palm and fingers. Facial attributes such as eyes, nose, lips, and chin can also be used to verify identity. Another accurate and feasible way for biometric recognition is the retina. DNA is based on the genetic makeup of an individual and differs from other identifiers in that, a tangible physical sample as

opposed to impression or image is required. Keystroke dynamics measures the time spacing of typed words, signature verification is concerned with the dynamic features like curve, route, acceleration, velocity, and trajectory profiles of a signature. Walking pattern, referred to as 'gait' may also be used to verify identity as well as one's voice.

2.2 Biometrics Defined

Biometrics can be either physiological or behavioral. Firstly, physiological biometrics is based on measurements and data derived from parts of the human body. Whereas behavioral biometrics is based on measurements and data derived from an action taken by a human person. A fingerprint is produced when a finger is touched on a smooth surface. It is basically the copied image of fingertip epidermis (Maltoni, 2005). The most obvious structural characteristic of a fingerprint is the pattern of interleaved ridges and valleys. If you look at a fingerprint image, darker parts are ridges while brighter parts are valleys; both ridges and valleys run in parallel; sometimes they divaricated and sometimes they terminate. When examined, it could be seen that the fingerprint pattern points out one or more regions where the ridge lines assume distinctive shapes. There are three classified typologies for these regions which are loop, delta, and whorl. Pattern recognition is the study of how machines can monitor the environment, learn to differentiate patterns of interest from their background and make sound and rational choices about the categories of the patterns. Fingerprint recognition could be classified as a complex pattern recognition problem. It is a hard process especially in poor quality images. There is a common misunderstanding that automatic fingerprint recognition is a completely solved problem in view of the fact that it was one of the initial applications of machine pattern recognition about fifty years ago. Quite the opposite, fingerprint recognition is still a challenging pattern recognition problem.

There are many fingerprint recognition algorithms. Some of them store the actual image of the fingerprint while others store only the text that comes from an algorithm. Basically, it means that, when you are giving your fingerprint, you may give your actual fingerprint image or some text. Nowadays, fingerprint print payment technologies offers both of them which means some of the companies are storing customers actual fingerprint images whereas others are storing the text algorithm of the fingerprint in an encrypted way.

2.3 The Use of Biometrics in Businesses

The U.S. Congress demanded the use of biometrics in the United States (U.S.) visas in the Enhanced Border Security and Visa Entry Reform Act of 2002., Additionally, all visa waiver countries were also demanded to implement biometric machine-readable passports for their citizens to visit the U.S. Malaysia intends to provide all citizens a fingerprint-stored and chip-toting piece of wallet-sized plastic that acts as a banking card, driver's license, commuting pass, and general national identification document. The stored fingerprint image can be compared to the holder's live fingerprint to verify the cardholder's identity. The rollout, known as MyKad, is reported to have cost $71 million and is expected to expand to eventually include

international travel and voting capabilities (McGinity, 2005). Several airlines and airports have gone as far as to tie biometrics to their frequent flyer loyalty programs as a global strategy to improve border security, drive service excellence, improve productivity, and reduce costs. Examples are Singapore Airlines (SIA) and its hub, Changi Airport (Wirtz & Heracleous, 2005) and Amsterdam's Schipol Airport in the Netherlands.

The business case for biometrics is also extremely powerful (Gohringer, 2004) and already several businesses are realizing bottom-line benefits from current biometrics authentication applications such as data protection, time and attendance tracking, access to buildings and facilities, access to company's network and computers, access to financial accounts, transaction security, and point-of-sale payments. Most notably, the finance industry (banks, credit unions) is one of the pioneers to adopt biometric technologies in business, an effort largely driven by a rapid increase in credit card fraud. While the need for enhanced security and prevention of fraud makes the application of biometric technologies a given, companies including restaurants and schools can leverage this technology to provide better services. The strategic challenge is perhaps moving beyond incremental applications which focuses just on security, to the applications which combines service excellence with higher efficiency, where higher security is a by-product rather than a raison d'être (Heracleous & Wirtz, 2006).

2.4 The Use of Biometrics in Hospitality

Restaurants have been using biometrics for some time now. Some systems such as Digital Dining, System 3, Radiant/Aloha and Future POS allow employees to clock in and out, place food orders, void/cancel orders and print out checks. The first step after implementing systems like those is registering employees to the computer system with their fingerprints. The second step is to assign responsibilities for the recorded employees. By assigning responsibilities, employer can restrict or allow their employees' access to specific areas within the software. The employer is able to assign different responsibilities to each employee. For instance, the employer can assign responsibility to one employee that may get access to a cash drawer while another does not. When the employee puts his or her finger on the fingerprint reader, instant access is allowed onto the computer. Once the action is completed, or if the touch screen is not touched within a certain amount of time, the system will log out for the next user (Restaurants among first, 2004).

McDonald's Restaurants experienced a reduction in payroll costs by up to 22 percent annually after including IR Recognition Systems' "HandPunch" biometric terminals to record time and attendance. This hand geometry technology eliminates expenses associated with employee badges and fraud caused by buddy punching (Sclage.com, 2003). The Decatur Hotel Group based in New Orleans has also experienced such significant savings in payroll costs by using hand-readers similar to that used by McDonald's. Verification takes less than one second (Hotel & Motel Management, 2002). Payment via fingerprint will offer a speedier checkout. Transaction times are usually faster and identification rates are higher than traditional identification

methods (Capizzi et al,.2004; Rossi, 2004). Moreover, it enhances security, easiness and comfort. It brings lots of advantages. The biometric approach has one principle advantage over other authentications means like credit cards; the user does not need to carry any physical appointments. No physical card is needed so nothing can be lost. From a practical point of view, biometric approach minimizes the operating costs of the systems and thus provides part of the economic rationale for implementation (Grabensek and Divjak, 2006). Fingerprint also will bring faster service which is very beneficial for the fast food industry. For instance BioPay estimates that pay-by-finger transactions are twice as fast as a cash payment, three times as fast as a credit card and four times as fast as a check (Chu, 2005).

2.5 Challenges with Biometrics

Biometric technology also brings some question marks to the consumers mind. Do the customers feel comfortable giving such sensitive information to a third party company, especially provided that even the most secure organizations such as CIA or FBI can be hacked? Even though recent identification methods offer a variety of advantages few new technologies have generated more controversy. The issue of collecting unsolicited data will be debated into the future (Milne, 2000). The customers can easily replace a lost credit or debit card, however, in the instance of a stolen fingerprint, it is really hard to replace. The vendors must show concrete security features for guests to feel comfortable to use this technology or offer alternative methods of access for guests who feel uncomfortable with the biometric technology. Some companies are telling that they are secure because, they use an algorithm to create the fingerprint pattern; they claim that they do not store the fingerprint image in their database. On the other hand, some companies are storing the actual fingerprint image in their database. Given the relatively slow growth of this potential technology, some key questions still remain to be answered. For instance, what is the level of awareness of biometric data collection? What is the willingness level of using fingerprint payment system of the customers if they know that their fingerprint stored in a database? It is a big question that, if these technologies will change the payment system, just as magnetic stripes on credit cards did a while ago. Skeptics are curious about if the security concerns are going to scare away the consumers.

According to Mayer, Bridgeman, Muller (2006) the main factors customers consider which influence their acceptances of a payment system are identified as: a) cost; b) convenience; c) security, and d) privacy. Whereas the interests in the first three factors are similar for merchants and customers, the interests of those two groups differ essentially for the privacy factor. Both groups want to have cost efficient payment systems with a high level of convenience and security, but when considering privacy, merchants usually prefer to collect as much data as possible whereas customers tend to want to protect their privacy as much as they can, by minimizing the data they are required to provide.

2.6 Perceived Risk

Particularly challenging to any biometrics business case are issues relating to risk. In an environment of threat, perceived risks are high. In an environment perceived as non-threatening, risks do not seem as large or of as much potential loss (Riley & Kleist, 2005). Perceived risk is a well-known construct and is defined by Hornibrook & Fearne, (2003) as a consumer's perception of both the uncertainty and consequences relating to purchases. This type of risk can occur whether or not a risk actually exists. In addition to the two determinants (uncertainty and consequences), researchers have proposed that the consequences from a purchase can be divided into various types of loss – financial, performance, time, physical, and psychological (Hornibrook & Fearne, 2003).

While these dimensions of loss seem logically applicable to both a would-be implementer and consumer, from the consumer's angle, consequences in the context of biometric technologies in purchases may be extended to include privacy issues and concerns about the misuse/abuse of personal information. Perceived risk in itself is essentially linked to trust and the level of familiarity with new technology. Consumers may think of how much they can loose financially if the biometric system is hacked or how much it may cause them to develop compelling buying habits because of the ease of use. From a psychological perspective, consumers may think of "big brotherism" whereby the system is criticized for potentially creating an electronic trail of their whereabouts and shopping habits that the FBI or marketers could follow.

Privacy advocates are disturbed with centralized databases which hold enormous amounts of personal information (Rohrer, 2003; Wong, 2002). In his argument regarding data compilation and movement monitoring, Gohringer (2004) purports that although we cannot avoid the fact that in the improper hands this could be the case, in point of fact the risk is not greater than the risk that we face everyday such as, bank recording the cash points we have accessed, mobile phones being used to track our whereabouts, a supermarket using loyalty cards to track consumers' spending patterns, or a company monitoring the comings and goings of its employees with a closed circuit television (CCTV). According to Gohringer, people will become conscious about the fact that the risk is no greater than being forced to reveal a password or to hand over an access swipe card. Actually, the risk is much less, thus representing an improvement over and above the existing solution by now in place.

This study examined the acceptability of biometric technologies in quick service settings. It used two distinguishing contexts specific to QSR to evaluate for differences: university meal services and public domain quick service food establishments. Capturing consumers' perceptions and attitudes toward the technology can serve as a qualitative benefit tool to IT executives in colleges/universities and quick service food restaurants who may be contemplating whether or not biometrics is a viable IT investment.

2.7 Hypotheses

H1a: Traceability of fingerprints back to the individual will result in lesser likelihood of adoption of fingerprint payment technology

H1b: Traceability of fingerprints back to the individual will result in lesser likelihood of adoption in public domain QSR settings as opposed to University Meal service settings

H2a: Familiarity with fingerprint data capture will result in lesser likelihood of adoption of fingerprint payment technology.

H2b: The relative importance of familiarity with fingerprint data capture as a predictor of adoption of fingerprint payment will be greater in public domain QSR settings as opposed to University Meal service settings.

H3: Personal innovativeness will be positively related to the likelihood of adoption of fingerprint payment technology.

H4a: Perceived risk will be negatively related to the likelihood of adoption of fingerprint payment technology.

H4b: The relative importance of perceived risk as a predictor of adoption of fingerprint payment will be greater in public domain QSR settings as opposed to University Meal service settings.

H5a: Convenience will be positively related to the likelihood adoption of fingerprint payment technology.

H5b: The relative importance of convenience as a predictor of adoption of fingerprint payment will be greater in University Meal service settings as opposed to public domain QSR settings.

3 Data, Measures and Methodology

In this study, a descriptive, cross-sectional survey research design was employed. Two surveys were prepared. While the first survey indicated that the fingerprint image will not be captured (placebo), the second survey clearly indicated that the fingerprint image will be stored by the firm involved. The population of the study comprised the community of a Mid-Atlantic university in the United States. Respondents were approached with one of two surveys by approaching respondents at the university's common foodservice facility during lunchtime. A systematic random sampling is used in which every 3rd person entering the foodservice facility was asked to participate in the study. A total of 185 respondents were approached out of which 150 accepted and responded to the questionnaires indicating a response rate of 81.08%.

Table 1. Constructs and Reliabilities

Construct (Reliability Alpha)	Loading	Eigen Value	Total Variance
Personal Innovativeness (0.78)			
1. I like to experiment with new information technologies.	0.89	2.44	61.20
2. Among my peers, I am usually the first to try out new information technologies	0.84		
3. If I heard about a new technology, I would look for ways to experiment with it..	0.79		
4. In general, I am hesitant to try out new information technologies.(R)	0.58		
Perceived risk (0.73)	0.86	4.60	65.74
1. Biometric technology as a payment method will keep me more secure	0.84		
2. Fingerprint payment system will protect me from identity thefts	0.84		
3. I believe that fingerprint payment can be totally secure	0.82		
4. I think fingerprints are encrypted and stored in a safe way	0.78		
5. Using fingerprint technology as a payment method would make me personally uncomfortable	0.78		
6. Fingerprint payment system will keep me secure than a credit card	0.75		
7. I have privacy concerns about using my fingerprint as a payment method.(R)			
Convenience (0.71)	NA		
1. Fingerprint payment is a good idea			
2. A biometric payment system will provide me with more personal convenience than a credit card. (because there is no card to carry or to lose)			

Personal innovativeness was measured using the four item scale validated by Agarwal and Prasad (1998). Perceived risk was measured using an adapted multi-item scale suggested validated by Hirunyawipada, & Paswan (2006). The four items of personal innovativeness and the seven items measuring perceived risk were subjected to separate procedures involving Principal Axis Factoring using SPSS 15.0. For both measures, all items loaded within their respective factors. See Table 1 above for PFA results as well as reliability alphas. For both models, the KMO figures were greater than 0.80 and the Bartlett test for Sphericity was significant at $p<.001$ suggesting that factor analysis met the valid assumptions and levels pertinent to multicollinearity and sphericity.

Convenience was measured using a two item scale adapted from Lee, Qu & Kim (2007)' attitude scale, political view was measured by a five items scale ranging from Very Liberal (1) to Very Conservative; lastly, familiarity with fingerprint data collection with a single item measured along a five point Likert Scale ranging from Not Familiar (1) to Very Familiar (5). The two dependent variables sought the likelihood of adopting the fingerprint payment system in university settings and in quick service restaurant settings outside the university domain. Both these measures were single items measured on a five point Likert Scale ranging from Very Unlikely (1) to Very Likely (5).

4 Analysis & Findings

To evaluate the likelihood of adoption of the fingerprint payment in university and QSR settings outside the university, two separate stepwise regressions were administered. The predictors of both regressions were (1) traceability of fingerprint (1=Yes and 0=No), familiarity with biometric data collection, personal innovativeness, perceived risk, convenience and political view. Stepwise regressions for both models satisfied the assumption of independence of observations and the lack of multicollinearity. As for independence of observations, the Durbin Watson statistic was 2.0 and within the acceptable range as suggested by Garson (2008). As for multicollinearity, all predictor variables had VIF values within 3. A VIF value of 4.00 indicates a serious multicollinearity problem. Table 2 illustrates the results of the stepwise regression models. Both stepwise regression models resulted in truncation of three variables (not significant) namely traceability of fingerprint, familiarity with fingerprint data collection and political view. This indicated that hypotheses 1a, 1b, 2a and 2b lacked support from the findings. Alternately, both models after iterations indicated that personal innovativeness, perceived risk and convenience were the significant variables of importance. However, the relative importance of these variables across both models was distinguishably different as evident from the standardized coefficient values provided in Table 2. In both models, personal innovativeness was positively related to the likelihood of adoption of fingerprint payment technology. This rendered support for H3.

When it came to perceived risk, it was negatively related to the likelihood of adoption of fingerprint payment technology. Additionally, the standardized coefficient value

for perceived risk was 1 ½ greater in public domain QSR settings as opposed to university settings. Both these findings indicate support for H4a and H4b. Lastly, convenience was positively related to the likelihood of adoption of fingerprint payment technology. Again, the standardized coefficient for convenience in university meal settings was nearly twice in value when compared to the coefficient value pertinent to public domain QSR settings. This also rendered support for H5a and H5b.

Table 2. Stepwise Regression Results

Predictor	**University Settings**	**QSR Settings (Non-University)**
Perceived Innovativeness	**0.17****	**0.18****
Perceived Risk	**-0.34*****	**-0.50*****
Convenience	**0.39*****	**0.20***
	*Adjusted R^2 = 0.567, F=62.864***,*	*Adjusted R^2 = 0.555, F=51.372***,*

**p<.05; **p<.01, ***p<.001*

5 Discussion

Findings need to be interpreted based on market realities and consciousness to the immediate issues pertinent to fingerprint capture. Clearly, respondents have not given thought to the ramifications of fingerprint capture. This is evident from the non-significance of traceability of fingerprints and familiarity with fingerprint data capture procedures. Additionally, the strong differentiation of perceived risk between university and public domain settings highlights an underlying uneasiness with the technology as yet. Based on this combination of findings, it is clear that the issue of fingerprint data capture amongst firms has not received widespread coverage in the news media in the US. Greater coverage weighing the pros and cons of the payment technology may actually result in an altogether different set of findings.

As hypothesized, personal innovativeness is a key adoption factor when it comes to fingerprint payment technology. However, this does not vary between the two settings explored in this study. Convenience on the other hand is seriously sought in the US. The greater importance of convenience in university settings can be attributed to the greater service efficiencies sought in time compressed lives that university students and staff pursue. However, its relatively less importance in public domain settings highlights the introductory level of the technology. Alternately, the significance of convenience in both models suggests that the technology may be more appropriate for groups or people who seek greater convenience in service settings. Again,

convenience should be better explored and communicated by fingerprint payment firms. At large, the contrasting dichotomy in the relative importance of perceived risk and convenience in university settings and public domain settings indicates that the decision to adopt fingerprint payment technology at this point of time may largely be a tradeoff between risk and convenience. Future research should explore this potential tradeoff in more definitive experimental settings.

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Website Accessibility of U.S. Based Hospitality Websites

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Abstract

The Internet has become an essential part of our society as we are continually embracing this technology to better facilitate our business and social lives. Hotels and restaurants have established websites providing functions such as room availability, menu description as well as online reservations. However, many of the hospitality web designers have neglected the difficulties that visitors with disabilities like visual impairment may have when they visit the websites. This study evaluated the current accessibility situation of current U.S. based hospitality websites and studied the potential problems those websites may have when presenting information to visitors with disabilities. By evaluating the sample hospitality websites under the criteria of Section 508, the Web Content Accessibility Guidelines, colorblind filter and text size flexibility, the study has found that the current accessibility of hospitality websites in the U.S. is low and failure in providing alternative text for non-text elements is the primary problem. Implications of possible reasons and future research suggestions are discussed accordingly.

Keywords: Website accessibility, Section 508, Web Content Accessibility Guidelines

1 Introduction

Since the emergence of the Internet, the hospitality industry, especially the hotel segment, has been using the Internet extensively to deliver information to the public and generate on-line reservations across large geographical locations, time zones and throughout computer systems (Yeung and Law, 2004). According to the TIG Global Special report by Heilbronner, Heilbronner and Green (2006), 16.4 billion dollars were spent on leisure hotel bookings in 2005, and this number is expected to grow to $40.1 billion in 2009. There are numerous advantages of Internet applications through websites for the hospitality industry. As has been pointed out by Namkung, Shin and Yang (2007), the Internet is a fast-growing advertising mechanism in the hospitality industry. According to O'Connor and Frew (2004) and Toms and Taves (2004), websites can benefit guests because they have direct communication with suppliers and they are able to search and purchase products and services without any geographical or time constraints. More importantly, guests can customize their own combination of products and services. On the other hand, suppliers, such as hotels, can better understand the guests' needs and can enjoy the benefits of lower

distribution costs, a less competitive environment and higher revenues over the web (O'Connor, 2004; Wilson & Abel, 2002).

However, being online does not ensure higher revenue for companies (Williams and Rattray, 2004). There are challenges in addition to simply setting up a website. For example, making sure the website is accessible to visitors, searchable by search engines; and that it contains the necessary content to provide what guests want, are a few important challenges. The attributes of a good website are achieved through web design, which is a broad concept including content structure, graphic design, search strategies and user accessibility (O'Connor, 2004). Among the above attributes, being accessible to all users is recognized as the *most essential attribute*. As indicated by Williams and Rattray (2004), if a website is not accessible to all visitors, then all those other attributes will be in vain. This paper is aimed to research the current accessibility environment of hospitality websites in the U.S., analyze possible problems and attempt to offer some suggestions in current hospitality website designs as well as in the future website constructions.

2 Review of Literature

The general definition of a disability is a condition caused by an accident, trauma, genetics or disease, which can affect or limit a person's ability (Kailes and Jones, 1993). A disability can affect or limit a person's mobility, hearing, breathing, vision, speech or mental function. A disability can be visible, such as a spinal cord injury necessitating wheelchair use, or invisible, such as diabetes, epilepsy, hearing loss, mental retardation or a learning disability. According to Sweetman (2002), there are four types of disabilities which may include one or more of the following: visual impairment, hearing impairment, mental impairment and motor impairment that may present difficulties when viewing a website. All of these four types of disability include permanent and temporary situations.

2.1 People with Disabilities

Many users may be operating in situations under which, for example, they may not be able to see, hear, move, or may have great difficulty trying to process some types of information; may have difficulty reading or understanding text; and, may not be able to use a keyboard or a mouse.. According to convention on the rights of persons with disabilities from UN, an estimated 650 million people who represents about 10 percent of the world's population live with disabilities around the world (UN, 2006). In the U. S., based on the report from U.S. Census Bureau, there are about 51.2 million Americans with some level of disability, which represents 18.1 percent of the population, and 32.5 million people which represents11.5 percent of the population have a severe disability (Steinmetz, 2006). Furthermore, the proportion of people with disabilities is growing as - the population grows older. In the U.S., People aged 45-54 have an 11.5 percent chance of developing a disability and the chances will increase dramatically between the ages of 55-64 (LaPlante, Mitchell and Carlson, 1992). Almost 54.5 percent of the U.S. population over 65 years old has a disability, which is an obvious growth from the lower age groups (Foley & Regan, 2002).

2.2 Web Accessibility

In the online environment, accessibility can be defined as "making web content available to all individuals, regardless of any disabilities or environmental constraints they experience" (Mankoff, Fait and Tran, 2005). Generally speaking, there are four types of disabilities that may present difficulties to users when viewing a website. They are visual impairment, hearing impairment, mental impairment and motor impairment (Sweetman, 2002). Researchers have found that common web tasks such as reading, searching and purchasing are often more difficult for people with disabilities (Paciello, 2000). However, although people with disabilities are having those difficulties, this does not necessarily mean they are not willing to be involved in the online environment. On the contrary, according to the research report from Taylor (2000), Internet users with disabilities on average spend twice as much time online as adults without disabilities, and this amount of time does not even include using E-mail services. Furthermore, the National Organization of Persons with Disabilities reports that in 2006, people with disabilities had a combined income exceeding $1 trillion and $220 billion in discretionary spending power.

2.3 Accessible Web Design

Some researchers have contended that the Internet has already become the commodity that everyone has to have and everyone needs to use (Paciello, 2000). According to a Pew Internet & American Life Project conducted between February 15 – April 6, 2006, the result showed that 73percent of American adults (about 147 million adults) were Internet users, compared with 66 percent (about 133 million adults) in the January 2005 survey. And at the end of March 2006, 42 percent of Americans had high-speed Internet at home, up from 30% in March 2005. More than 75 percent of people were between 30 and 49, and 58 percent of those between 50 and 64 used the Internet on a regular basis. The report also pointed out that 22 percent of all Americans over 65 used the Internet and one in four people between the ages of 70 and 75 have gone online. (Pew Internet & American Life Project, 2006)

All of those Internet users will likely experience different web designs every time they enter a new website. As was stated in the introduction, there are various components in a typical web design and many researchers have done different studies in the field of web design. However, a great amount of the research has fallen into the related argument of whether the web design should be more of "usability" or "presentation".

According to Robbins and Stylianou (2003), the basics of web design can be concluded as "presentation" which is how the content is represented on the webpage and "usability" which means how users interact with the content. The debate of whether web design should be of more "presentation" or "usability" has never stopped. According to O'Connor's (2004) review, some designers focus on the aesthetics such as designer David Siegel. They propose that multiple graphics should be used in the webpage to achieve the full marketing and advertising potential of the website. Also, Salerno (2007) has contended that as website designers tend to be

right-brain directed people who have a better capability for creativeness and innovation, they may lack the sense of the importance of usability and the content. While others like usability-focused experts, they stated that more focus should be put in content and function rather than graphical features because users visit a website mainly for its content and it will be a waste of time on the packaging (Nielsen, 1993). However, few of the debates have pointed out the basic accessibility aspect in web designs. Paciello (2000) has contended that accessibility is one common challenge in web design to provide an effective interface so that the electronic content can be perceived effectively and successfully by all visitors. No matter how the debate goes, no websites can be valuable if they are not accessible to everyone.

2.4 Guidelines and Standards

Accessibility is important also in that "it represents an important step toward independence for individuals with disabilities and it also guarantees broader access for all users of the web" (Foley, 2003). Accessible web pages will provide people with disability opportunities for being involved in activities that people without disabilities take for granted. To ensure the accessibility of the website from the designing stage, there are guidelines and standards for web designers to follow on how to -build an accessible website for everyone. As stated above, there are mainly two sets of standards as Section 508 from the Federal Government and Web Content Accessibility Guidelines (WCAG) from the World Wide Web consortium (W3C).

2.5 Research Question Formulation

Hospitality properties, such as hotels and restaurants, have accessible rooms and other facilities to help guests with disabilities enjoy their stay and dining experiences, but when it comes to the online environment, will their "online experience" deliver the same accessibility? In one hotel website accessibility study done by Williams and Rattray (2004), only 19 percent of the 97 sample UK-based hotel websites passed the basic web accessibility test. As there has been too little research done in the important area of hospitality website accessibility in the U.S., it was the goal of the researchers to carry out this exploratory research project to analyze website accessibility of the U.S.-based hotels and restaurants. In doing so, this study was designed to answer the following research questions:

What is the level of accessibility of U.S.-based hotel websites?

What is the level of accessibility of U.S.-based restaurant websites?

Is it possible to identify common accessibility problems/reasons for U.S.-based hotel websites?

Is it possible to identify common accessibility problems/reasons for U.S.-based restaurant websites?

3 Methodology

The researchers applied a systematic sampling method to gain 60 hotel websites and 60 restaurant websites in the U.S. as the research sample. Six tests were utilized on each sample website to achieve a comprehensive evaluation of the web accessibility. The six tests are as following:

Test 1: Section 508; Test 2: WCAG 1.0 Priority 1; Test 3: WCAG 1.0 Priority 1,2; Test 4: WCAG 1.0 Priority 1,2,3; Test 5: Colorblindness test; Test 6:Text Size Flexibility.

Each test was assigned 5 points with a total score of 30. Because there are five sub-categories for colorblindness, it had one point for each sub-category. The researchers calculated the final score and percentage of each sample website to get an understanding of the current accessibility of hospitality websites in the U.S. A qualitative analysis was used to examine some primary problems those sample websites might have and what changes they could make to increase their accessibility.

3.1 Sampling

In order to get a comprehensive review of the accessibility of U.S.-based hospitality websites, the authors randomly chose 60 hotel websites and 60 restaurants websites to be the sample from Zagat.com. Zagat.com is the world's leading provider of consumer survey-based information on where to Eat, Drink, Stay and Play globally. Zagat.com has also been adopted as a sampling tool by other researchers such as Young and Nestle (2003). With ratings and reviews based on the opinions of over 300,000 surveyors from around the world, the Zagat Survey has obtained a large data base of U.S.-based hotel and restaurant information including addresses, telephone numbers and websites.

The authors searched for hotel/restaurant properties alphabetically then chose every 10th property with a website for participation in the sample, additionally taking into account geographic information as selection criterion. Several major cities from the Northeast, Southeast, West, Midwest and southwest regions, such as New York City and Chicago were chosen. If the property had no website, the next one in the list was chosen.

3.2 Assessment Tools

Although “Bobby Checker” was one of the most used research tools in accessibility studies, however, as of February 1, 2008, Bobby checker was no longer available to the public. Hence, the researchers chose another similar online testing tool called “CynthiaSays” (www.cynthiasays.com) to test the accessibility based on Section 508 and WCAG1.0. Compared with Bobby Checker, Cynthiasays.com is still a free online accessibility testing site. It follows every particular guideline in both WCAG 1.0 and Section 508. The exact checkpoint result from Section 508 and the WCAG appears in the report, and the result is quite similar with Bobby Checker.

To eliminate the weakness of lack of colorblind filter testing of previous research studies, the author used a Colorblind Web Page Filter (http://colorfilter.wickline.org/) to test the website accessibility specifically for colorblind users. There were five dimensional tests used to determine the web accessibility for people with colorblindness. The colorblind filter report counts for 5 points in the data analysis, one point for each of the five dimensions. Additionally, the authors conducted a manual test on the user's ability to enlarge or decrease the text size by pressing CTRL and "+" or "–" at the same time. This function is helpful when users with low vision want to enlarge the text size to make the webpage easier to see. Text size flexibility counts for 5 points in the data analysis. Altogher, the final total score for each sample website is 30.

4 Findings

After scanning the test results of 60 hotels and 60 restaurants and eliminating 2 hotels' test results and 6 restaurants' test results, 58 hotels and 54 restaurant websites were selected to be the valid sample for analysis. The reason why some websites were eliminated from the study was that they did not allow the assessment methods to work (i.e. Cynhtiasays.com), therefore, no data could be collected from these websites. Among the 58 hotel websites, none of the sample hotel websites passed both the Section 508 and WCAG 1.0 testing; even the most successful hotel group websites failed the tests due to several reasons. More details will be discussed in the following.

The findings strongly support previous research hypotheses. In fact, the test results are far from ideal, especially for hotel website accessibility, about 96 percent of the test scores of sample hotel websites fall between 6 to 10 points out of 30 points, and most of the scoring points are from the colorblind test and text size flexibility test. The restaurant websites'results are slightly better. About 20 percent of the sample restaurant websites scored higher than 20 points out of 30 points, which is a noticeable jump compared with the sample hotel websites. Because there has not been an appropriate measurement of website accessibility in terms of score scale from previous studies, a qualitative analysis has been carried out to present and analyze the findings.

Research question 1: What is the level of accessibility of U.S.-based hotel websites?

The average total accessibility score from the sample hotel websites was 8.93 out of 30 points (29.7%). For a website to be called "accessible", one would expect that the website would score 30 full points (100%). However, the findings of the hotel websites show that the level of accessibility of U.S.-based hotel websites was low.

The highest score of the accessibility test for sample U.S.-based hotel websites was 10 and the lowest score was 5. The results were somewhat consistent without much fluctuation. Because most of the hotel websites are aimed to provide basic information and online reservations, it is easy to find the web design similarity among the sample hotel websites. Since many of the websites share the same designing purposes, their test results are also similarly low.

Research question 2: What is the level of accessibility of U.S.-based restaurant websites?

The average total accessibility score from the sample restaurant websites was 11.74 out of 30 points (39.1%). For a website to be called "accessible", one would expect that the website would score 30 full points (100%). However, the findings of the restaurant websites show that the level of accessibility of U.S.-based restaurant websites was low although the restaurant website accessibility scores were higher than hotel website accessibility scores.

The highest score of the accessibility test for the sample U.S.-based restaurant websites was 30 which is the full score and the lowest score was 0. One more noticeable finding was that there were very low scores and very high scores in the restaurant testing results. Comparing with hotel testing results, because of their simplicity and variety, restaurant websites are more likely to present different results.

To make the results easier to perceive, and to answer research question 3 and 4, the authors have chosen several snapshots of typical results in Section 508 test and the results are presented and analyzed as following.

Research question 3: Is it possible to identify common accessibility problems/reasons for U.S.-based hotel websites?

Lack of providing alternative text for non-text elements in webpage and other web design deficits are the most common accessibility problems for U.S. based hotel websites. For example, users of Marriott.com without disabilities can view the flash-based web advertisement and are able to book hotel nights through the websites by filling out the blanks and choosing from several dropdown menus. As one of the top hotel brands and management companies in the world, Marriott.com is easy to navigate and convenient to use for average users. It is safe to say that this website is able to provide users without disabilities what they need. This website has failed Section 508 and WCAG 1.0 tests. Unfortunately, Marriott.com did not pass the colorblind filter either.

The mistake in one Section 508 standard "A text equivalent for every non-text element shall be provided" is the major mistake of this website. Specifically, failures in "All IMG elements are required to contain either the 'alt' or the 'longdesc' attribute and "All INPUT elements are required to contain the alt attribute or use a LABEL" count for the overall low accessibility of this website. Furthermore, failures in "All OBJECT elements are required to contain element content" and "When EMBED Elements are used, the NOEMBED element is required in the document" are other mistakes that contributed to the final low score of this website.

Research question 4: Is it possible to identify common accessibility problems/reasons of U.S.-based restaurant websites?

Lack of providing alternative text for non-text elements in webpage and other web design deficit are the most common accessibility problems for U.S. based restaurant websites.

One of the restaurants in the sample scored 5 points out of 30 points. In fact, this website only passed the text size flexibility test. For other tests such as Section 508 and WCAG 1.0, the website scored 0 points. As has been stated in the previous chapters, the "Cynthia Says" test will go through the source coding of the sample website and come back with the results based on the specific requirements of Section 508 or WCAG 1.0. In this particular sample, the testing tool went through the HTML coding and marked each mistake with the reason and location of the failure.

From this snapshot, the result showed "No" meaning failing the test and all of the failures are for the same reason: failure in "All IMG elements are required to contain either the 'alt' or the 'longdesc' attribute". The lack of alternative text to images on the webpage was the major failure of this website. This mistake is common in previous similar research and was seen in this study repetitively, which demonstrated two hypotheses of this research: H3 that lack of "ALT" tag in the backstage HTML coding was the most common accessibility problem of U.S. based hotel websites and H4 that lack of "ALT" tag in the backstage HTML coding was the most common accessibility problem of U.S. based restaurant websites. These particular websites passed the section 508; however, when tested with Test 2, 3, and 4, this website failed to fulfill specific requirements such as Rule 13.1: "Clearly identify the target of each link" in Priority 2. This situation was not common in the sample and the author took extra effort to minimize the possible error when the reports contained such warnings instead of failures. Among all of the testing tools, text size flexibility was the major scoring point for both the hotel and restaurant websites. Figures have shown that less than 4 percent of all the sample websites failed this test.

Overall, from the demonstration figures and discussion, it is clear that restaurant websites outperformed hotel websites in this study. There was no hotel that scored above 10 points out of 30 points and there was one hotel that did not pass any of the tests, meaning that it is not accessible to people with disabilities, at all. For restaurants, there were 7 properties that scored above 80 percent and even one restaurant passed all tests. However, similar to the hotel case, there was one restaurant that failed to pass any of the tests. Furthermore, the major reason for such a failure was the error of providing alternative text for non-text elements.

5 Discussion and Conclusion

This study examined website accessibility for restaurants and hotels in the U.S. Although most of the properties have established their own websites, more than half of them cannot be viewed successfully by people with disabilities. Restaurant websites were found to be more accessible than hotel websites but many restaurant websites also failed. Most hotel websites in this study failed a majority of the tests.

Interestingly, the major reason for most failures was in the inadequacy to provide alternative text for non-text materials, such as images. This result was consistent with previous similar research and has been reported by other researchers. There are several assumptions that could be made to explain the failures. The first one is the complexity of the webpage, including the amount of content, and all the activities the website tries to undertake. Hotel websites are complex and include services, maps, reservations, shuttle information, dining options, menus, credit card partnerships, packaged deals, current and future promotions, corporate history, philosophy and culture, virtual tours of that property, and sister properties, etc. The websites that passed most of the tests were usually simple with less content on the webpage such as Amrheins Restaurant, whose webpage only contained pictures and simple text. However, this doesn't mean that websites cannot use multimedia including animations and flash. It is just the simple question of accessibility.

In order to explain the reasons why sample restaurant websites have outperformed hotel websites in accessibility, the author reviewed the homepages of most sample websites and found that restaurant websites were usually simpler with just basic dining information and they tended to have various designs. Most hotel websites were enabled with online reservation functions and lots of graphic contents in the pages such as online TV and flash. Because of the complexity of those WebPages, the author suspected that fewer hotel websites would pass the accessibility tests than restaurant websites.

The second assumption is the possible website developers' lack of awareness of website accessibility issues. With the purpose of providing an interactive webpage to viewers, these website designers often apply multi-media techniques such as flash, animations and online videos which increase the difficulty in accessibility for people with disabilities. The people that website developers most identify with are leading edge designers who use the latest design elements. The richer and fuller the design, the more excited they are about their "craft". It is not difficult for website developers to comply with the accessibility standards because detailed display methods are already defined. The suspicion is that they might spend too much effort on the design and the layout of the webpage, i.e., the "presentation". However, when the webpage is not accessible by users with disabilities, no vivid "presentation" can convey the useful information to the visitors. Third, the different operating methods in the hospitality industry may be another possible explanation, including franchising and management contracts. The corporate headquarters may only provide the "shell" website under their brands, and, the franchisee and/or management company personnel may be in charge of providing the website content. It is difficult to determine who is in charge of maintaining the websites. This responsibility gap may affect web accessibility and may be another reason for the research results.

These results are further supported in the statement by Mills, Han and Clay (2008), arguing that the hospitality industry has been focusing their online operations on mainstream customers instead of providing full consideration to customers with disabilities or other factors. Most hospitality companies have already established their own websites; however, there are some other procedures that could be of help when

the companies plan to re-construct the websites to be more accessible. The list of guidelines provided above and in this research could greatly improve the accessibility of those with limited visibilities.

5.1 Implications

Building an online platform that is universally accepted and accessible to everyone is not yet a mandatory act but with such huge market potential, no hospitality company would want to fall behind. Through this study, the following implications may be of help to hospitality web designers when it comes to providing universal access to the websites and gaining smooth universal visits from potential guests. First, the web designer can run some online testing tools such as Cynthia Says, to check where and what are missing based on Section 508 standards or WCAG 1.0. Then by adding the alternative text for non-text materials would be the first way to start making the website accessible. Any shortcomings could be corrected accordingly.

Second, web designers may need to reconsider the balance between "presentation" and "usability" of a website. Content is the "king" for every website. Web designers may have to decrease the flash-based content or animation elements that may present difficulties in compatibility for assistive technologies or other users with lower versions of necessary viewing software.

5.2 Recommendations

The expense of website development for large-volume hospitality companies is enormous. Because many hospitality properties have already established their websites, it would be difficult to renovate or re-construct a new accessible website replacing the original one. As a matter of fact, it takes a great deal of labor and money to correct a website with possibly as many as a million affiliated pages like Marriott.com. In order to balance out the difficulties, web designers could provide an optional text-based "mirror website" which would provide all the necessary content of the original website. Setting up a navigation bar directing the users to the "mirror website" in a noticeable place on the website homepage could significantly reduce the labor and cost of re-constructing a new entirely accessible website. In this way, challenged users or users who prefer fast webpage loading could navigate with fewer requirements and gain the same information.

This recommendation would save costs for hospitality companies and at the same time, would be proactive. If there comes a time when laws are passed requiring totally accessible websites for all forms of disabilities, those who had ready developed "mirror websites" could rest easy.

5.3 Limitations

One limitation was that no quantitative analysis was provided because of the lack of a standard measurement. The other limitation was that the current assessment tool Cynthiasays.com was not perfect as it only provided what and where the possible

failure was based on Section 508 and WCAG 1.0 standards. Since there were inconsistent results revealed in the report, it was difficult to determine if the sample website had fully passed the tests. The third limitation was the sample size.

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A Study of Chinese and International Online User Perceptions of Hotel Websites' Usefulness

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Abstract

The unprecedented growth of China's online market renders more online Chinese users to use the Internet to search and purchase tourism related services and/or products. Hence, it is crucial to understand China's online users and how they act as compare to international users. The aim of this research is to compare the difference in perceptions of functionality and usability between Mainland China and international online users on the usefulness of hotel websites. Empirical findings revealed that the two groups of users do not exhibit significant differences in perceptions in most of the included attributes. Additionally, many users would like to use weblog or social network to share their travel experiences. Findings of this study would be of use to readers for better understanding the Chinese online users. Industrial practitioners may consider using the recommendations to improve their websites.

Keywords: hotel website**,** usability, functionality, China, website design, perception

1 Introduction

Information search and purchase behaviours of hotel customers have changed dramatically in the Internet era with more people searching and booking hotel rooms online (Chung and Law, 2003). At present, many hotels have already realised the importance of utilising the Internet to remain competitive in the industry (Buhalis and Law, 2008). As such, most hotels have established their own websites. These hoteliers expect that their own websites can be used as an effective advertising and direct marketing tool which helps them promote sales and attract more consumers (Au Yeung and Law, 2006). Along with the increasing number of hotel websites, the number of online users is growing rapidly. In China, according to the report of CNNIC (China Internet Network Information Centre, 2008), at the end of Year 2007 the number of Internet users has reached 210 million, as compared to the corresponding number of 116 million in 2004. With the largest population in the world, China has a high potential to become the world's biggest online market in the near future in general and in particular in the eTourism market which has plenty of potential users.

Although various studies have been conducted to examine consumers' perception of website performance in the context of consumer satisfaction and importance of service quality, most of these studies had concentrated on the Western markets (Kim, Ma and Kim, 2006). In the existing literature, only a few studies had investigated the Chinese online tourism and hospitality market. Still, it was found that the characteristics of Chinese online consumers include the preference of participating in online discussion to seek information for products recommendation (Fong and Burton, 2008), using multimedia on presenting products could attract more online consumers in China (Bai, Law and Wen, 2008), and that China's online users do not care whether a website provides an online payment system or not (Li and Buhalis, 2006). In additional, Fong and Burton (2008) stated that online consumers in mainland China are very different from Western users including those from Hong Kong and Singapore (Wee and Ramachandra, 2000).

In spite of Chinese online users are unique and China has a huge tourism and online tourism market, published articles rarely focused on finding out what are the Chinese online users' perceptions on hotel websites and how they act as compared to international users. In view of the arising challenge, this study makes an attempt to fill in the research gap by determining the perceptions on hotel websites from the perspective of website users in Mainland China (hereafter known as Chinese users) and international users. Thus, the specific objectives of this study are:

- To compare and contrast the perceptions between Chinese and international online users on the usefulness of hotel websites.
- To provide appropriate recommendations for hotel website improvements.

2 Literature Review

Since the late 1990s, different published articles have presented various approaches to improve commercial websites and have determined the factors which may influence online service qualities, consumers' online perceptions, and decision making process on eBusiness (Law and Hsu, 2006). Lu and Yeung (1998) pointed out that the usefulness of a website comprises website functionality and usability. While functionality refers to contents of a website, usability involves the website design or easy of use (Nielsen, 1993). Both website functionality and usability could thus affect consumers' online behaviours. A good website should present rich information, ease of use, and efficiency to consumers (Au Yeung and Law, 2006; Chung and Law, 2003; Lu and Yeung, 1998). Jeong and Lambert (2001) stated that consumers perceive the quality of information about products and services as the most crucial factor on online decision-making. Additionally, a website with poor interface design cannot attract consumers (Perdue, 2001). The performance of a website's ease of use also influences consumers' online purchase (Goldman and Tong, 2000). Moreover, Roy, Dewit and Aubert (2001) stated that the quality or usability of interface design is a key factor in the establishment of trust toward a website.

Previous studies on website evaluations have assessed website functionality and usability, and indicated the importance of different dimensions to different groups of

consumers. However, Law (2007) pointed out that there are no existing standardized website attributes or guidelines to incorporate web design and contents into the context of tourism. With the growing importance of website evaluations and the large potential market of eTourism in China, the perception of China's online consumers renders its importance to both industrial applications and academic research. To compare the differences between China's and international online users would help suppliers on their website improvement. However, the existing tourism literature has a very limited number of published articles, if any, that compared and contrasted the perceptions of Chinese users and international users on hotel website attributes. This study thus makes an attempt to analyse the perceived importance of website usability and functionality by these two groups of website users.

3 Methodology

The aim of this study was therefore to compare and contrast the difference in perceptions between Chinese and international users of websites in terms of usefulness, which comprises functionality and usability. The functionality attributes were mainly adopted from prior studies of Chung and Law (2003) and Ham (2004). These factors included i) reservation information which was how customers can book a hotel room online, ii) facility information which presented how a hotelier provides hotel facilities online, iii) contact information that included contact details of a hotel, iv) website management for the attributes that were related to maintaining a hotel website, v) surrounding information that referred to the destination information near a hotel, and vi) accessibility which was about how easy an online user can reach a certain hotel website. Similarly, the usability factors and attributes were mainly adopted from prior studies of Au Yueng and Law (2006), Nielsen (1993), Murphy, Schegg and Olaru (2006), Schmidt, Cantallops, and Santos (2007), as well as Zafiropolos and Vrana (2006). These usability factors included i) navigation which referred to how consumers can easily go back and forth between different pages, ii) website friendliness that is pertained to the website's ease of use, iii) playfulness/joy of use showed how a hotel website can interact with consumers and entertain them, and iv) overall layout and appearance that determined a website's overall performance and features arrangement.

A focus group discussion was conducted for pre-testing the questionnaire. The focus group was formed by three doctoral students in hotel and tourism management. Based on the feedback collected during the pre-testing period, a questionnaire was finalised. The questionnaire consisted of two sections. The first section was to obtain a respondent's demographics as well as online and travel experiences. Attributes including gender, age group, income level, education level, number of years using the Internet, have own blog/social network, purpose of the blog/social network, and preference of using travel websites. The second section used two questions to measure respondents' perceived importance of website usability and functionality. Respondents were asked to rate the importance of each attribute using a 5-point Likert scale (1=least important; 5=most important). Additionally, the respondents could choose NA/NO (Not Applicable/No Opinion).

A quota sample was then selected in this research for primary data collection (Sekaran, 2003). A sample size of 100 was determined as appropriate in this exploratory study. Respondents were assigned to two groups in this study, with 50 Chinese users and 50 international users of hotel websites. The questionnaire was distributed on the Internet. On the basis of the English questionnaire, a Chinese version was prepared for Chinese speaking respondents. One hundred usable questionnaires were collected at the end of July 2008 from different geographical areas (Fig. 1).

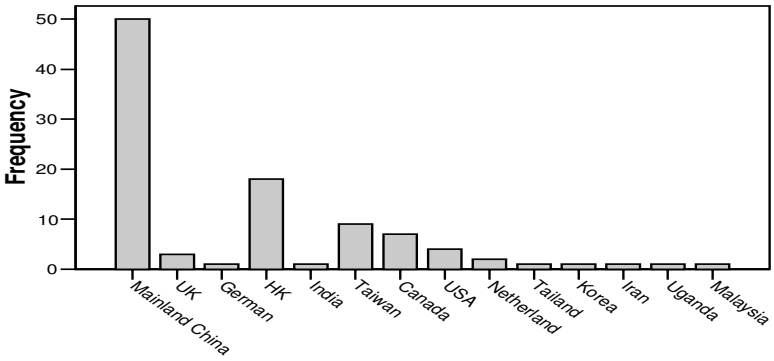

Fig.1. Origin of Respondents

4 Findings

4.1 Profile of Respondents

Table 1. Demographic Profile

	Respondents				
	Chinese		International		Overall
Gender (N=100)					
Male	23	23%	22	22%	45%
Female	27	27%	28	28%	55%
Age (N=100)					
25 or less	16	16%	8	8%	24%
26-35	33	33%	27	27%	60%
46-55	1	1%	15	15%	16%
Education (N=100)					
Less than secondary/high school	1	1%			1%
Completed secondary/high school			1	1%	!%
Some college or university	3	3%	1	1%	4%
Completed college/university diploma degree	21	21%	20	20%	41%
Completed postgraduate degree	25	25%	28	28%	53%
Income (US$) (N=100)					
Less than 1,000	26	26%	4	4%	30%
1,001 – 2,000	6	6%	4	4%	10%
2,001 - 3,000			16	16%	16%
3,001 - 4,000			7	7%	7%
4,001 - 5,000			5	5%	5%
6,001 – 7,000			2	2%	2%
7,001 – 8,000			4	4%	4%
8,001 or above			1	1%	1%
Refusal / Other	18	18%	7	7%	25%

As shown in Table 1, the percentage of male and female respondents was similar. In addition, most respondents were in the age groups of 26-35 years old. This result matched with the findings from Yip and Law's (2002) study that showed people who used the Internet to search online information included travel related information are young. In this study, Chinese users were slightly younger than international users. In terms of education level, most respondents were Bachelor degree holders or have completed their postgraduate degrees. This finding also matched that of Yip and Law's (2002) work which indicated Internet users tend to be highly educated. Also, the international respondents tended to be widely distributed among different income groups, whereas most Chinese respondents had monthly income of less than US$1,000. This wide distribution of income groups for international users was likely due to the unequal economic developments in different regions.

4.2 Travel Experience of Respondents

Table 2 presents the travel experiences of Chinese and international users of websites. As indicated in Table 2, respondents had a diverse range of domestic travel experiences. Most respondents had travelled once or twice within the past two years. A few respondents had travelled for more than five times in domestic destinations in the past two years. Apparently, there was no significant difference between these two groups of respondents in domestic travel experience.

In terms of overseas travel experience, 58% of the respondents had travelled once or twice in the past two years. In addition, findings of this study showed there was a significant difference between these two groups of respondents in overseas travel, in which international users had travelled more often than Chinese respondents. Such a difference could be due to the variance in disposable income levels.

Table 2. Travel Experiences

	Respondents						
	Chinese		International		Overall	t	Sig
Domestic Travel Experience						0.481	0.299
None	5	5%	9	9%	14%		
Once	12	12%	11	11%	23%		
Twice	17	17%	6	6%	23%		
Three times	6	6%	9	9%	15%		
Four times	1	1%	9	9%	10%		
Five times	5	5%			5%		
Six times	1	1%	1	1%	2%		
Seven times			1	1%	1%		
Eight times	1	1%			1%		
10 or more than 10 times	2	2%	4	4%	6%		
Overseas Travel Experience						2.997	0.016*
None	14	14%	8	8%	22%		
Once	14	14%	10	10%	24%		
Twice	1	17%	17	17%	34%		
Three times	2	2%	2	2%	4%		
Four times	2	2%	8	8%	10%		
Five times	1	1%	1	1%	2%		
Six times			2	2%	2%		
Seven times			2	2%	2%		

***Significant at α=0.05**

4.3 Online Experience of Respondents

No significant difference was found (Table 3) for online experiences. In other words, Chinese and international respondents had similar online experiences. In particular, 95% of the respondents had more than three years of experience in using the Internet, and most of them used the Internet for more than 30 hours per week. As weblogs are becoming more popular (Pan, MacLaurin & Crotts 2006), people tend to create their blogs for various reasons (Nardi, Schiano, Gumbrecht, & Swartz, 2004). This research divided personal blogs into four types of diary style, travel blog, news record, and others. Table 3 indicated that 26% of the respondents did not have a weblog or use a social network, and 74% of the respondents had their own weblogs or used a social network. Additionally, most respondents used diary style weblogs or social network, and 16% of the respondents used their weblogs or social network combined with travel blogs. Also, some respondents indicated that they used their weblogs or social network in other styles such as using a photo album to present their profile and record academic information.

Table 3. Online Experience

	Respondents						
	Chinese		International		Overall	t	Sig
Own a personal Weblog / social network						-0.668	0.161
Do not have any	11	11%	15	15%	26%		
Diary style	25	25%	11	11%	36%		
Travel Blog	3	3%	5	5%	8%		
News record	4	4%	2	2%	6%		
Others	4	4%	12	12%	16%		
Diary/Travel blog	1	1%	2	2%	3%		
Diary/Travel blog/Others	1	1%	2	2%	3%		
Travel blog/News record/Others	1	1%	1	1%	2%		
Year of using the Internet						-0.277	0.250
Less than one year							
1-3 years	2	2%	1	1%	3%		
More than 3 years	48	48%	47	47%	95%		
Online hours per week						-2.200	0.182
Less than 11 hours	3	3%	3	3%	6%		
11 to 20 hours	5	5%	14	14%	19%		
21 to 30 hours	7	7%	19	19%	26%		
More than 30 hours	35	35%	23	23%	58%		
Preference of using tourism related websites						1.094	0.192
Never used	2	2%	2	2%	4%		
Travel agency	7	7%	6	6%	13%		
Hotel Website	2	2%	3	3%	5%		
Destination Website	10	10%	2	2%	12%		
Airline	1	1%	6	6%	7%		
Others	4	4%	2	2%	6%		
Travel agency/ Hotel	3	3%	1	1%	4%		
Travel agency/ Destination	1	1%	1	1%	2%		
Travel agency/Airline	1	1%	1	1%	2%		
Hotel/ Destination	2	2%	1	1%	3%		
Destination / Airline	4	4%	1	1%	5%		
Travel agency/ Hotel/ Destination	1	1%	1	1%	2%		
Travel agency/ Hotel / Airline	1	1%	1	1%	2%		
Travel agency/ Destination / Airline	5	5%	6	6%	11%		
Hotel/ Destination / others	1	1%	1	1%	2%		
Travel agency/ Hotel/ Destination/ Airline	4	4%	13	13%	17%		
Travel agency/ Hotel/ Destination/ Airline/ others	1	1%	2	2%	3%		

In terms of the preference of using tourism related websites, only 4% of the respondents had not used any tourism related websites. During a travel preparation process, most respondents visited travel agency websites or visited all kinds tourism related websites (Travel agency/ Hotel/ Destination/ Airline). Also, 9% of the respondents mentioned other sources were used to search for travel information like travel forum and travel blogs.

4.4 Perceived Website Usability and Functionality Importance

Importance of Website Usability

Table 4. Perceived Usability Importance

	Chinese Respondents			International Respondents			Overall				
Usability Attributes	**N**	**Mean**	**s.t.d.**	**N**	**Mean**	**s.t.d.**	**N**	**Mean**	**s.t.d.**	**t**	**Sig**
Navigation											
Navigation system	49	4.33	0.851	50	4.16	0.912	99	4.24	0.882	-0.939	0.975
Website internal navigability	50	4.24	0.716	50	4.10	0.886	100	4.17	0.805	-0.869	0.422
Backward / forward icon	49	3.57	1.225	50	3.80	1.088	99	3.69	1.157	0.982	0.124
Back to main page	50	3.80	1.161	49	3.90	1.085	99	3.85	1.119	0.434	0.699
Search internal information	50	4.24	0.797	49	4.02	1.051	99	4.13	0.933	-1.173	0.248
Website friendliness (Ease of use)											
Text understandability	50	4.46	0.676	50	4.56	0.787	100	4.51	0.732	0.682	0.938
Transaction utility	50	4.40	0.700	46	4.30	0.866	96	4.35	0.781	-0.597	0.200
Website learnability	50	3.74	0.965	49	4.02	1.145	99	3.88	1.062	1.318	0.641
The colour of hyperlinks will be changed after use	48	3.27	1.317	49	3.49	1.192	97	3.38	1.254	0.859	0.467
Multiple language versions of website	49	4.04	1.020	48	3.88	0.959	97	3.96	0.989	-0.824	0.757
Downloading speed	49	4.31	0.742	50	4.30	0.839	99	4.30	0.788	-0.038	0.548
Design and appearance of multimedia/ virtual tours	49	3.47	1.082	50	3.36	0.964	99	3.41	1.020	-0.531	0.522
Moving address	48	3.69	1.055	47	3.36	1.169	95	3.53	1.119	-1.427	0.468
Playfulness/Joy of use											
Entertainment within a website	50	3.16	1.076	50	2.88	1.023	100	3.02	1.054	-1.334	0.693
Personalization website system	50	3.14	1.050	50	3.10	1.015	100	3.12	1.028	-0.194	0.745
Interactivity between consumers and website	50	3.66	0.982	50	3.50	1.035	100	3.58	1.007	-0.793	0.562
Interactivity among consumers	50	4.36	0.834	49	3.45	1.081	99	3.91	4.219	-1.075	0.206
Overall layout and appearance											
Overall visual appearance of interface	49	3.96	0.841	50	3.74	0.828	99	3.85	0.837	-1.307	0.961
Web page design uses aesthetic/ artistic theory	50	3.82	0.850	50	3.54	1.034	100	3.68	0.952	-1.479	0.142
Sign or Logo of website uses aesthetic/ artistic theory	50	3.70	1.055	47	3.53	0.952	97	3.62	1.005	-0.822	0.362
Graphic Layout	50	3.86	1.050	50	3.68	0.957	100	3.77	1.004	-0.896	0.682
Internal search engine design	49	3.96	0.935	47	3.53	0.997	96	3.75	0.984	-2.168	0.279
Clarity of text colours	50	4.12	0.872	49	3.80	0.912	99	3.96	0.903	-1.807	0.745
Front size of text	49	3.88	0.971	48	3.48	0.945	97	3.68	0.974	-2.047	0.854
Design of transaction function	49	3.90	0.895	47	3.72	1.015	96	3.81	0.955	-0.894	0.591
Logical design of the website	50	3.96	0.947	47	3.94	1.009	97	3.95	0.972	-0.120	0.716
Length of each page	49	3.43	1.041	50	3.86	0.969	99	3.65	1.023	2.135	0.432
Text content includes design of title and subtitle	50	3.52	1.015	49	3.76	0.855	99	3.64	0.942	1.245	0.129
Website has its own characteristics	50	3.72	1.161	50	3.60	1.195	100	3.66	1.174	-0.509	0.936

Table 4 presents Chinese and international respondents' perceptions on website usability attributes. As indicated in Table 4, individual attributes received mean values ranged from 3.02 to 4.51. This, in turn, indicates that the respondents considered usability on hotel websites as fairly important. In particular, text understand-ability, transaction utility, downloading speed of website items, and navigation system were the most important ones among all usability attributes. In contrast, the attributes of entertainment within a website and personalization website system were considered as the least important usability attributes. When the perceptions of the respondents were individually considered, the perceived overall mean score of all usability attributes was 3.85 for Chinese respondents and 3.73 for international respondents. Most importantly, no significant difference was found in perceptions between these two groups of users.

Importance of Website Functionality

Table 5 shows the perception of respondents on the functionality attributes. Similar to the usability attributes, respondents generally viewed the functionality attributes as important. The perceived importance of functionality attributes ranged between 3.04 and 4.62. Examples of the perceived important attributes included room rate, online reservation system, transaction (transfer payment), online booking confirmation, and mapped location of the hotel. Employee web page, newsletters, and staff directory search were some examples of the less important attributes.

When the perceptions of Chinese and international respondents were separately considered, these two groups of respondents exhibited significantly different views on ten functionality attributes. Chinese respondents perceived that the functionality attributes of room rate, transaction (transfer payment), online booking confirmation, hotel address, availability of virtual tours or video files of the hotel, multimedia is combined with web-based representation, timeliness of information/regular updating, and create or modify personal profile were significantly more important than international respondents. The findings demonstrate that China's online users pay more attention to product information. This is likely due to the fact that China's business market still keeps trading as a way of "pay off in cash on goods' arrival" (Li and Buhalis, 2006). Therefore, searching and gathering more product information like multimedia and virtual tours may help Chinese online users know more about a hotel. Bai, Law and Wen (2008) advocated that using multimedia on travel websites could help the suppliers promote their products.

In contrast, employee web pages and staff directory search attributes were perceived as significantly less important by Chinese respondents. This indicates that international online users may not only search travel information but they also pay attention to other useful information. Interestingly, the Chinese online users were more concentrated on their original purpose. As a travel information buyer or browser, they are less interrupted by other information which does not directly relate to their target.

The perceived overall mean score of all functionality attributes was 4.14 for Chinese respondents and 3.85 for international respondents. Apparently, Chinese respondents had a higher expectation of website functionality attributes than their international counterparts.

Table 5. Perceived Functionality Importance

	Chinese Respondents			International Respondents			Overall				
Functionality Attributes	**N**	**Mean**	**s.t.d.**	**N**	**Mean**	**s.t.d.**	**N**	**Mean**	**s.t.d.**	**t**	**Sig**
Reservation Information											
Room Rate	50	4.70	0.544	50	4.38	0.805	100	4.54	0.702	-2.328	0.014*
Availability check	50	4.00	1.069	50	4.16	1.149	100	4.08	1.107	0.721	0.809
Online reservation system	49	4.57	0.736	49	4.41	0.977	98	4.49	0.864	-0.934	0.088
Refund function	50	4.32	0.741	49	4.18	0.972	99	4.25	0.861	-0.786	0.107
Book products from a variety of distribution channels	50	4.52	0.614	48	4.13	0.89	98	4.33	0.784	-2.566	0.514
Online cancellation	50	4.36	0.749	49	4.27	1.016	99	4.31	0.888	-0.528	0.143
Transaction (transfer payment)	49	4.65	0.561	49	4.27	0.908	98	4.46	0.776	-2.544	0.008*
Price ranges of different products/services	50	4.46	0.706	50	4.36	0.898	100	4.41	0.805	-0.619	0.480
Online booking confirmation	50	4.74	0.527	49	4.45	0.980	99	4.60	0.794	-1.845	0.001*
Facility information											
Hotel introduction	50	4.32	0.741	50	4.16	0.766	100	4.24	0.754	-1.062	0.807
Hotel address	50	4.64	0.563	50	4.42	0.906	100	4.53	0.758	-1.459	0.023*
Mapped location of the hotel	50	4.68	0.587	50	4.56	0.787	100	4.62	0.693	-0.865	0.149
Facilities information	50	4.46	0.706	50	4.42	0.642	100	4.44	0.671	-0.296	0.266
Availability of virtual tours or video files of the hotel	50	3.76	0.870	50	3.62	1.105	100	3.69	0.992	-0.704	0.026*
Promotion of products	50	4.48	0.707	50	4.22	0.864	100	4.35	0.796	-1.647	0.731
Multimedia is combined with web-based representation	50	3.74	0.922	50	3.68	1.133	100	3.71	1.028	-0.291	0.035*
Product warranty/legality	50	4.34	0.848	48	3.75	0.887	98	4.05	0.912	-3.366	0.902
Contact Information											
Contact information of hotel	50	4.42	0.702	49	4.29	0.957	99	4.35	0.837	-0.797	0.157
Employee web page	49	2.96	1.060	50	3.12	1.304	99	3.04	1.186	0.673	0.035*
Feedback of customers	50	4.14	0.857	50	3.84	0.934	100	3.99	0.904	-1.673	0.886
Comments or reply function for consumers' questions	50	4.28	0.809	50	3.68	1.039	100	3.98	0.974	-3.222	0.082
Website Management											
Timeliness of information/Regular updating	49	4.39	0.671	48	4.21	0.988	97	4.30	0.844	-1.048	0.041*
Information credibility	50	4.50	0.647	46	4.15	1.010	96	4.33	0.854	-2.025	0.136
Speed of transactions	49	4.45	0.647	49	4.20	0.935	98	4.33	0.809	-1.507	0.165
Provision of related web links	50	3.70	0.953	50	3.34	1.081	100	3.52	1.030	-1.767	0.510
Download/print function	50	3.78	1.055	50	3.44	1.163	100	3.61	1.118	-1.531	0.334
Option for different browser versions	50	3.60	1.107	48	3.65	1.041	98	3.62	1.070	0.211	0.787
Staff directory search	48	3.02	1.082	47	3.21	1.267	95	3.12	1.175	0.795	0.033*
Customized news report	49	3.39	1.017	47	3.47	0.975	96	3.43	0.992	0.395	0.712
Newsletter	50	3.10	1.147	47	3.17	0.985	97	3.13	1.067	0.322	0.368
Create or modify personal profile	50	4.02	0.795	49	3.76	0.990	99	3.89	0.902	-1.469	0.031*
Surrounding information											
Weather report	50	3.70	1.165	50	3.22	1.148	100	3.46	1.176	-2.075	0.786
Destination information	50	4.50	0.614	49	4.20	0.841	99	4.35	0.747	-2.002	0.276
Accessibility											
Ranking result of search engine	49	3.96	0.912	50	4.00	0.926	99	3.98	0.915	0.221	0.804
Download speed of webpage	50	4.22	0.954	49	4.53	0.739	99	4.37	0.864	1.809	0.181

***Significant at α=0.05**

5 Conclusions and Implications

This research has examined the difference in perception between Chinese and international users of hotel website in terms of usefulness, defined to comprise of usability and functionality. The participated Chinese users were similar to international users in demographic variables. Most of them were highly educated young people with more than three years of online experience. Most of the respondents have had international or domestic travel experiences. These findings indicated that Chinese users have high expectations on hotel websites. The results also indicated that 12% of the Chinese respondents would like to share their travel experiences on their weblogs or social networks. The hotel website designers should understand the expectations from Chinese online users, pay attentions to their website performance by meeting the needs of their target users. Since Chinese online users are more likely to seek recommendations from the Internet (Fong and Burton, 2008), poor usefulness of a website may receive negative comments about the hotel and affecting its online reservations. In addition, how are the differences between Chinese online users and international users on hotel websites. According to the findings from this research, hotel websites' functionality and usability were both perceived as important by Chinese users and international users. This strongly hints that hoteliers should keep improving their own websites in the functionality and usability attributes should they wish to remain competitive.

The perceived importance of hotel websites' functionality and usability did not exhibit significant difference between Chinese and international users on the usability aspect. Hoteliers, therefore, may not need to treat these two groups of users separately. An important and sensible approach for hoteliers would be to ensure that their own websites have good performance on text understandability, transaction utility, downloading speed, and navigation system. Moreover, these two groups of respondents did not have significant differences on most functionality attributes. Still, the Chinese respondents are more interested to gain detailed information from hotel websites. In other words, Chinese users perceive hotels' information as more important than international users. Therefore, hotel website owners can provide more multimedia information that is related to hotel products, such as hotel rooms and facilities, in order to assist Chinese online users to know more about the hotel. However, international users considered communication functions of hotel websites more important, particularly on the attributes of employee pages and staff directory search. This indicates that international online users may not only search hotel information but also pay attention to other related information. Hoteliers should, therefore, ensure the availability of effective online communication functions. In contrast, Chinese users are more interested in searching hotel information. As such, if hotels plan to establish a Chinese version of their websites, they should provide as much information on hotel products as possible but the efforts on employee pages and staff directory search can be minimized.

6 Limitations

Some related questions on hotel website development have not been investigated and these are opportunities for further research. As such, this research has a couple of limitations that could be addressed by future studies. With the limited number of respondents in this research, the instrument on hotel website functionality and usability factors was validated by a focus group discussion. A future study could repeat the study with a larger sample in order to do a factor analysis on the collected data. In addition, a future study can focus on more geographical regions for a more comparative analysis.

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Global e-Readiness of Hotel Chain Websites

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Abstract

Research has shown that companies wishing to serve a truly global customer base need to adapt their websites to take the linguistic, culture and social differences of local marketplaces into account. This study benchmarks the efforts of the top fifty hotel chains to incorporate appropriately adapted content and facilities on their consumer websites as an indicator of their commitment to servicing international markets. Both the individual findings and the summary Global e-Readiness Index figures suggest that most are not global in their e-commerce efforts. While many provide content in languages other than English, the spectrum of content and facilities available in alternative languages is limited. Even the best performers fail to take their internationalisation efforts deep enough into the purchase process to allow non-Anglophone customers to interact with sites seamlessly, with the result that business is potentially being lost.

Keywords: e-Commerce, Globalisation, Hotel sector

1 Introduction

Although lacking an agreed definition, e-commerce has become a key characteristic of modern society (Good & Schultz, 2002). Many businesses use e-commerce, in particular the medium of the Internet, to inform, interact with, and sell to customers all over the world (Seidenspinner & Thuner, 2007). As countless researchers have pointed out, the growth of the Internet as an information and commercial medium allows any company, regardless of its size or location, to reach out and transact with customers globally (Hwang, Jung & Salvendy, 2006). However, with many companies' e-commerce efforts originating in the United States (Sarkar & El Sawy, 2003), a question mark arises over how well companies are prepared to cater to the global nature of e-commerce. While in the past the majority of Internet users (and thus potential shoppers) were resident in North America, web demographics are quickly changing, with Asian, African and Arab countries growing rapidly in terms of both Internet penetration and e-commerce (Elbeltagi, 2007).

However Bin et al (2003) claim that "most American companies today are so focused on their domestic market that they do not pay any attention to overseas". Currently over sixty percent of e-commerce transactions are estimated to have at least one party outside the US (Schneider, 2007). Being able to exploit this opportunity is highly dependent on having adapted to the needs of international markets. Yet there is much evidence to suggest that such adaptation has not taken place. Bin, Chen & Qin Sun (2003) quote statistics from both IDC and from Forrester Research that show that

more than half of sites surveyed were doing nothing to internationalise their content; that many leading websites were turning away almost half of orders that originate outside the US; and that three-quarters of websites were not designed to handle non-US addresses or calculate non-US shipping costs. Kim & Lee (2006) maintain that many US retailers believe that international growth could be achieved by simply extending their domestic strategies, and thus many have launched websites in foreign markets that exactly parallel their domestic offering in all features and elements.

Given the importance of selling in foreign countries for the travel sector, this paper sets out to explore how prepared the major hotel chains are to service clients from international markets. Having examined the literature, the websites of the largest fifty companies are critically evaluated as to their suitability for use by non-US based customers. Their *Global e-Readiness Index* (GRI) – a quantitative metric designed to assess the degree of preparation of a website to interact with a global audience is subsequently calculated (Augustine & Surynt, 2004). Recommendations as to how sites could be improved are subsequently presented.

2 Background

In an era where the world is essentially flat, firms operate in a global environment (Friedman, 2005). This is especially true of companies in the travel industry, as their customers typically come from all over the world. Thus the growth of the Web as a communications and commercial medium with worldwide reach would therefore seem to offer great potential. By drastically reducing the importance of proximity, e-commerce helps people and companies to connect across borders with exponentially growing ease. However, having the entire world available as potential customers does not necessarily translate into being able to do business effectively on a global basis (Augustine & Surynt, 2007). The challenges of operating globally are not trivial, given "the existence of around two hundred and thirty counties, over six thousand languages, one hundred and forty seven currencies and innumerable cultures and sub-cultures" (Baker, 1999). Companies that wish to be global players must therefore pay a price in terms of time and effort to adapt and tailor their web presence to the specific needs of clientele in each market – in effect engage in a process of globalisation.

To achieve this, the e-commerce literature suggests a number of inter-related issues that need to be addressed. The most obvious is language. While in the past, the majority of Internet users resided in the US and for the most part spoke English (Bonanni & Cyr, 2004), Anglophones now account for less than one-third of Internet users. In addition, as can be seen from Table One, the number of non-Anglophones Internet users is growing rapidly. Although English is the official language of nearly eighty countries, it is the native language of only seven (Raisinghani & Beldona, 2003). Research has shown that one of the key elements for e-commerce success is addressing markets in their native language. For example, Forrester Research (2003) claims that consumers are likely to spend nearly twice as much time at websites presented in their own language and that they are three times more likely to buy from them. Similarly, having surveyed Chinese, American, Egyptian and German consumers from an epistemological perspective, Seidenspinner & Thuner (2007)

maintain that translation of the entire website into the local language is highly advisable if a company wants to address a particular market. Blended approaches - with part of the content presented in the native language and part in English - represent a reasonable, but less effective, compromise (Seidenspinner & Thuner, 2007). Despite this, the majority of Web pages continue to remain in English. This is challenging not only from a linguistic point of view, but particular poses problems for speakers of Asian and Arabic languages which do not use the Roman alphabet (Elbeltagi, 2007).

Table 1. Top Ten Languages Used on the Web

Language	% of Internet Users	Internet Users by Language	Language Growth on Internet (2000-2008)	2008 Estimated World Population for Language
English	30.5%	430,802,172	203.5%	2,039,114,892
Chinese	20.4%	276,216,713	755.1%	1,365,053,177
Spanish	6.8%	124,714,378	405.3%	541,910,690
Japanese	1.9%	94,000,000	99.7%	127,288,419
French	6.1%	68,152,447	458.7%	410,498,144
German	1.4%	61,213,160	121.0%	96,402,649
Arabic	5.4%	59,853,630	2,063.7%	357,271,398
Portuguese	3.6%	58,180,960	668.0%	239,646,701
Korean	1.1%	34,820,000	82.9%	72,711,933
Italian	0.9%	34,708,144	162.9%	58,175,843
Top 10	78.2%	1,242,661,604	278.3%	5,218,073,846
Other	21.8%	220,970,757	580.4%	1,458,046,442
Total	100.0%	1,463,632,361	305.5%	6,676,120,288

Source: Internet World Stats - www.internetwordstats.com/ststs7.htm

However linguistic translation is only a minor issue – the challenge of adapting to a global marketplace is in fact much more subtle. In particular the culture of local markets has a massive effect. In many cases, the value system, perceptions and perspectives of people who don't use English as their first language is very different from that of Anglophones (Bin, Chen & Qin Sun, 2003). Thus while web content can be linguistically translated relatively easily, adapting to these differences is more difficult. There have been several studies that have investigated the relationship between cultural factors and e-commerce related variables such as website design, online shopping behaviour and trust in an e-commerce context. Most highlights how there are significant cultural and attitudinal differences as regards online shopping between different regions of the world (Sagi et al, 2004) - especially between western consumers and others (Elbeltagi, 2007). For example, Del Galdo and Nielsen (1996) demonstrated how screen design directions have different psychological and social associations in different cultures, causing users to have different shopping experiences. Similarly Dong & Salvendy (1999) show how vertically designed web menus for Chinese and horizontally designed menus for US consumers increase

performance and satisfaction due to the differences in the writing styles - i.e. top-down vs. left-to-right - in the two regions. Seidenspinner & Thuner (2007) maintain that users' cultural preferences impact their preferred navigation tools, perceived quality of web designs and their perception and processing of information provided online. Similarly, Kim & Lee (2006) showed how different components of WebQual (particularly integrated communications, trust and innovativeness) affect the satisfaction and purchase intent of potential shoppers in the US and Korea differently. In a similar study, Hwang, Jung & Salvendy (2006) found that Korean consumers are more concerned about trust and security than those in the US or Turkey.

Adapting to these cultural differences is thus important for e-commerce success (Park & Jun, 2003). Singh & Pereira (2005) maintain that consumers prefer to shop on and interact with sites that are specially designed for their locale, while in a follow up study Singh, et al (2006) found that "culturally adapted web content positively affects user attitudes, site navigation and purchase intention". Luna, Peracchio and de Juan (2002) claim that adapting web content to a market's specific needs enhances usability, reach and website interactivity, ultimate leading to higher purchase intent. Thus linguistic translation is only the first step to internationalisation. To be effective, a more thorough process of localization, taking into account the political, social, technical and economic conditions of each market is needed to reconcile global strategies with local cultural and market differences (Hwang, Jung & Salvendy, 2006). In practical terms this can be quite difficult, requiring an in-depth understanding of culture, values and norms of the target market (Raisinghani & Beldona, 2003). If for example the issue of colour is considered, white stands for purity in the West, but in India, Japan and several other Asian nations it represents death (Mitchell, 2000). Similarly the number four is considered bad luck in numerology obsessed China, while thirteen, usually considered unlucky in Western cultures, is regarded favourably. Even within language groups, different approaches may be necessary in different regions. For example, Hispanic consumers within the US differ greatly from both the general population and from other Spanish speakers in Central / South America or Spain (Singh et al, 2008). Even though linguistically they speak (more or less) the same language, these important consumer groups do not want to be lumped together, instead demanding culturally relevant content adapted to their specific needs.

The practical challenges of localization become apparent when issues such as payment and logistics are considered. For example, websites originating in the US typically require online or offline (with a customer calling or faxing a given telephone number to provide credit card details) payment by credit card (Bin, Chen & Qin Sun, 2003). However in other regions both credit card penetration and credit card usage are more limited. For example, in China the most common payment method is cash-on-delivery, reflecting the Chinese culture of cash-based payment (Bin, Chen & Qin Sun, 2003). Similarly in the Arab world the widespread use of credit and debit card is not readily accepted by the general population for historical and religious reasons (Elbeltagi, 2007). In Germany payment by bank transfer is common, while in Japan consumers typically pay for online purchases at their local grocery store. To be successful in such markets, companies must adapt to local conditions and allow

customers to order and pay using whatever methods are the local norm, as failure to do so means significantly lower online sales. Logistics and shipping can also be a challenge. Unlike in the US where delivery is contracted out to major courier firms such as UPS and FedEx, in many countries the only viable delivery service is the state-owned Post Office system, which is often notorious for being slow, unreliable and for mishandling goods (Bin, Chen & Qin Sun, 2003). In China, where labor is relatively cheap, the solution has been to implement a hybrid e-commerce model, with orders being processed online, but deliver being made by employees who collect cash upon delivered.

As adaptation to the needs of different markets is clearly seen as a key success factor in the global e-commerce market, the concept of a *Global e-Readiness Index* (GRI) has been proposed as a means of evaluating the preparation of websites to interact with a global audience (Augustine & Surynt, 2007). In their initial 2004 paper, the authors adapted an idea that had previously been applied at the macro level to measure the potential of countries to support e-businesses (see for example Economic Intelligence Unit (2001), Tate (2001) or Raisinghani & Beldona (2003)). Applying this concept at the company level, the authors synthesized prior research to develop the *Global Readiness Index* (GRI) - a summary statistic designed to show the extent to which individual company websites have been adapted to meet the requirements of operating in a global marketplace.

In their most recent study, their initial proposal has been refined so that the GRI effectively combines five elements: Language – does the website offer languages other than its native language?; Currency – does the website offer currency conversions or the ability to purchase in alterative currencies?; Address – does the website accommodate non-US elements in the purchase address?; Payment – does the website allow for payment options other than credit cards?; and Logistics / Shipping – does the website support the use of shipping / logistics systems appropriate to multiple locales (Augustine, Surynt & Jen, 2008). Note that this list is largely supported by other independent studies. For example, Bin, Chen & Qin Sun (2003) maintain that payment, logistic systems and language are the primary factors that every firm should take into account in the process of their online globalisation. Calculation of the GRI itself is carried out by performing a visual evaluation of the selected websites and assigning values based on how well each satisfies criteria developed using the variables described above, with a score ranging from zero to two (corresponding to low, medium and high) assigned based on the degree to which the specific measure is applied. The GRI is then calculated by simple summation and expressed as a percentage.

3 Research Methodology

Given the importance of international customers for most hotel companies, and the continued growth in the sale of hotel rooms over the Internet, it was decided to extend Augustine, Surynt & Jen's study to the hotel sector by assess the global e-readiness of the major international hotel chains. Although the initial intent was to closely follow the same methodology, certain characteristics of the hotel sector necessitated some

adjustments, which are summarized in Table Two. In particular the fact that hotel rooms are an intangible product, and thus do not require delivery means that the logistics / shipping element was irrelevant and was thus eliminated. In addition, as the literature stressed the importance of localizing not just from a linguistic point of view but also to take cultural preferences into account, a variable was added to incorporate localization. Whether a full or blended approach (i.e. whether the entire website or just a proportion had been adapted linguistically and culturally) was also thought to be important, and thus a variable was added to capture this data. Lastly, given the importance of the reservations process in hotel e-commerce, an assessment was also carried out of the site's booking engine to establish if it too had been localized.

Table 2. Adaptation of GRI Criteria

Issue	**Augustine, Surynt & Jen (2008) study**	**Current Study**
Language	Yes	Yes
Localisation	No	Yes
Full Content	No	Yes
Bookings Engine	No	Yes
Currency	Yes	Yes
Address elements	Yes	Yes
Payment options	Yes	Yes
Logistics / Shipping	Yes	No

The population for the study was defined as the websites of the top fifty global hotel chains as identified in Hotels Magazine ranking of January 2008. Actual assessment as carried out by three trained researchers during June 2008. Each researcher assessed all of the selected sites independently, scoring each variable using pre-established criteria. Their assessments were subsequently combined and differences highlighted. These elements were then collectively re-examined by the assessors and consensus achieved as to the most appropriate score. In each case, assessment began with the brand's .com website. Initially the home page was reviewed to establish links to either country specific or international versions of the site to determine the number of languages available. Following the procedure outlined by Raisinghani & Beldona (2003), alternative versions (specifically a French and / or Chinese version if they existed) were explored by comparing the pages generated by clicking on the top level menu systems to establish if alternative versions of the site were full content (i.e. they contained broadly the same content sections, features and facilities as the English version) and to see if the non-English content had been localized (by the inclusion of distinctive looks or colours, special offers, images, local personas or text targeted to the local market).

The booking engine (where present) was assessed in detail. Initially it was explored to establish if its pages were available in the alternative languages. The format in which the date needed to be entered (dd-mm-yy vs. mm-dd-yy) was also noted. A trial reservation was then made to examine the rate descriptions displayed by the system.

Unlike the booking engine's web pages themselves, rate descriptions do not generally form part of the website code but are instead pulled dynamically from the hotel company's Central Reservation System. Thus, in some cases, while the user interface is displayed in the alternative language, the rate description (including important issues such as booking conditions) often revert back to English. Whether the rates displayed could be automatically translated by the system into alternative currencies was also assessed. Two different possibilities were noted here – the option to have the rates transformed into the currency of the user's choice, or the provision of a link to a currency converter to allow the user to perform such conversions on an ad-hoc basis on a third party website. The range of payment methods allowed was also noted. As was discussed previously, although credit cards are common in many countries, other regions have traditionally preferred other forms of payment. For example, charge cards are popular in certain countries, Switch is widely used as a payment method in the U.K., and German / Swiss clients often prefer to pay by bank transfer. Lastly the address data that needed to be entered to complete the reservation was examined to establish if a zip / postal code was mandatory. Such codes are not ubiquitous, and requiring that they be entered can prevent international clients from completing reservations. In some cases, validity checks are also used on zip codes to insure that they match the address data, in effect prohibiting the entry of a false code just to complete the reservation process.

For each variable, the presence / absence of the respective features was noted on the websites under assessment. The resulting data was then analysed using SPSS to generate appropriate descriptive and non parametric statistics, the results of which are presented below. As in the Augustine, Surynt & Jen (2008) study, each site's GRI was calculated by a simple summation of the individual variable scores, although as will be discussed later a more complex calculating, taking into account the relative importance of each variable, might be more appropriate.

4 Findings

Given their importance for interacting with international clients, it's not surprising that hotel websites tended to be multilingual in nature. On average, websites were available in five different languages (Mean = 5.14, standard deviation = 3.70). However the findings were positively skewed, with the majority of sites offering a lower number of options, and a comparatively small number of sites offering a very high number of languages affecting the average. Nearly one quarter of hotel chain websites (24%) were offered only in English. However where sites were available in alternative languages, over half (56%) provide full content, with another twenty percent using a blended approach, providing some content in the additional language(s), but either omitting and / or linking back to English for some features. In the vast majority of cases (90%), the non-English language content had been localized with the inclusion of offers, features and other material specifically targeted to the market.

Where the site was offered in a language other than English, in most cases (79%) the user interface of the bookings engine had also been translated. However, as the user

dug deeper into the reservation process, the degree of adaptation to international markets fell significantly. Only 60% provided rate descriptions in alternative language(s), with the remainder reverting to English for this key data. Over one third (34%) of sites required that dates be entered in U.S. format, and nearly two-thirds (60%) required the entry of a zip / postal code in order to complete the reservation process. Payment options were similarly limited, with nearly three-quarters of sites only accepting the basic options of Visa / MasterCard or American Express.

Table 3. Cluster Analysis

	Overall	**Partials**	**Globals**	**Locals**
Cluster Sizes	50	6	15	29
Cluster Means				
Languages	2.0	3.0	2.8	1.3
Localization	0.7	0.8	1.0	0.5
Full Content	1.3	1.4	1.7	1.1
Bookings Engine	0.6	0.0	0.9	0.5
Date format	0.3	0.0	0.1	0.5
Rate Description	0.4	0.0	0.5	0.5
Currency	1.1	1.2	1.1	1.1
Zip	0.4	0.0	0.0	0.7
Payment	1.3	1.4	1.5	1.2
Cluster Variances	Overall	Cluster 1	Cluster 2	Cluster 3
Languages	1.6	0.0	0.3	1.7
Localization	0.2	0.2	0.0	0.3
Full Content	0.7	0.3	0.2	0.9
Bookings Engine	0.2	0.0	0.1	0.3
Date format	0.2	0.0	0.1	0.3
Rate Description	0.3	0.0	0.3	0.3
Currency	0.8	0.2	0.7	1.0
Zip	0.2	0.0	0.0	0.2
Payment	0.4	0.8	0.4	0.4

An unsupervised cluster analysis was carried out to identify similarities among the companies surveyed. As can be seen from Table Three, three distinct clusters emerged. The first, dubbed *Partials*, contained 6 observations and was composed of companies that provided multiple languages on their website, generally provided full localized content, but whose booking engine was only available in English. Rate descriptions were thus only offered in English, and currency conversion facilities (where provided) were external links rather than integrated into the site. Zip codes were required from those making reservations, and payment methods were limited. The second cluster, dubbed *Globals*, contained 15 observations and once again was composed of companies with multi-lingual, full content localized websites. However these companies also provided their bookings engine in multiple languages, in general down to the rate description level. The largest cluster, dubbed *Locals*, contained 29 observations and was composed of companies that offered their website in a more limited number of languages, provided only limited content in these languages and made little attempt to localize their product offering. Although in some cases their

bookings engine was offered in more than one language, in general their websites were less well adapted to international markets, requiring, for example that zip codes be entered and accepting few alternative payment methods.

As in prior studies, the above variables were also combined to generate a Global e-Readiness Index (GRI). For hotel chain websites as a whole, the index figure was 55%, indicating that collectively these sites are not well adapted to cater to international clientele. However averages can be deceptive, as in fact the GRI scores ranged from 13% to 80%, with a standard deviation of 22%, indicating wide dispersion. The skew was -0.68, indicating that the majority of sites had high scores, with a tail of lower performing companies negatively affecting the average.

Post-hoc inspection of the results revealed that many of the sites with lower scores tended to be U.S. chains, and that their performance was having a very negative effect on the overall findings. To test if this theory was statistically significant, the data were split into two groups – that of US hotel chains (defined as those having their corporate headquarters within the US) and international chains (those with their headquarters in other countries). As can be seen from Table Four, the GRI for these two grouping differs greatly, and the difference is significant at the 99% confidence level. Similarly it was postulated that economy hotels tended to have a lower GRI than other types of hotels, as such chains generally tend to be limited to a single geographic area. Again this assumption was tested by comparing the mean scores for the two groups. As expected, full service hotel chains had significantly higher GRIs ($p>0.05$) than their economy sector colleagues, as can be seen from Table Four.

Table 4. Global e-Readiness Index

Global e-Readiness Index	**n**	**Mean**	**Significant**
Overall	50	55%	
Headquarters in the U.S.	35	50%	
Headquarters outside the U.S.	15	67%	p>0.01
Economy sector	23	49%	
Full service sector	27	62%	p>0.05

5 Conclusion

For companies truly wishing to serve a global customer base, adapting their website to take into account the language, culture and social norms of local marketplaces has become a key issue. This study benchmarks the efforts of the top fifty hotel chains to incorporate appropriate content and facilities on their website as an indicator of their commitment to servicing international markets.

Both the individual findings and the summary Global e-Readiness index suggest that at present the major hotel chains are not very global in their e-commerce efforts. While many provide content in languages other than English, in most cases the

spectrum of content and facilities available in the alternative language is more limited. Even the "best" performers often fail to take their internationalisation efforts deep enough into the purchase process to allow non-Anglophone customers to complete reservations in their native languages and using local norms. As can be seen from the cluster analysis, the majority of sites' efforts are very limited. Those that do make an effort often do so superficially, using straight linguistic translations of their domestic site performed without taking local needs or cultural issues into consideration. In light of the changing consumer landscape of e-commerce, and in particular the increased percentage of non-English speaking customers, such an approach is clearly short sighted and puts these companies at a disadvantage. As discussed previously, Internet use is growing rapidly in non-Anglophone countries, and most analysts agree that the future of e-commerce lies in these regions. Hotel companies wishing to take advantage of the continued growth in online travel sales need to be more proactive about incorporating the appropriate culturally adapted content and facilities to effectively address their target markets. Even simple steps like including more comprehensive content in the language of their target markets should have an impressive effect.

However future research is needed to help identify the relative importance of each of the variables discussed above in the success of globalisation efforts. Such a study would be invaluable in helping companies focus their localization and globalisation process, and would also be useful to help overcome one of the key limitations of the current study. As it stands, the evaluation process used above and in particular the assignment of scores to calculate the GRI was to a large extent subjective. Although efforts were made to minimize this subjectivity by triangulating the evaluations of three researchers, biased could still exist and affect the results. For future studies, there is thus a need to develop a more objective way of quantitatively measuring and scoring variables as localization and full content. Similarly, as in the study by Augustine, Surynt & Jen (2008), simple summation was used to calculate the GRI, in effect giving equal weight to all the variables. In reality certain variables (including, for example, the availability of several languages, or having localized content) have a more significant effect on the usability and acceptance of a website by international clients than others (such as, for example, the date format required). Thus a more appropriate weighting system, taking relative importance of each issue into account, needs to be developed and empirically tested. In addition, from an empirical perspective, the focus on hotel chains means that the study's results cannot be generalized to the industry as a whole, and indeed a similar study of independent hotels in particular might generate very different results. However, the findings are useful as a benchmark for future studies, and an argument could also be made that as the major chains have the budget, expertise and global presence to engage in e-commerce in a professional manner, studying their performance gives a useful indicator of best practice in the industry as a whole. In a related issue, the use of a brand approach means that the performance of certain companies may be unduly influencing the results. Several hotel companies (e.g. Accor Hotels & Resorts, Wyndham Worldwide) own multiple individual brands within the list of top fifty hotel companies. In such cases their back end technology may sometimes (but not always) be shared across brands, meaning that the resulting content and facilities

provide on their brand websites would be the same. To overcome these last two challenges, a larger scale study, using a representative sample of the industry as a whole, needs to be undertaken.

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On the Importance of Hyperlinks: A Network Science Approach

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Abstract

Hyperlinks are the essence of the World Wide Web. Their importance is very high due to their ability to provide a visitor with a wealth of good quality information and for the role they play in the ranking of sites by modern search engines. This paper provides a network science approach to provide evidence to the importance of hyperlinking. We examine the webgraph of a tourism destination using graph theoretic methods to highlight the effects that the topological structure has on its navigability. Moreover, through a series of simulations performed on the representation of the real web network we show how a modest increase in the number of links may improve the visibility and the navigability of the destination's webspace.

Keywords: Web navigation, hyperlinks, complex networks, random walks.

1 Introduction

Hyperlinks are the essence of the World Wide Web (WWW). They provide rapid access to segmented information chunks in non-sequential order, mimicking the associative non-linear process used by an individual looking for information (Conklin, 1987). The links between materials on one site and references provided by other sites on the WWW is regarded as a core characteristic of communication (Benkler, 2006). Hyperlinks were a main design feature of the WWW and one of the objectives of the original scheme proposed by Berners-Lee, who wrote that "a 'web' of notes with links (like references) between them is far more useful than a fixed hierarchical system" (1989: 4).

Hyperlinks have further increased their importance due to the extensive commercialisation of the Web. They may provide visitors to a website with access to a wealth of related information which, if well chosen, can be of high value and strengthen their appreciation of that particular site. On the other hand, the mechanisms underlying their creation favour the build up of 'communities of interest', i.e. groups of websites related by a common topic. This eases the movement between them (surfing) and provides added value to the visitors (Park & Thelwall, 2003; Vaughan et al., 2006). The nature of the links between sites is one of the major determinants of a website's positioning on the results pages of modern search engines and thus vital to online success (Biever, 2004). Hyperlinks also provide a representation of social links between the individuals who own the websites (Adamic & Adar, 2001, 2003; Park, 2003). In this manner, hyperlinks have acquired an

economic value, becoming what may be called the *currency* of the Web (Walker, 2002).

Nonetheless, a great number of websites (and particularly in the tourism field) exhibit very few external links, seeming to suffer form a marked *linkphobia*. This low propensity to reference the external world can be ascribed to the 'transfer' to the Web of a historically independent tradition in the conduct of the (mostly) small and medium enterprises forming European tourism (Bramwell & Lane, 2000; Leidner, 2004). Tourism stakeholders appear not to realise how detrimental this can be to the user experience, and the problems this may create in the overall visibility of their websites on the WWW (Baggio, 2006). The aim of this paper is to demonstrate the importance of hyperlinks using a network science approach based on graph theoretic methods. The remainder of this paper is organised as follows. Section 2 presents the background for this research; Section 3 examines the methods used. Results and discussion are reported in Section 4.

2 Background

The study of the Web as a complex network of interconnected elements (the websites bound by the hyperlinks connecting them) has shown that, far from exhibiting some kind of regular or random distribution of connections, it has a well definite structure. The well known *bow-tie* model (Broder et al., 2000; Dill et al., 2002; Flake et al., 2002) sees the Web as a self organizing, self-similar structure, basically divided into the following components (see Fig. 1):

- a core of strongly connected nodes (SCC), in which web pages are joined with bidirectional links;
- a set of pages (IN) connected in a unidirectional way to the SCC (pages have outgoing links that reach the SCC, but are virtually unreachable by other parts of the web);
- a set of pages (OUT) reachable by those in SCC, but whose links are mainly inward bound (i.e. there are paths from SCC to OUT, but there is no direct connection from OUT to SCC or IN)
- some TENDRILS: pages connected to either IN or OUT without linking to SCC; and
- TUBEs: direct connections between IN and OUT without passing through SCC.

This structure, along with the other graph theoretic characteristics of the WWW network (distributions of connections, clustering or modularity etc.), is also found in subsections of the Web (self-similarity, see Dill et al., 2002). This topology is the basis for a number of functional algorithms for crawling (Deo & Gupta, 2001; Skopal et al., 2003), searching and communities discovery (Gibson et al., 1998; Newman & Girvan, 2004). These algorithms are fundamental components of the next generation of crawlers, spiders or other automated Web searching tools, and are based on the possibility of identifying well connected groups (communities) of websites sharing common content akin to the one expressed in the query terms user by a web-surfer.

Due to its high density of connections, the bow-tie's SCC is a preferred starting point for these explorations. Areas of the WWW with topologies significantly different will inevitably thwart these crawling strategies (Adamic et al., 2001; Deo & Gupta, 2001; Kleinberg, 2006).

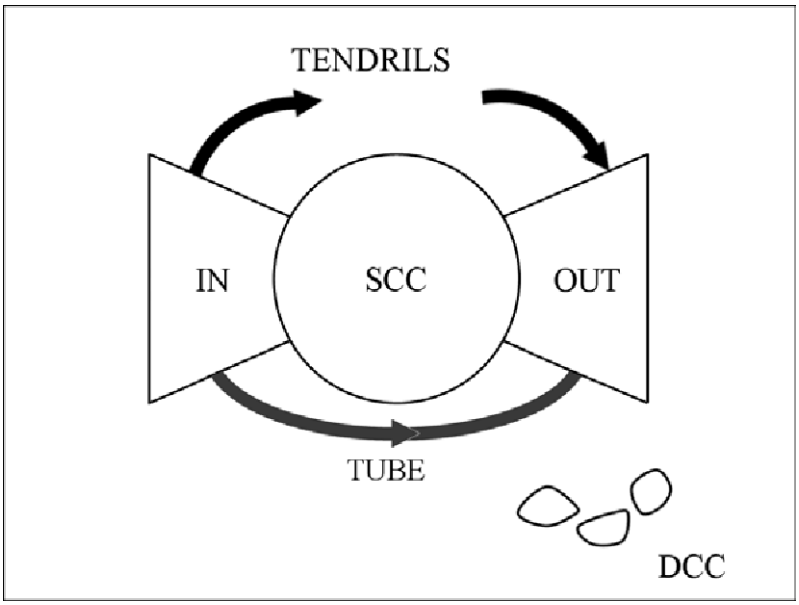

Fig. 1. The bow-tie model of the Web

Locating a website of interest among the billions present online can be a demanding task for an unaided web-surfer and therefore a large proportion of users rely on a search engine, with the most using Google (statistics on search engine usage are published by Search Engine Watch, http://searchenginewatch.com/). Consequently, any organisation seeking 'visibility' strives to obtain a good position on the search engine results list. Once a 'starting point website' is found it is quite common that the users continue their navigation guided by the hyperlinks they find on that site (Pan & Fesenmaier, 2006). Movement between linked sites accounts for a large proportion of the visits to websites.

A good indicator of the probability of finding a website is provided by the PageRank. This metric and the underlying algorithm that calculates it were devised by Larry Page and Sergey Brin at Stanford University (Brin & Page, 1998; Page et al., 1999) and form the foundation of the success attained by Google (Vise & Malseed, 2005). PageRank assigns a measure of relevance or importance to each web page, allowing Google to return high-significance pages in response to a user query. The recursive nature of the algorithm, where a page is highly ranked if it is linked to by other highly ranked pages ensures good robustness and reliability. The details of this algorithm are provided in Berkhin (,2005) and Langville and Meyer (2005, 2006). The PageRanking process may be interpreted stochastically as a random walk (Langville & Meyer, 2005; Page et al., 1999). Assume that a user is currently browsing a certain page. After having read it, the surfer moves with a certain probability p to a page that

is linked to that page. If there are no links to follow, the user selects (with probability *1-p*) a new page, chosen uniformly over all other Web pages. The PageRank (when normalised) corresponds to the invariant measure for this process. In other words, it represents the long-run proportion of visits made to the destination page, i.e. the probability of a visit to that page.

Let us now suppose a tourist looking for a place to spend his holidays has found a website belonging to a tourism organisation which is connected to a destination. From the 'destination' point of view, it is important to make any effort to 'retain' the visitor for the longest possible time on websites which deal with and therefore belong to the destination. In this way the probability of the destination being chosen as a place for a visit is greatly enhanced. Thus we may see that the structure of the destination's websites network is a crucial element in a tourist's information search process.

In the following sections we analyse a case and show how the density of linkages affects the 'dwell time in destination's pages' of a user surfing websites presented online by the stakeholders of a tourism destination.

3 Data and Methods

The destination used as a test case for this research is the island of Elba, Italy. Elba is a well known seaside destination, off the coast of Tuscany, Italy in the Tyrrhenian Sea. The structural characteristics of the websites belonging to tourism operators located on the island have been discussed elsewhere (Baggio, 2007; Baggio et al., 2007). Here those results can be summarised by saying that the general topology of the network is similar to the one characterising many other complex networked systems (Pastor-Satorras & Vespignani, 2004).

In particular the Elban network exhibits a clear scale-free (power-law) degree distribution (a few nodes have many connections, while the majority have very low connectivity), very poor connectivity and limited modularity. In addition, the structure of the Elban web graph is markedly different from the bow-tie shape found in the Web (Baggio, 2007; Baggio et al., 2007). The network also shows a limited connectivity with regards to the rest of the WWW. The average number of links on a site to websites not belonging to the destination is 1.56 and almost 43% of the websites have none. Moreover, the in- and out- degree distributions show a power law with an exponent much lower than expected from the literature (Pastor-Satorras & Vespignani, 2004). This skewed and 'sparse' distribution of web links provides a very low propensity to reference the external world (Baggio, 2007).

With the existing Elban network as a basis we may then simulate the behaviour of an Internet user looking for information about the destination. This is done here by exploring the system with a series of random walks. The method is far from new in graph theory and network science. Random walks have been used as a way of describing the static and dynamic characteristics of complex networks (da Fontoura Costa et al., 2007 ; Dall'Asta et al., 2005; Yang, 2005), but also as a technique to

identify modular communities (Latapy & Pons, 2006) or to measure the 'quality' of a Web search engine (Henzinger et al., 1999).

Let us assume a user has found a website belonging to a tourism operator located on the Elba island (one node of the network is chosen at random). The 'agent' performs a random walk by following the hyperlinks found on the website(s) visited. In other words, one of the links present is chosen with uniform probability and followed to the next website. Here the process is repeated until a website with no links is found. In this case we assume the user changes 'area' and leaves the destination. A maximum of 10 'hops' are allowed and no website can be visited twice (technically this is called a self-avoiding random walk). The algorithm is then run generating 1000 random walks and the average length and the proportion of zero-length walks measured. Further, to show the importance of increasing the general connectivity of the network, this process was repeated 10 times with different parameters. Each successive simulation was created by adding 2% of links to the previous case. Links were added following a simplified preferential attachment rule (Albert & Barabási, 2002). They were created by randomly choosing a node among the 50% having lowest degrees and connecting it to one chosen (randomly) among the 50% with the highest degrees. This procedure preserves the basic topological characteristics of the network.

4 Results and discussion

The Elban Web network is depicted in Fig. 2. This drawing has been obtained by applying a Fruchterman-Rheingold visualisation algorithm (Fruchterman & Rheingold, 1991) which is especially suited to highlight the disconnected components of the network (this picture is drawn with Pajek, a large network visualisation and analysis program written by Batagelj & Mrvar, 2007).

A confirmation of this poor connectivity is provided by considering the PageRanks of the Elban tourism websites. Their PageRank distribution was obtained by querying Google and is shown in Fig. 3. The average value is 2.85±0.11 (on a 0 [poor] to 10 [good] scale). This is a low value indicating poor visibility for these websites on the Net.

The analysis of the random walks conducted over this network shows interesting characteristics. The results are shown in Table 1. The first column contains the percentage of links added with respect to the first entry (the original Elban network). Other data shown are: density of links in the network (Density), average path length (Length) and diameter (Diameter), the average length of the random walks (aveRW) and fraction of walks with zero length (%zeroRW). As described in Section 3 these values were obtained averaging over 1000 random walks. The random walk measurements give an indication of the 'deepness' (and could be related to the time spent online) of the visit to the destination's websites, while density, average path length and diameter are standard measurements of a network's topological characteristics and give indication of its compactness and the ease of navigating it (da Fontoura Costa et al., 2007).

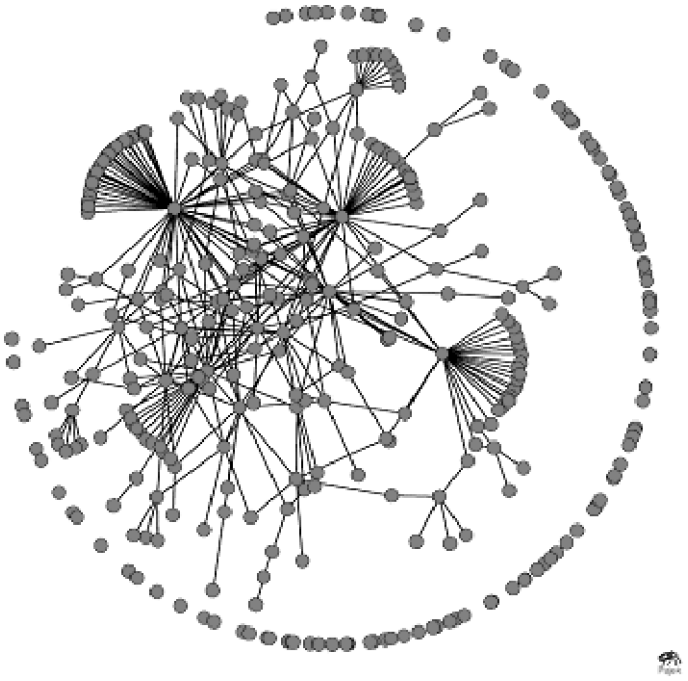

Fig. 2. The webgraph of tourism operators at Elba

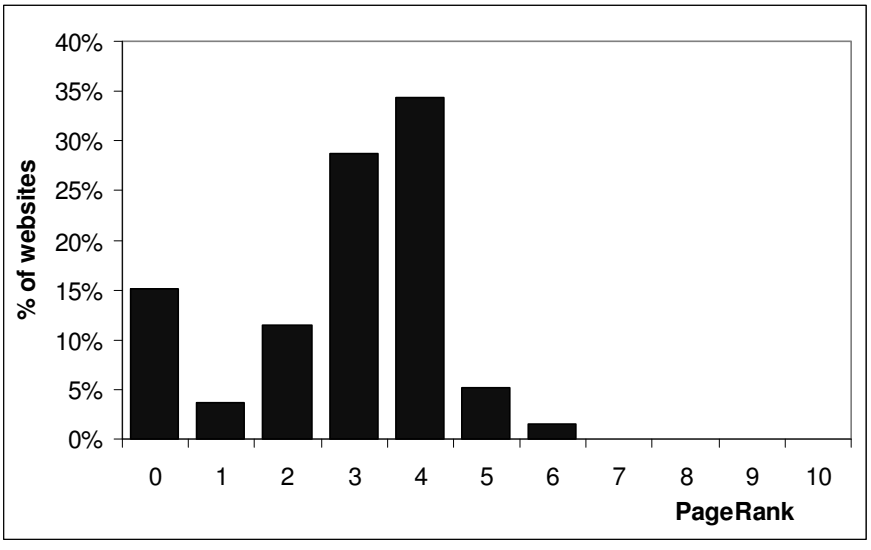

Fig. 3. PageRank distribution for the Elban tourism websites

Table 1. Results of the random walk simulations on Elba tourism networks (see text for a description)

Added Links	Density	Length	Diameter	aveRW	%zeroRW
Original	***0.0045***	***3.7***	***10.0***	***0.8015***	***72.4%***
2%	0.0047	3.7	10.0	0.8411	70.6%
4%	0.0052	3.8	9.3	0.9872	65.8%
6%	0.0060	3.7	8.7	1.1980	59.7%
8%	0.0075	3.7	7.6	1.5426	51.5%
10%	0.0097	3.5	6.7	1.9678	43.4%
12%	0.0134	3.2	5.8	2.4937	35.7%
14%	0.0196	2.9	5.0	3.3864	24.5%
16%	0.0301	2.6	4.0	4.7269	14.0%
18%	0.0487	2.3	3.3	6.1465	8.1%
20%	0.0828	2.0	3.0	7.2291	4.5%

The original network, which as discussed above is characterised by a very low connectivity, has a very short random-walk length and a high proportion of zero-length walks. This is also evident when comparing (Table 1 and Fig. 3) these values with the average path length (the average length of the shortest paths between any two nodes) and the diameter (the maximal shortest path).

By increasing the link density, rather obviously, aveRW increases and the proportion of zero-length walks reduces. As long as the average random walk is lower than the network diameter (or average path length) the random walker will have a limited knowledge of the whole network, and his browsing sessions will be much shorter than the topology of the network could allow.

We can describe the results in the following way. After having found a website belonging to Elba, in approximately 73% of the cases a Web surfer changes destination (no more links are found). In the remaining 27% of the cases our visitor is likely to visit on average less than one other website. This is a poor outcome for a tourism destination seeking to compete to attract tourists and to convince them of the worth of a stay. A single website might also be sufficient to provide all the information sought after, but, unfortunately, Elban tourism websites do not perform well from this point of view (see e.g. Tallinucci & Testa, 2006). The situation is even worse when taking into account (Sections 2 and 3) the structure of the Web and likely future developments of search engines where websites with low PageRank will be difficult to find and sparse networks or small SCC components hinder efficient crawling processes.

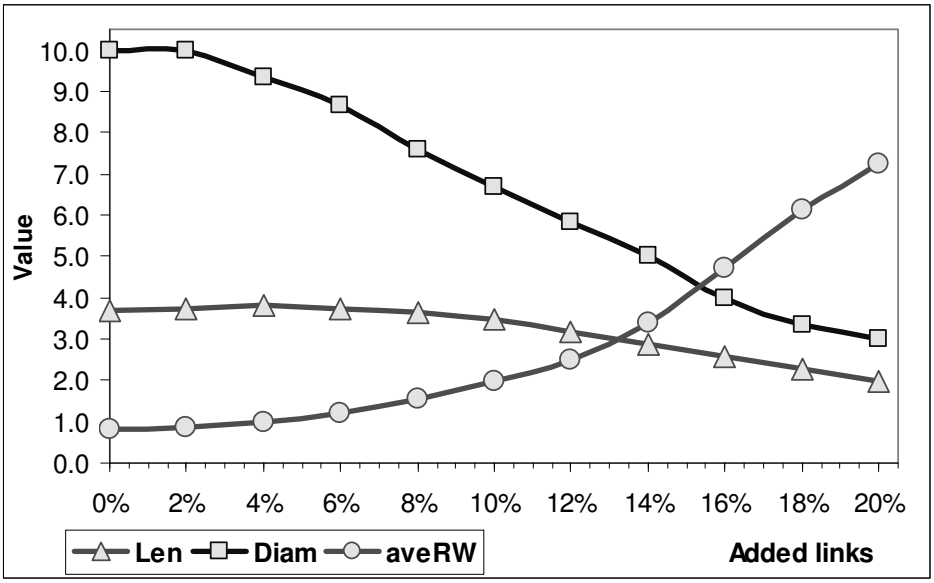

Fig. 4. Modifications of diameter, average path length and average random walk when increasing the number of links

A simple and efficient way to address this situation exists, provided the *linkphobia* of Elban tourism operators can be circumvented. Consideration of Table 1 indicates that the average random walk grows with an increase in link density. This is an expected outcome when increasing the network density. What is interesting to note, however, is that a *moderate* increase in the number of links has the effect of greatly improving the overall navigability of the system. This is mainly due to the topology of the network. This behaviour is more evident when looking at Fig. 3 in which the average random walks for the different augmented networks are shown along with the average path length and the diameter of the same networks. As can be seen, a mere 13% increase in the number of links is sufficient for the random walk to assume the same value of the average path length and a 15.5% increase allows having the diameter's value. Thus modestly improving linking may provide a marked improvement in the capabilities to navigate the whole system.

5 Concluding remarks

Graph theoretic methods (analysis and simulation of random walks) applied to a tourism destination's webspace have allowed us to provide more arguments to the stated importance of the presence of hyperlinks on website's pages. Although limited to a single instance (Elba Island) and using a simplified algorithm, the results presented here appear generally valid and can be extended easily to other cases. Further work is needed to refine and broaden these results and cross-check them with an estimation of the improvement in visibility (e.g. by estimating possible variations in PageRank values).

The outcome and the method used in this study have a strategic relevance for destination managers as well as for individual tourism operators. They provide a way of assessing their own specific context and provide them with simple means of improving the visibility of their websites on the major search engines. Collaboration and cooperation are long discussed arguments in tourism destinations' studies. Here we have provided tangible reasons for doing so in the virtual world, and a very simple, inexpensive and effective way to greatly enhance the possibility of improving web visibility for both a destination and its stakeholders. Adding links connecting more websites within the destination (and to external entities) can be done in a few minutes but can lead to long-term returns.

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Cultural Destination Usability: The Case of Visit Bath

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Abstract

This research describes the usability evaluation of the website of Bath's Destination Management Organization (DMO). A proven usability methodology called MiLE+ has been used and a Usability kit (Ukit) for the eTourism (and particularly for the web communication of cultural destination) field has been created. The Ukit is composed by a library of scenarios of use (user profiles, user goals, user tasks) and heuristics for the evaluation. Ukit has been created and validated also thanks to usage analysis (1 year time frame) which has been performed also to confirm, where possible, the results of the inspection.

Keywords: DMO usability, usage analysis, scenario driven evaluation, usability kit

1 Introduction

Usability, and in general terms, website quality cannot be considered as a nice-to-have feature for the online communication: usability plays an essential role in the online user experience (Garrett, 2003; Nielsen, 1999). Furthermore, in the tourism field, which is an information intensive domain (Werthner and Klein, 1999), usability should be recognized as one of the most important issues for the Internet communication. Moreover, tourism destination websites are an interesting application domain for usability engineers because of their intrinsic multi-domain characteristics. Actually, as stated by Buhalis (2003), information and communication technologies play a strong role in the whole tourism value chain. Websites are the primary instrument for users to access destinations information and for the DMOs to market themselves worldwide. Finally, the cultural tourism domain is one of the most challenging fields for online communication: this is mainly due to the interplay between tourism and cultural heritage assets (McKercher and du Cross, 2002), which should be harmonically represented online to display a clear understanding of the destination and of its attractions. This paper aims to investigate the website usability and quality of a cultural destination, namely the city of Bath (England), trying to understand the main usability issues and breakdowns, with a proven usability methodology MiLE+ (Triacca et al., 2005). Within the methodological framework a

Usability Kit (Ukit) is developed: Ukit can be considered as an application-independent and domain-dependent usability instrument that could be reused to investigate the quality of other DMO websites at each level (e.g. city level, regional level and country level) belonging to the same domain. The study is organized as follows: section 2 presents a review of the usability related work; section 3 outlines the methodology used for the study, and section 4 is devoted to the study results: particularly section 4.1 presents the usability kit created for the analysis which is explained within section 4.2; section 4.3 describes the use of log files during the study (usability kit creation and usability risk assessment). Conclusions and future work are presented in the last section of the paper (section 5).

2 Related Work

According to Garrett (2003), “user experience is not about how a product works on the inside (although that sometimes has a lot of influence), but it is about how it works on the outside, where person come into contact with it and has to work with it”. The same author (Garrett, 2003) underlines the fact that as “web site is a “self service” product. [...] There is no instructional manual to read beforehand, no training seminar and so on. There is only the user facing the site alone with only her wits and experience to guide her”. User experience has been investigated in some studies such as one by Kuniavsky (2003). He identifies three main factors that positively affect user experience, namely (i) functionality, which considers the websites’ usefulness with regard to the users, (ii) efficiency, which considers the time needed by the users to accomplish specific tasks, and finally (iii) desirability, which considers the users’ feelings of surprise and satisfaction with regards to the web application. According to Cantoni and Tardini (2006: 129-130), usability is defined as "the adequacy of contents/functionalities (pillar I [of the Website Communication Model - WCM]) and accessibility tools (pillar II), between themselves and with respect to the users (pillar IV) and the relevant context (world)”. However, this adequacy has to be measured taking into consideration the goals of people who commission, project, develop, promote and run the website (pillar III)". Furthermore, ISO defines usability (ISO 9241) as “the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments”. The various approaches used to evaluate usability can be classified into two main categories: (i) usability inspection methods and (ii) empirical testing. (i) Usability inspections methods (also called “expert review” methods) is the generic name for a set of methods based on having expert evaluators instead of final users to inspect or examine usability-related aspects of a user interface (Triacca et al., 2005; Nielsen, 1994). During the inspection phase, the expert evaluator goes through an application to look for usability breakdowns; the expert judges the application according to her/his personal skills and competences, as well as a set of instruments (such as usability principles, criteria or a set of previously defined guidelines) that are applied during the inspection. These methods generally focus on “surface-oriented” features of the graphical interface (mainly at page level) (Green, 1996) and they are strictly dependent on the individual know-how, skill and judgment of inspectors (Matera et al., 2002). (ii) Empirical testing methods, (also called user based methods) investigate usability through observation of the user interacting with the application: usability properties are assessed by observing how

the system is actually used by some representatives of real users (Whiteside, 1988). The main problems lie in the difficulty to properly select representative user samples, and in the difficulty to give adequate training to use advanced functions of a website (Matera et al., 2002). Within these two categories (user-testing and inspection methods), the most current usability evaluation techniques for web applications are alternatively based on two main approaches: heuristic-driven evaluation and task-driven (scenario-driven) evaluation. In the heuristic-driven evaluation, checklists and usability principles are used (Nielsen, 1994), while task-driven evaluation provides sets of tasks guiding the user-testing, walk-through and inspection techniques (Brink et al., 2002). Normally, the task-based evaluation is used within a scenario, that is, the description of a concrete episode of application use, a "story about use" (Carrol, 2002). This methodology has some disadvantages: although the scenario-based approaches can easily detect the feasibility of a task, i.e. whether a task can be actually accomplished or not, they do not identify what exactly caused its failure or success. All methodologies presented above have been intended to work independently and alternatively.

Besides, usage analysis (or log files analysis) is one of the most interesting studies to be performed on a website if there is no possibility of involving users during the usability analysis (Atterer et al., 2006). In general terms, log files are the traces left by the user while visiting the web site; this specific group of files are server side files that record users' activities while they are visiting the website. The study of the log files is not an engineering activity as such: log files analysis can give interesting information at a communicative level (Cantoni and Ceriani, 2007) such as the study of the users' paths along the website (Pitkow, 1997) by which it is possible to optimize the communication flow within the website.

Finally, as one of the main purposes of a DMO website is to attract more consumers and to increase visits to the destination (Shanshan et al., 2007), the quality of its online communication should be very high; otherwise, as explained by some empirical study, a huge amount of users might leave the website because of usability problems (e.g. Souze et al., 2000). Moreover, as stated by the World Tourism Organization, DMO websites can promote destination products (WTOBC, 2000), and act as a bridge in promoting services and products and communicate with the market (Pike, 2005). The system which hosts other services or products (or in other words, gives visibility to third party websites), should be well-designed and have great performance in order to satisfy both investors and end-users. Good website usability normally leads to a good website performance; therefore usability performance is a key success factor for a website (Douglas and Mills, 2004; Nielsen, 2003). Several different researches have focused on the comparative evaluation of destinations' websites in terms of features, functions, lay-out and information presentation (e.g. Getz et al., 1998; Buhalis and Spada, 2000; Wang and Fesenmaier, 2006). Few of them focus on pure usability (e.g. Au Yeung and Law, 2003; Zhou and DeSantis, 2005), and even fewer are related to DMO website usability (e.g. Shanshan et al., 2008).

3 Methodology

MiLE+ evolved from a previous method called MiLE (Milano-Lugano Evaluation) (Bolchini and Garzotto, 2008; Triacca et al., 2005) and is the fruit of a joint research performed by University of Lugano and Politecnico of Milan. MiLE+ is not the sum of the methods quoted above (i.e. usability inspection methods and empirical testing), instead it is an experience-based usability evaluation framework for web applications that strikes a healthy balance between heuristic evaluation and task-driven techniques. MiLE+ introduces a new conceptual approach and several new tools (Triacca et al., 2005). It has been adopted in different domains such as cultural heritage (e.g. Speroni et al., 2006), banking, ecommerce, and mostly in the eLearning field (Triacca et al., 2004; Inversini et al., 2006; Botturi et al., 2007). MiLE+ philosophy comes directly from the previously quoted ISO 9241 definition , where the context of use played a crucial role in the ways which users achieve their goals and tasks ("effectively, with efficiency and satisfaction"). Before performing the usability evaluation with MiLE+, a crucial preliminary phase is the usability kit creation. The usability kit (in short Ukit) is a set of tools that enables the usability inspector to carry out the evaluation. Ukit consists of scenarios (user profiles, goals and tasks) and evaluation metrics (heuristics, user experience indicators) (Triacca et al., 2005). The components of the usability kit may vary from case to case. It is possible to argue that Ukits are application-independent (so that they can be adopted to analyze different websites) but domain-dependent (the focus is on a certain domain and the inspector analyzes different websites belonging to the same domain with the same usability kit). Different combinations of Ukit elements can lead to different usability inspections that might be chosen by the inspector according to time and money constraints. Some examples are: (i) scenario-based user-experience evaluation, (ii) scenario-based heuristic evaluation, (iii) scenario-based user-testing. The Ukit is always created thanks to the expert knowledge of the specific domain and where possible thanks to users' focus groups and/or stakeholders interviews. In this study, Ukit has been created thanks to a preliminary interview with the website manager of Bath Tourism Plus, and it has been validated and enhanced with a usage analysis. Particularly, log files track all users' activities and all clicks on the website and the aggregation of this information can help website managers understand strengths and breakdown within the website design. From a communicative perspective, it could be argued that if usability analysis measures threats (or potentiality), usages analysis assesses the risk of these threats (or the objectivity). Let us consider this example: if usability analysis finds a breakdown as poor visualization of search results (threats), the usages analysis can tell the evaluator the exact number of users accessing website information through the internal search engine. As a result, the evaluator can understand if the risk is low (e.g. 0.0001% users use the internal search engine) or if the risk is high (e.g. 20% of the users use the internal search engine). This measurement could guide the intervention on the website redesign (or in this case the search results' optimization). Within this study log files analysis has been used both as Ukit validation and to assess risks and threats (section 4.3): a freeware program (namely Funnel Web Analyzer - http://www.quest.com) has been used for the analysis. Agents and visitors filters have been applied in order to exclude on one hand spiders and robots and on the other developers and internal visitors IP addresses. Figure 1 show the methodological

process in a nutshell: under the letter "a" the inputs for the Ukit creation ("b") are listed; then after the evaluation the usability issues (or threats) are validated with the log files ("c") in order to assess the risks.

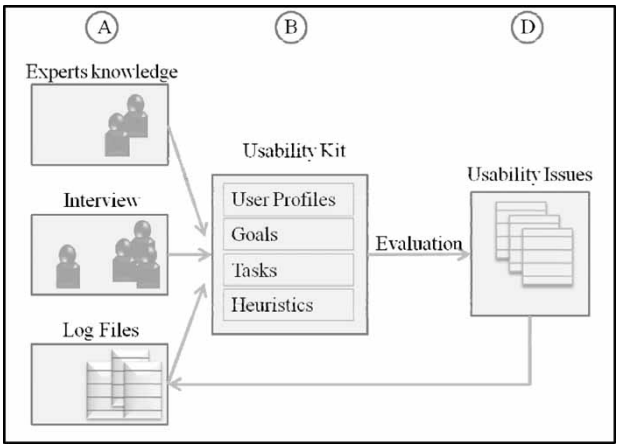

Fig. 1. The methodology in a nutshell

4 Case Study

4.1 Usability Kit

The usability kit comprises eight user profiles, 10 user goals, 72 user tasks, 40 heuristics (selected from the MiLE+ library of heuristics where more than 80 heuristics are classified).

User profiles: In order to create user profiles some different attributes have been considered to create the possible users (Cantoni et al., 2003). These attributes have been classified into: (i) web-graphic (e.g. internet and computer skills, web site knowledge); (ii) technical (e.g. connection speed), and (iii) personal (e.g. motivation, domain knowledge, disabilities).

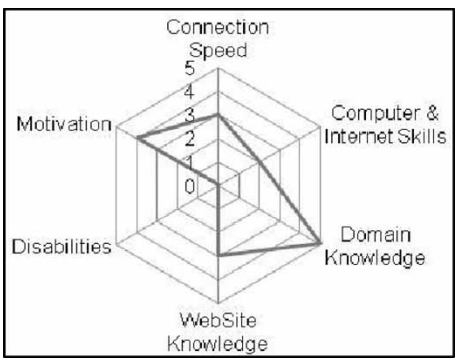

Fig. 2. User Profile attributes radar chart

User profile creation: Scale 1-5 (where 1 is low and 5 is high) indicates the level of importance of the specific attribute for the given profile. Usage analysis as well as the semi-structured interview helped creating user profiles (mostly for the technical – e.g. connection speed, used browser - and general attributes – e.g. time on the web sites). User profiles have been represented with a radar chart as in figure 2.

User goals: They represent the high level goals for users while browsing the website. They refer to the general purposes which guide the users' actions while browsing the website (Cantoni et al., 2003). The identified goals are: (i) obtain destination information, (ii) obtain attractions information, (iii) obtain events information, (iv) find and book a hotel, (v) obtain information about groups travels, (vi) obtain information about new activities, (vii) shop online, (viii) obtain information eating and drinking, (ix) obtain and download maps and guides, (x) obtain information about guided tours. Usage analysis, as well as semi-structured interview helped creating users' goals. Main paths and page views have been the most significant indicators for the goals elicitation.

User tasks: They are the basic operations that the user performs on the website. If user goals refer to general purposes, user tasks refer to the basic (or atomic) operations which could be performed by the user on the website (Cantoni et al., 2003). Let as consider as example the users' goal G4 Find and book a hotel, the associated users' tasks are: (i) Find a hotel for less than *x*£ (e.g. 50/70£) per night. (ii) Find a hotel in a given location (e.g. centre city). (iii) Find the most recommended hotel by the users. (iv) Find hotel information. (v) Find hotel pictures. (vi) Book the hotel. (vii) Find accommodation contacts. (viii) Send an email to the accommodation.

Table 1. Example of Scenario from the Usability Kit of visitbath.co.uk

S1	Title: Decide to Visit Bath	SR4
USER PROFILE	USER1 This first user profile, Paul, is male, and is 45 years old. He accesses the website from home during the evening. His connection speed is medium (low speed ADSL). He is not familiar with the computer and the Internet, so some icons or conventions on the web do not have any meanings for him. However he has strong domain knowledge (tourism and cultural tourism). He is motivated to reach his goals while visiting the web site.	
GOAL	G1. To obtain destination's information	
TASKS	T1.1 Find the city overview T1.2 Find the city history T1.3 Find information on how to get there by car T1.4 Find information on how to get there by train T1.5 Find information on how to get there by plain T1.6 Find detailed map of attractions T1.7 Find deals for visiting the attractions T1.8 Find city internal transportation	

Usage analysis, as well as semi-structured interview helped creating users' tasks. Main paths and page views have been the most significant indicators also for the tasks creation. The combinations of these elements lead to the possibility of creating scenarios of use (table 1).

The combination chosen for analysis is the Scenario-Based Usability Inspection (Scenarios plus Heuristics).

Heuristics (or evaluation metrics) are divided basically into three main groups: content, graphics and navigation. The following are three examples, one from each group of the heuristics used during the inspection. (i) Content conciseness. (Content). People rarely read web pages word by word: they prefer to read only a few lines (15-25 lines) on the screen. Therefore, conciseness is one of the most important aspects of the art of web-writing. For this reason it is very important to write an effective "short" and concise text. (ii) Background contrast. (Graphic). The use of strong background colors or unsuitable images can damage the readability of website contents. Some color pairs can be very difficult to read, especially for people with visual disabilities. (iii) Depth anticipation. (Navigation). Often the "tree architecture" of a website is very complex. For this reason, the user may have problems in understanding the structure both of the website and of each branch. The user should always have a clear perception of the website pages he has visited and of the next pages.

4.2 Usability Inspection Results

Inspection was conducted by two usability experts (as required by the methodology). Two different results were obtained from the usability inspection: The first is a table (table 3) with goals rated (based on tasks average rating) on a scale from 1 to 5 (where 5 indicates that the heuristic is absolutely respected and 1 indicates that the heuristic is absolutely not respected). Each task belonging to a given high level goal has been rated according to the 1-5 scale and the heuristics. The average rating of the sub-set of tasks gives the weight of the goal (table 2).

Table 2. Rated Goals

Id	Goal	Rating
G1	Obtain destination information	3.9
G2	Obtain attractions information	3.6
G3	Obtain events information	3.6
G4	Find and Book an hotel	3
G5	Obtain information about groups travels	3.7
G6	Obtain information about new activities	3.5
G7	Shop online	2.8
G8	Obtain information eating & drinking	3.5
G9	Obtain and download maps and guides	3.3
G10	Obtain information about guided tours	3.5

In general, the website of Bath's tourism organization is simple and well-designed. The only goal that ranked under 3 is G7. The website has several usability problems with regards to certain tasks in the goals (G1, G2, G3, and G9). In G1, G2 and G3 the main usability issues are related to information retrieval. The website is actually really rich of information, and the retrieving technologies are quite powerful. The representation of results, as explained in the following section, has usability problems with both contents and graphic representation. The shopping section (G7) has several problems that will be underlined in the following paragraphs, while the map and guides (G9) should be technically improved (e.g. file dimension and retrieving). 35 usability issues were found as a result of the analysis. The three most important usability issues were isolated and presented below; they are most important as they affect the major number of tasks in the usability kit.

(i) Search results organization and representation

Search results organization and representation seem to be poor. The database appears to be well-structured but an improvement on the look and feel of the results may be an important issue.

Number of tasks affected by the problem: 6 (T2.1, T3.1, T4.1, T4.2, T6.2, T8.1).
Example: (T2.1) Find the list of attractions. The list of attractions is accessible through the search engine in the attractions section. Three parameters may be set by the users (type, location, and keyword). This kind of search engine is very useful when the user knows what s/he is looking for. It would be less useful when the user is simply exploring attractions. Some problems may arise when the user searches for "any attraction" in "any place" or for "any attraction" and "Bath". The following screenshot (figure 3) shows the search results for "any attraction" in "any place" (1).

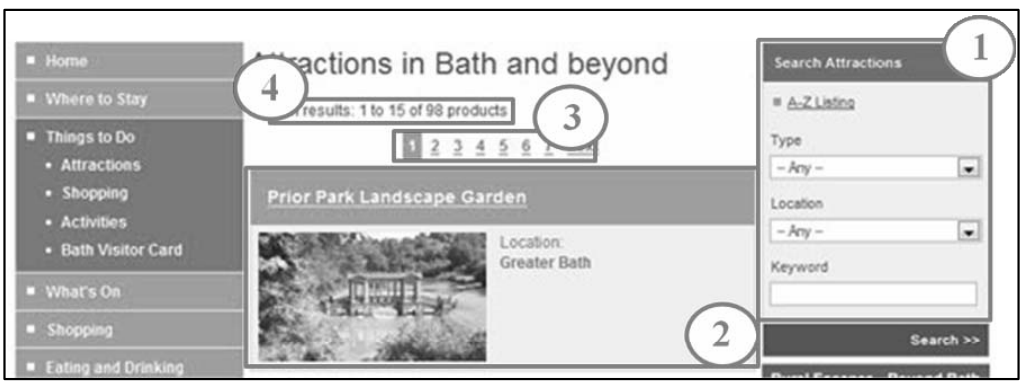

Fig. 3. Visitbath.co.uk - usability issues in search results page

Usability issues about accuracy and conciseness: The search gives seven pages of results with 98 results organized in 15 results per page (3). The order seems to be random and users may scroll through a number of pages before finding what s/he is interested in. The attractions are not introduced to the user (2): no information except

a picture is given. There is also an accuracy issue regarding the fact that the search engine retrieves attractions, not "products" (4) as indicated on the web site.

(ii) Depth anticipation

Depth anticipation is related not only to the search results but also to the general design structure of some information paths on the website.

Number of tasks affected by this problem: 5 (T1.7, T2.12, T2.13, T3.1, T3.8).
Example: (T3.9) Book a ticket online. The user is trying to buy a ticket for one event of the month, highlighted in the home page. The choice is "Last Night at Bath Racecourse" (1), the user clicks on the event location in order to have more information and from the location s/he can access the online shop. In the online shop there are not only tickets for the event but also other tickets related to the normal activity of the racecourse (figure 4). Usability issues about orientation and depth anticipation include the huge amount of clicks (numbers 1 to 4) involved and the final landing page in the Bath shop may disorient the user.

Fig. 4. Visitbath.co.uk - Depth anticipation: steps for booking a ticket online

(iii) Shop section

The shop seems to be a stand-alone website. There is no connection between the shop and the rest of the web site. This problem is a usability issue that refers to the entire goal of G7 (namely "shop online"). Access to the online shop was problematic for end-users (Figure 3). The problems are summarized in Figure 5, a collage of the usability issues.

Fig. 5. Visitbath.co.uk - shopping section

Usability issues about orientation and backward navigation: the shop looks very similar to the rest of the website. The graphic style is the same, but the links highlighted in red are not the same as in the main web site (3). The page does not have a title (1), and the convention of using the logo for backward navigation is not respected (2). Indeed when accessing the shop, there is no possibility to go back to the main website. The user is in a different website, which looks the same as the one s/he was browsing before with no possibility to go back to the main website.

4.3 Usage Analysis (time frame May 01 2007, April 30 2008).

As explained in the previous sections (sections 3 and 4.1), usage analysis played a strong role before and after the usability analysis, namely within the usability kit creation phase and within the risk and threats assessment phase. In this section two examples of the use of the log files analysis are given in order to justify their use during the two quoted phases.

Usability Kit: goals and tasks enhancement

Main path observations helped in shaping and enhancing the goals and tasks of the usability kit. Users' paths on the website could be easily translated into Ukit elements (namely the scenarios, where tasks may be inferred and created). The three most popular sections of the website are: (i) where to stay, (ii) book online and (iii) things to do. Many individual user paths end up in those sections.

Book online: eight different user paths for 222.149 user sessions
Where to Stay: five different user paths in 161.500 user sessions
Things To do: four different user paths in 157.596 user sessions

Among these sections recurrent pages visit and paths can be identified. Goals about the destination information (G1), attraction information (G2), events information (G3)

activities (G6) and accommodation (G4) have been enhanced thanks to the log files analysis.

Usability analysis, issues verification (threats and risks)

Among the three threats (or usability problems) described above, the highest risk (in terms of end user usage) is represented by the internal search engine results (section 4.2, 1). The usability inspection found out that it is a critical issue that could be improved. The usages analysis confirms the fact that this is a critical issue for the website success: search results are one of the major drivers for information-seeking activities in the website, according to the log files, 5.24% of the users use the internal search engine to access information.

5 Conclusion and future work

VisitBath.co.uk appears to be a high quality website. However, it suffers from problems that are related to the nature of a data-driven website, such as the search engine and the results display as well as the depth anticipation. Thus, the usability investigation found few usability issues (here three have been presented), which could be classified as major problems, and there was one critical issue that could be classified as a significant problem. The shop section appeared as one of the most important usability issues. This is mainly due to the fact that it was created by a different company and was integrated into the website as a preliminary experiment. Nevertheless, it is a critical section for a website which presents good overall quality. Unfortunately, it was not possible to study all kinds of usages within this section, because the analyzed log files do not cover the shop section. It is interesting to note that the tourism office was aware of these problems, agreed on the presented evaluation and is now working closely with the technology supplier to fix these issues in order to improve the user experience of the website. As regards the methodological conclusions and contributions, a usability kit for cultural tourism destination websites has been created and validate particularly thanks to the managers' interview and the use of log files analysis. As the usability kit is domain-dependent and application-independent, it can be reused for the evaluation of several cultural DMOs websites. It would be a useful added value both for evaluators and DMO managers seeking to evaluate the quality of a given destination web site. Thus the contributions of this study concern: (i) usability engineer, thanks to the creation of a usability kit (scenarios of use, user profiles, users' goals and users' tasks as well as the adoption of specific guidelines for the usability heuristic evaluation) which is application-independent and domain-dependent and (ii) the specific industry usability evaluation: DMO websites and particularly cultural destination websites, can exploit the usability kit to start evaluating the quality of their own websites. Future work will mainly regard the enhancement of the usability kit and its extensive application in the domain, in order to create a comprehensive library of user profiles, goals and tasks (as well as the evaluation criteria), to match the needs of tourism stakeholders. Future work will regard the extensive validation and extensive testing of the Usability kit within the online cultural tourism domain.

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Acknowledgements

Authors would like to thank Bath Tourism Plus and NewMind for the precious support.

Effectiveness of eBrochures: An Analysis of Use Patterns

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Abstract

Destination Websites typically offer print brochure request forms in addition to the information already presented on the Website. Also, more sophisticated sites increasingly offer the ability to view brochures online, and others even provide users with an opportunity to create customised brochures. The log file data of a destination Website was analysed to investigate whether the use of the different brochure formats was complementary and whether differences in use patterns occurred. The findings suggest that there is almost no overlap between interactive trip planner uses and print brochure requests. Also, the sessions that include interactive trip planner usage are longer and more active. Thus, analyses of use and use patterns can provide important indicators of effectiveness.

Keywords: eBrochure; Web log analysis; information search; brochure effectiveness; online brochure requests; interactive trip planner.

1 Introduction

Travel brochures have been used as an important medium of communication throughout the travel and tourism industry (Getz & Sailor 1993; Wicks & Schuett, 1993). Often seen as an inexpensive form of advertising yet versatile communication tool by the industry, consumers regard travel brochures as one of the most trusted sources of travel information (eMarketer, 2007a). Importantly, it is generally believed that travel brochures, also known as tourism collaterals, have an important influence on the choice of vacation destinations (Molina & Esteban, 2006). Each year, millions of dollars are spent on publishing travel brochures to generate requests from potential visitors and stimulate travel to the destination (Zhou, 1997; Holloway & Plant, 1988; Gilbert & Houghton, 1991; Hodgson, 1993). Consumers of tourism products and services are often dependent upon the information found in brochures (Wicks & Schuett, 1991; Holloway & Plant, 1988; Andereck, 2005) and use travel brochures to find potential attractions to visit, plan future trips, and inform themselves about the destination. There are many means for distributing travel brochures: mailing them out to the people who requested them, handing brochures out on site or by displaying

them in the lobbies of hotels, in convention centres, in rest areas, in travel agency offices and in tourist information centres (Zhou, 1997).

A majority of destination marketing organizations nowadays also distribute brochures through request capabilities on their Websites and think that such brochure request functions are important (Wang & Fesenmaier, 2006). This is an interesting phenomenon as the Website itself provides the same information that the brochure provides. Indeed, many tourism bureaus expected that print brochures would become obsolete with increases in Website use for travel planning but had to realize that this was not the case (Gretzel, Fesenmaier, Formica & O'Leary, 2006). In the meantime, new technologies have also made it possible to create online versions of brochures that can be browsed through and communicate the feel of a real brochure by simulating the turning of pages and the viewing of two pages at the same time. In addition, many destination marketing organizations now offer interactive trip planners that allow users to add only those pieces of information that are of interest to them and then save or print a customised brochure. These diverse brochure formats often co-exist on the same Website.

Recognizing that many tourism bureaus currently offer the same information in multiple formats, this study seeks to examine the effectiveness of these different information sources and investigate whether their use is exclusive or complementary.

2 Background

Given the importance of brochures for tourism, the use of print brochures has been studied quite extensively, while no research was found that specifically addressed the use of electronic versions of brochures (eBrochures).

2.1 Use of Brochures

Consumers nowadays face ever greater choices of tourism products and services, resulting in a demand for more information to inform their selections. Also, travellers are getting more sophisticated and they are hungrier for more information than before (Pollock, 1996). Travellers typically use internal information first, and then extend their quest for more information from external sources depending on the amount of internal information available (Andereck, 2005). In general, the more unfamiliar the destination to travellers, the more time and effort will be spent on information search (Fodness and Murray, 1999). Interestingly, existing travel information search frameworks hint at the potential for significant redundancies in this process, as tourists typically use several information sources (Moutinho, 1987; Runyon & Stewart, 1987); however, it is generally assumed that these sources stem from different industry players and contain different information.

While the specific ranking varies slightly, research has found and continues to find that print brochures are important information sources. Gitelson and Crompton (1983), for instance, found brochures to be the second most frequently used external

information source after commercial guidebooks. Wicks and Schuett (1991) studied the way in which travellers used requested brochures and found that uses involved not only pre-trip planning but also reference to the print information during the trip. Similarly, Andereck and Caldwell (1993) reported that brochures are the third most important source of information at attractions while Fodness and Murray (1999) identified brochures as fourth in rank among automobile travellers from a list of eleven sources of information. In addition to that, more recently, Andereck, Vogt and LeClerc (2003) discovered that brochures were ranked the fifth most frequently used information source by welcome centre visitors following personal experience, word of mouth, maps and travel guidebooks.

Yoo, Lee and Gretzel (2006) found that brochures are still used extensively despite the advent of the Internet, and actually ranked higher than the Internet in terms of extent of use for pre-trip planning among a sample of US travellers. Importantly, 44% of US travellers prefer travel destination websites with features that enable them to download and print promotional literature and travel brochures from the website (eMarketer, 2007b). Most recently, a study of US online travellers indicated that, while brochure use is less prominent among online travellers than among general travellers, brochures still play a role in the information search process of those who plan their trips online (TIA, 2008). Indeed, about 16 % of online travellers even seek out sites which specialize in offering free travel brochures (such as vacationfun.com). While many (33%) indicated that use of the Internet has decreased the amount of travel brochures requested, 20% report that Internet use has increased their brochure requests. Also, while 41% stated that they typically request brochures online when planning trips, 59% do not request brochures online. About 47% print out information to take with them on trips and 19% use interactive trip planners to create customised brochures. This suggests that different travel information searchers have preferences for different informational media.

2.2 Effectiveness of Brochures

Given the high investment in brochure printing, it is of course important to measure their effectiveness (Andereck, 2005). Existing research generally suggests that brochures influence visitor behaviour (Lime & Lucas, 1977, Krumpe & Brown, 1982, Roggenbuck & Berrier, 1982). Specifically studies conducted in welcome centres (Gitelson & Crompton, 1983; Fesenmaier & Vogt, 1993; Tierney, 1993) indicate that information obtained in information centres has a great impact on tourists. Andereck (2005) proposes that brochure evaluation studies can be generally classified into three categories: economic impact studies (Tierney & Haas, 1988; Fesenmaier & Vogt, 1993); conversion studies (Woodside & Reid, 1974; Silberman & Klock, 1986; Woodside & Ronkainen, 1982; Woodside & Soni, 1988; Woodside, 1990; Mok, 1990; Messmer & Johnson 1993); and brochure studies (Gitelson & Crompton, 1983; Etzel & Wahlers, 1985; Baas et al., 1989; Wicks & Schuett, 1991; Gilbert & Houghton, 1991; Hodgson, 1993; Zhou, 1997; Pritchard & Morgan, 1995; Fodness & Murray, 1999; Sirakaya & Sonmez, 2000; Andereck, Vogt & LeClerc, 2003; Andereck, 2005; Edelheim, 2007). However, despite all this research, there is still a need to better understand the reason why brochures are effective or not effective and

whether they are effective for all types of travellers (Fesenmaier and Vogt, 1993; Wicks & Schuett, 1993).

One basic condition for brochure effectiveness is, of course, brochure use. Existing research indicates that brochures are not read by most people who receive them (Fazio, 1979, Cella and Keay, 1979). In contrast, Zhou (1997) evaluated the effectiveness of a destination brochure and indicated that most people read the brochure, 50 percent ended up visiting the destination, and most consulted the brochure during their visit. The brochure helped boost travellers' interest in visiting; yet, the influence of the brochure on visitation decisions was affected by prior experience and perceived usefulness of the brochure.

2.3 eBrochures

The Internet has become the most important communication channel in tourism and has greatly influenced tourism organizations' marketing activities (Buhalis, 2003; Wang and Fesenmaier, 2006). It has forced tourism organizations to re-evaluate and 're-invent' their strategies and offerings in order to adapt to this new environment (Poon, 1993; Gretzel, Fesenmaier, Formica and O'Leary, 2006). Therefore, the majority of destination marketing organizations has created online marketing systems to extend and help distribute their products and services (Wang & Russo, 2006). Hanson (2000) indicates that many websites actually mirror print brochures and fall into the category of "brochure-ware". Others provide opportunities for cross-channel communication in that they allow consumers to request print materials online. An increasing number of sites also feature online versions of print brochures as pdf files or interactive versions using Flash. Therefore, eBrochures can take on many forms (Pollock, 1996).

Interactivity has been found to positively influence consumer perceptions (Chen, Griffith, & Shen, 2005) and, thus, can be seen as a great opportunity for marketers. Similarly, Pollock (1996) suggests that interactive brochures have the potential to communicate destination experiences more fully. The ability to customize contents leads to greater relevance and persuasiveness, and, thus, is also an important feature that eBrochures can provide (Migas, Anastasiadou & Stirling, 2008). Following this line of thought, destination marketing Websites should encourage the use of their interactive and personalized versions of brochures, rather than driving travellers to print brochure requests. This would also help bureaus reduce the printing and shipping costs for their offline brochure versions. Yet, at the same time, important synergies might exist between the different formats in that they could potentially serve very different information needs of distinct groups of travellers. Therefore, a better understanding of if and how the different brochure formats are used is needed. This is especially important as different media channels seem to have different impacts on awareness and intentions to visit (Kim, Hwang, & Fesenmaier, 2005).

3 Methodology

Log file data from the Website of a convention and visitors bureau in the United States were analysed to investigate:

1. Differences in the frequency of use of different brochure formats (print brochure request, Flash version of brochure and interactive trip planner);

2. Overlap in the use of the different brochure formats;

3. Differences in user sessions that include the use of specific brochure formats.

The Website features three different brochure formats. First, the Website contains a request form to order a print copy of the brochure. Second, a Flash version of the brochure that allows users to turn pages, view two pages at the same time or zoom in to see details is also available. Third, the Website features an interactive trip planner. When viewing content pages, users can add information to their personal trip planner with a simple click. They can then view a pdf version of all the contents or save and email the brochure if they register. A link to the interactive trip planner is presented on top of the homepage and icons for adding content to the trip planner appear throughout all content pages. Links to the other two formats appear on all third-level content pages. Specifically, the pages show a picture of the brochure cover and links to either view the brochure now (leading to the Flash version) or to request a copy by mail. These links are also presented on the second level of the "visitor center" link presented at the bottom of the homepage. Clicking on the brochure picture automatically opens the Flash version of the brochure.

Due to the complexity of the data and computing limitations, one month (from 0:01am June 1, 2008 to 11:59pm June 30, 2008) of data was extracted from the overall data set. This data set contained 2,924,480 records. After collapsing the records into unique requests and deleting unsuccessful requests and those initiated by web robots as well as those from bureau employees, a total of 284,183 records were retained.

The final data set was constructed following the methodology proposed by Reichle, Perner and Althoff (2006). User sessions were constructed based on requests from the same IP address. Requests were compiled into the same user session if the time span between two unique requests from the same IP address was 30 minutes or less. A total of 50,984 user sessions were extracted from the records.

4 Results

Overall, user sessions lasted on average 3.5 minutes and included 5.6 page views. However, the standard deviations for both measures are high, suggesting that there is a wide range of use in terms of length and activity level.

An analysis of page views and user sessions reveals that in the month under investigation, the Flash version of the destination brochure was only viewed twice. This is quite astonishing as clicking on the brochure picture directly leads one to the Flash version. In comparison, the request form was viewed 669 times, accounting for 0.2% of all page views and being represented in 1.3% of all user sessions while the use of the interactive trip planner is even higher with 737 views (0.3% of all page views) in 1.4% of the user sessions. Overall, the findings suggest that the information presented on the Website pages seems to be quite sufficient and that there is little need for viewing eBrochure formats or requesting a print copy.

As far as differences in use patterns are concerned, sessions that include use of the interactive trip planner are significantly longer and active (1099 seconds, 29 page views) than those which include print brochure requests (734 seconds, 18 page views). Interestingly, looking at navigation sequences, the data reveals that 19.7 % of the page views of the request page constitute the start of a user session, while 31.1% mark the end of a session. In comparison, only 14.5% of the page views of the trip planner occur at the beginning of a session and 21.8% at the end of a session. This suggests that both brochure-related behaviors are more likely to occur at the end of sessions. Also, brochure request is an activity that is more often the initial goal of a user session.

While the theory suggests use of multiple information sources, overlap between print brochure requests and interactive trip planner use was found in only 64 sessions. This is quite an astonishing result and suggests that these two formats serve very different information needs. Users who engage with the interactive trip planner are not very likely to request a print brochure and vice versa. Also interesting is the overlap with other pages. While interactive trip planner views co-occur with many content page views, brochure requests do not. This is not surprising per se, as the interactive trip planner requires adding pieces information from content pages. However, looking at the specific pages with which overlap occurs, they include most frequently descriptions of communities and attractions, photo gallery pages, suggested itineraries, event listings and an interactive map. Thus, it seems that the interactive trip planner function is mostly used for planning activities rather than for accommodation-related decisions. The findings are summarized in Table 1.

Table 1. Summary of Results

Measure	eBrochure Format		
	Brochure Request	*Interactive Trip Planner*	*Flash Version*
Page views	669	737	2
% of Total page views	0.2	0.3	0.0
% of Total user sessions	1.3	1.4	0.0
Average session length (seconds)	734	1099	-
Average # of page views per session	18	29	-
% of Session start	19.7	14.5	-
% of Session end	31.1	21.8	-
Overlap (% of user sessions)	0.0	0.0	0.0

5 Conclusion

The findings show that use is an important indicator of eBrochure format effectiveness. In this specific case, the Flash version of the brochure was not used at all, while use of the interactive trip planner function led to very active and engaged user sessions. Requests of print brochures seem to serve very specific information needs that cannot be met by the Website content pages or the eBrochure formats. Also, user sessions that include brochure requests seem to be very goal-directed and often end with the brochure request.

One of the limitations of the study is of course the 1 month time-frame. Since June is already part of the high travel season for the destination for which data was analysed, the user sessions might not have captured those travellers who plan far in advance. These planners might have very different needs and strategies than those with shorter planning horizons. Comparisons across several months will be needed to account for effects caused by the specific time period taken into account. Also, data were only available from one destination and the findings cannot be generalized to other destinations. Comparison with results from other bureau Websites will be necessary to establish general tendencies in eBrochure use. Importantly, interface characteristics can have tremendous impacts on navigation patterns. Where in the interface a specific brochure type is embedded can greatly influence its use. Thus, future research should compare structurally different Websites to investigate how eBrochure usage patterns are influenced by Website structures. Qualitative research approaches such as focus groups or think-aloud protocol studies might provide further insights as to how the Website structure influences ebrochure use and, thus, could greatly complement the analysis of the log file data.

Overall, the study findings contribute to our understanding of brochure use and add to the literature on brochure effectiveness. They also stress the importance of mining

Web log data in terms of navigational patterns instead of just page views as is often the case.

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Affiliate Marketing in Travel and Tourism

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Abstract

This paper explores, through an analysis of the existing literature and in-depth interviews with key stakeholders, the use of affiliate marketing within the travel and tourism industry. The study findings show that affiliate marketing is becoming a key strategic channel for distribution of travel and tourism product and that the discipline is maturing with the advent of affiliate networks and the increasing sophistication of both merchants and affiliates. The findings also show that are still several problematic aspects linked to this form of online distribution mainly in relation to issues of brand management and affiliate fraud.

Keywords: affiliate marketing, merchant; affiliate networks distribution channels, electronic distribution; online travel, brand management, online fraud.

1 Background and Aims

Affiliate marketing is increasingly becoming an important source of customer acquisition and a major strategic issue for travel and tourism companies which market their products online. Whilst other online marketing activities and techniques such as Search Engine Marketing (SEM), Search Engine Optimisation (SEO) and Customer Relationship Management (CRM) have been well covered both by the generic and tourism specific academic literature, there is a paucity of work in the area of affiliate marketing, particularly as it relates specifically to the travel and tourism industry. The aims of this paper are thus to provide an overview of affiliate marketing and its use within the travel and tourism industry, identify areas of best practice in the industry and to explore potential areas for further research.

Wallington and Redfearn (2007:3) define affiliate marketing as:

"a working relationship whereby a merchant (online shop or advertiser) has consumers driven to it by adverts on an affiliate (website). If a consumer visiting the affiliate's site clicks on an advertisiment and goes on to perform a predetermined action (usually a purchase) on the advertisers site then the affiliate receives a payment. The predetermined action can range from a sale to a referral, a newsletter sign up to a click. It is this cost per action that defines affiliate marketing and sets it apart from other channels".

The term affiliate marketing also has a broader significance in terms of describing a whole industry which has developed around this activity, including merchants, affiliates, affiliate networks and advertising agencies which are increasingly incorporating affilluiate marketing functions on behalf of their clients.

It is important to note that in the literature merchants are interchangeably referred to as "advertisers" and affiliates as "publishers".

Whilst the concept of paying a fee or commission for referred business is not new and certainly predates the Internet, the advent of the Web in 1994 provided the impetus for the development of online affiliate marketing. One of the widely acknowledged pioneers of affiliate marketing was CDNow which introduced its BuyWeb program in 1994 which allowed music-oriented web sites to review or list albums on their pages and offer a link that would take the visitor directly to CDNow to purchase them. (Olim, Olim and Kent, 1999),

Collins (2000) however suggests that affiliate marketing was already used by the adult industry before CDNow launched their BuyWeb program suggesting that Cybererotica was either the first or among the early innovators in this field with a cost-per-click program. Whilst CDNow and Cybererotica may be considered the pioneers of affiliate marketing it was Amazon.com' launch of its "Associate Program" in 1996 that popularised and was used as a model for subsequent programs. (Collins, 2000).

The year 1999 saw the birth and development of affiliate networks in the UK with companies such as DGM, Commission Junction and Tradedoubler opening within a few months of each other (IAB, 2007)

Since those early days affiliate marketing has grown to become an industry in its own right with a turnover in the UK alone of £3.13bn in 2007 a 45% increase on previous year sales of £2.16bn (e-Consultancy, 2008). Industries investing the most in affiliate marketing include telecoms which spends 24% of its online budget in affiliate marketing, followed by financial services companies which spend 20%. Travel companies spend an average of 16% of their online budget on affiliate marketing which is responsible for 18% of their sales (e-Consultancy, 2008).

2 Methodology

Given the exploratory nature of this project, in-depth interviews with key stakeholders were carried out based on a fairly open-ended interview protocol developed from analysis of both the academic and the trade literature on the topic. Purposive sampling was used to determine cases for interviews as the authors wanted to examine instances of best practice in the field. Six companies were originally approached for this study: 3 affiliate marketing networks (Commission Junction; Affiliate Future and Buy.at) and three travel merchants (Lastminute.com, TUI/Thomson and Hyatt). Such companies were identified as being relevant for this study based on their size, level of involvement with the travel and tourism industry and adoption of affiliate marketing strategies. Following a letter inviting these companies to take part in the study Lastminute.com and Buy.at declined to participate, whilst Hyatt agreed to an email interview which was carried out but later discarded due to the very basic nature of answers received. At the end of the process one senior representative in the area of affiliate marketing for the following companies was interviewed: for the *merchant's perspective* TUI/Thomson was selected as their merchant program is widely considered as one of the largest and most innovative within the travel and tourism sector; for the *affiliate network's perspective* Commission Junction and AffiliateFuture were selected as they are both amongst the largest affiliate networks in Europe and both have a strong presence of travel related merchants and affiliates. Interviews where carried out on the company premises with the exception of one inteview conducted via phone. Interviews lasted between 40 to 100 minutes and were audiotaped with permission of the interviewee for accuracy. In addition secondary data was collected through analysis of newspaper and trade articles, and several affiliate marketing websites and blogs. Interview transcripts and the above mentioned data were imported into nVivo7 for analysis. Such Computer Assisted Qualitative Data Analysis Software (CAQDAS) is well suited to the facilitation of a qualitative approach to research (Lewins and Silver, 2006). Using thematic coding several key areas for discussion analysis were identified and are highlighted in the following sections.

3 Affiliate marketing business model

The affiliate marketing business model is driven by the need of travel and tourism suppliers and intermediaries (merchants) to find new and relatively risk free distribution channels for their product and services. In the affiliate marketing model, the affiliate takes full responsibility for marketing the merchants' products and services usually by placing adverts on its website (these can be in the form of advertising banners or text hyperlinks) but also by driving traffic to their own websites through typical search engine marketing techniques or even offline advertising (Goff, 2006; Del Franco and Miller, 2003; Goldschmidt et al.,2003; Haig, 2001). Figure 1. below provides a schematic representation of the concept.

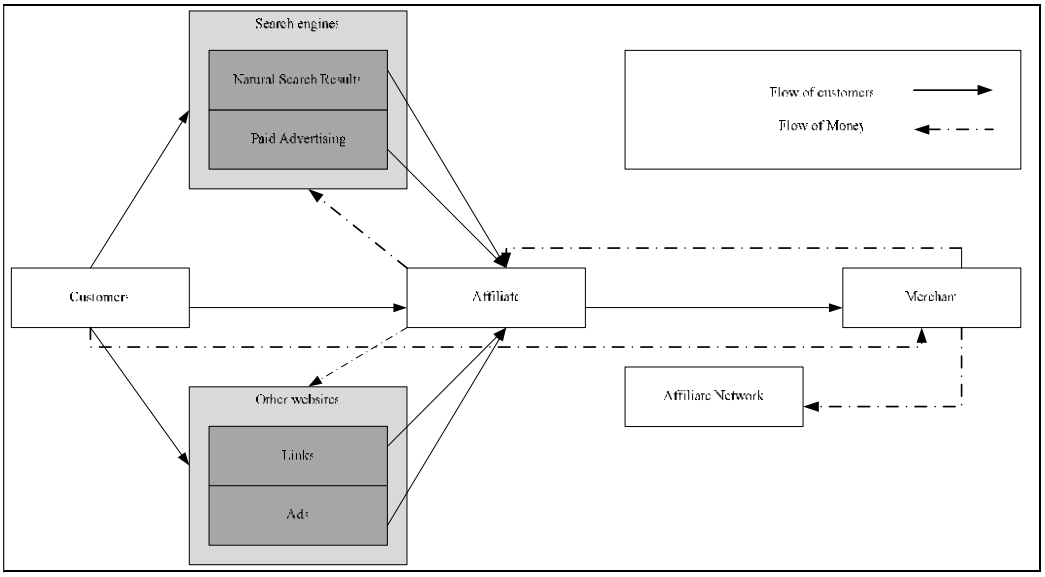

Fig. 1. Affiliate Marketing Business Model (adapted from Benedictova and Nevosad 2008)

Duffy (2005) suggests that key to the success of this business model lies in the ability of the affiliate to calculate in a relatively predictable manner their return on the investment in a particular affiliate program where the investment is the amount paid by the affiliate in their own site's search engine marketing activities and the return is the amount of revenue generated by commissions given by the merchants. Variables that predict the above are typically the click through rate (percentage of visitors to the affiliate website which click on a particular link), conversion rate (percentage visitors that end up making a transaction) and the average merchant's commission (average transaction size for a particular merchant multiplied by the commission percentage) (Duffy 2005).

There are four main revenue models which are traditionally linked with affiliate marketing:

Cost Per Action or Acquisition (CPA): whereby a commission (or more infrequently a flat fee) is paid for each sale generated by a visitor from the affiliated website;

Cost Per Lead (CPL): whereby the affiliate is paid after a website visitor carries out a specified action (e.g. subscribing to a newsletter, filling in a questionnaire);

Cost Per Click (CPC): whereby affiliates receive a commission (or flat fee) for every click at the link to the advertiser's website;

Cost per mille (CPM): whereby affiliates receive payment based on ad impressions served on their site.

Duffy (2005) suggests that CPA/CPL are increasingly becoming the preferred revenue model for merchants as these methods allows them to achieve very predictable marketing costs as a percentage of their total sales and in effect create a very powerful sales force which is remunerated on a commission basis only. Interviews with key travel and tourism stakeholders certainly confirmed that this is increasingly the case within the sector.

The advantage for the affiliate is that it can enter the e-commerce arena without the need to develop or own any kind inventory and associated overhead costs. As long as the affiliate is able to create a presence which is interesting enough to entice traffic to it website, then there is the possibility to "monetise" such traffic through affiliate programs.

Table 1 below highlights the advantages and disadvantages of this business model from both the affiliate and merchant's point of view.

Table 1. Advantages and disadvantages of affiliate marketing

Advantages for Affiliate	**Advantages for Merchant**
Potential for revenue generation;	Potential for incremental revenue generation;
No need to develop and or deliver any products or services;	Little or no risk as cost (usually in the form of commissions) are only incurred if affiliate generates a sale;
No need to create or hold inventory;	Increased brand exposure.
No need to take, process and ship orders;	Potential exposure to new markets;
Possible to start with very little capital and as a part-time or second job;	Increased website ranking in search engines due to number of external links to site;
No cost to join affiliate programs;	Leveraging SEM expertise of multiple affiliates at no direct cost.
Allows for very flexible working patterns.	
Disadvantages for Affiliate	**Disadvantages for Merchant**
Difficulties in creating adequate traffic particularly in competitive product categories;	Brand control;
Commissions can be low or lowered by merchant after initial sign up period and paid sporadically;	Fraud e.g. false advertising, unlawful use of trade names, logos, or brands, pay per click fraud etc;
Fraud e.g. link hijacking;	High commissions or overrides
Cost of generating traffic to website through pay-per-click activities.	Cost of setting up program (i.e. affiliate network costs).

Due to the dramatic growth in the number of affiliates and the complexities for the merchants to manage this, affiliate networks such as AffiliateFuture, Commission Junction and TradeDoubler have developed to act as intermediaries between merchants and affiliates allowing affiliates to find programs which are suitable for their websites and helping merchants to reach their target audience.

Affiliate networks ad value to merchants by providing increasingly sophisticated tracking technologies, reporting tools and payment systems and by offering them access to a large pool of affiliates. They also provide services to affiliates including one-click application to new merchant programs, reporting tools and payment aggregation and settlement. Typically affiliates are invited to join network for free whilst merchants are required to pay an initial set up fee, ongoing maintenance fee and a percentage of the commission paid to the affiliate as a fee for their services (usually between 25% and 30%).

More recently advertising agencies have also started to include affiliate marketing as a substantial component of their marketing mix offer thus becoming important players in this field.

4 Affiliate typologies

Whilst there is no clearly defined classification of affiliate typologies, IAB (2008) suggest the following six primary affiliate types:

Niche content and personal interest websites: these are affiliates which develop niche websites on specific destinations or typologies of products and services and can be an optimal way for merchants to attract very targeted traffic;

Loyalty and reward websites: these affiliates develop a loyal customer base by sharing part of their profits with consumers either via straight cash back offers or loyalty points systems;

PPC and search affiliates: these are affiliates that specialise on bidding on key words and phrases on search engines to help pushing traffic to the merchant's website;

Email marketers: email affiliates create and distribute email campaigns to their users. These affiliates have very comprehensive and well segmented customer lists that allow merchants to target specific target markets;

Co-registration affiliates: this is a relatively new form of affiliate marketing where customers opt in to receive offer from third party merchants whilst registering on the affiliate's website. Provided approval of the customer is obtain, registration details are forwarded to the merchant;

Affiliate networks: these are "top tier" affiliates who promote merchant offers to their own affiliate networks whilst also providing key services such as account tracking and management.

Clear examples for each of these types of affiliates were found to be present in the travel and tourism domain with a general trend of decline in the number and importance of paid search affiliates and a substantial growth of loyalty and reward websites.

Some authors (Dorobantescu, 2008; Duffy, 2005) also distinguish between two types of affiliates: "first tier" or large scale affiliates - also know in the industry as "super affiliates" - are those which are commercially run, employ staff tend to have an established brand name and have a relatively large consumer base and are able to generate considerable volumes of traffic for their merchants. A much larger proportion of affiliates fall into the "second tier" affiliates category which includes either small companies but more often individuals who have recognised the earning potential of affiliate programs and engage in this activity as a part-time/second job using a variety of techniques ranging from basic search engine optimisation to paid advertising on Google to attract visitors to their websites (Duffy, 2008). Whilst these affiliates in isolation do not generate substantial amounts of traffic for individual merchants, they represent the "long tail" of affiliate marketing and given their vast numbers can generate substantial aggregate volumes for merchants. Whilst there was no definitive data about this all interviewees seemed to agree that super affiliates are currently responsible for 70% to 80% of travel merchant's revenues with the remainder 20% to 30% being delivered by the "long tail".

5 Merchants and their affiliate programs

After tentative beginnings toward the end of the '90, affiliate marketing activities are now firmly embedded in the distribution strategies of most travel and tourism merchants. Dominant players in this field with the largest affiliate programs (both in terms of revenue generated and number of affiliates) are the large OTAs (Online Travel Intermediaries) such as lastminute.com and Expedia and the large tour operators such as TUI/FirstChoice and Thomas Cook/MyTravel. These merchants can boast affiliate numbers in the high thousands and generate between 20% and 30% of their online revenues through their affiliate marketing programmes.

Airlines and hotels have also become active in this field although the revenue contribution of their affiliate marketing programs is slightly lower, possibly within the 15% to 20% range. More recently there has also been the emergence of travel merchants such as sunshine.co.uk whose business model is based entirely around affiliate marketing distribution.

Critical to a merchant's success in the affiliate marketing arena is the quality of their programs. Affiliate marketing programs are the package of activities put together by a merchant (often in conjunction with an affiliate network) to develop affiliate marketing as a distribution channel. These activities include the selection and recruitment of affiliates, the provision of relevant content by the merchants to affiliates (links, banners, newsletters, blogs, data feeds etc) the setting and payment of

commissions and overrides for affiliates and the provision of adequate technologies to track traffic, conversion, sales and to monitor and detect fraud.

Given the increasingly competitive nature of affiliate marketing, the management of affiliate programs can be quite resource intensive and requires sophisticated management. Increasingly merchants are choosing to develop their programs in conjunction with affiliate networks.

Table 2 below summarises the main features of affiliate programs from a selection of key travel and tourism merchants.

Table 2. Sample affiliate marketing programs for key travel and tourism merchants (source: company websites and selected interviews)

	Thomas Cook	TUI/ Thomson	Expedia	BA	IHG
Affiliate Network	Commission Junction (CJ)	CJ	Trade Doubler & Buy.at	LinkShare & TradeDoubler	CJ
Number of affiliates	Not disclosed	7500	Not disclosed	Not disclosed	Not disclosed
Revenue from affiliates as % of all online revenues	20%	25%	N/A	Approx. 15%	N/A
Base Commission for Affiliates:					
Flights	1%	2% (charter)	1%	2.5%	N/A
Hotels	3%	2%	6%	N/A	3%
Car	2%	N/A	5.5%	N/A	N/A
Flight + Hotel	2%	2%	3%	N/A	N/A
Flight + car	N/A	N/A	3%	N/A	N/A
Packages	2%	2%~2.5%	N/A	N/A	N/A
Cookie duration	30 days	30 days	28 days	30 days	7 days

Most of the interviewees stressed the importance of communication between the travel merchant and their affiliates as one of the key determinants of success or failure of affiliate marketing programs

6 Technology

Most of the affiliate marketing specific technology is usually provided to both merchants and affiliates by affiliate networks although there are plenty of software development companies offering affiliate marketing packages to merchants who wish

to run their programs in house as opposed by affiliate networks. Key technology platforms focus on two key areas of functionality:

Transaction and business metrics tracking software: the ability to track customer behaviour as he/she moves through the affiliate website to the merchant sites and completes a purchase (or other action). Typically this is achieved by the affiliate using special links and banners provided by the merchant (or affiliate network) with code embedded in them (generally a cookie) that allows for tracking. These links and banners are then placed on the affiliate's website allowing all clicks and subsequent sales to be tracked. The duration of the tracking is usually set for 30 days (although this can vary quite dramatically) which means that the merchant will be able to trace and credit the source of a sale back to the affiliate who originated the visitor. The merchant can then validate such sales as legitimate and then pay the affiliate its dues (IAB, 2008). Typically such technology is built in house by the merchant but more often this is done by affiliate networks which are providing both merchants and affiliates with increasingly sophisticated tools to track key metrics;

Fraud detection software: as affiliate fraud is becoming an increasingly problematic issue (as outlined in section 7 below), both merchant and affiliate networks are devoting large amounts of resources to the development of fraud detection software which aims to detect fraudulent activities based on analysis of click behaviour and anomalies in purchasing or navigation patterns.

7 Brand Management and Affiliate Marketing Fraud

Whilst affiliate marketing is without doubt a positive distribution/promotional channel it also creates considerable issues in terms of both maintaining control and management of the brand and detecting and eradicating fraud by unscrupulous affiliates. Much effort is therefore required by merchants and affiliate networks on three main fronts:

Screening and selection of affiliate partners: this is required to ensure that the content and nature of the affiliate website is not only legal but also does not present offensive material or content which could harm the merchant's brand reputation and profile in any way. Affiliate management contracts are becoming increasingly demanding on this front meticulously specifying what is considered to be unacceptable content.

Control on affiliate's marketing activities: in the quest for driving traffic to their own site, affiliates can often come into conflicting or competing positions with their merchants. One of the most obvious manifestations of such conflict is brand bidding by affiliates whereby affiliates use the merchant's brand name for their pay-per-click campaigns. There is an ongoing debate in the industry as to whether affiliates should be allowed this practice or not Allowing for brand bidding will have the positive effect of increasing traffic to the brand but, on the downside, competition over brand name words will result in increased search costs not only for affiliates but also for the merchant and the risk of cannibalisation of the merchant's customers. Other activities

which are closely monitored and regulated by merchants are the use of spamming techniques by affiliates to promote merchant's products and failure to maintain updated content in relation to merchant's products.

Detection and prevention of affiliate fraud: there are many and increasingly sophisticated forms of affiliate fraud which both merchants and affiliate networks need to monitor, detect and eradicate. Some of the more prominent forms of fraud include cloning whereby the look and feel of a particular website is perfectly re-created to mislead customers in carrying our transactions on the cloned site, link high-jacking whereby traffic is diverted from a legitimate affiliate website to a fraudulent one (usually by replacing the affiliate's legitimate tracking code with the fraudster's one).

8 Implications for practitioners

Whilst relatively new, affiliate marketing is now a well established online distribution activity accounting in many cases for considerable proportion of revenues for companies involved. The mature nature of this industry however requires a mature and sophisticated approach to the task which is dramatically different from the "experimental" approach adopted by travel merchants and travel affiliates alike in the early days of this industry. Companies wishing to get involved in affiliate marketing activities should nowadays consider the following practical issues:

Need to ensure fit of current business model with affiliate marketing activities: interviews for this research and industry data suggest that certain typologies of travel merchants are more suited than others to implement affiliate marketing activities: travel intermediaries for example seem to be able to generate a higher proportion of affiliate marketing revenue in relation to total revenue than individual suppliers. The reason for this lies in the fact that affiliates prefer to deal with brands that give customers a wider choice of options as this tends to increase likelihood of conversion. Revenue model is also important as, at least in theory, merchants operating on a merchant revenue model (or at least on a high commission basis of 15% or more) are able to provide more competitive commissions/fees to affiliates;

Brand and brand management play a key role: there was ample evidence from both the interviews and an examination of various affiliate marketing discussion forums, that affiliates prefer, where possible, to deal with established brands as conversion is a key metric on their revenue model and well know brands generally provide higher conversion rates. Companies which do not possess particularly strong brands need to be prepared to obviate to this by incentivising affiliates through higher commission payments, favourable overrides and closer relationship with the affiliate in terms of promotional support. In any case travel merchants should be highly aware and vigilant with regards to brand management issues identified in the previous section of this paper and, where possible, should work with affiliate networks who are often better placed to monitor such issues;

Proactive and focussed approach now needed to succeed in affiliate marketing: a common theme that emerged from all the interviews was that of the increased maturity and sophistication of the affiliate marketing industry: with this has also come increasing competition. Travel companies now wishing to have adequate returns from this marketing activity can no longer expect to advertise their affiliate marketing program and wait for sales to roll in; rather they need to take a proactive approach involving considerable investment in terms of time, resources and building of close knit relationships more often than not working closely with both affiliate networks and affiliates to tailor-make specific promotions and proactively inform affiliates about new products and or developments to help them in the conversion process.

9 Conclusions and Future Research

Over the last decade affiliate marketing has grown from being a peripheral and little understood activity to becoming a significantly important marketing and distribution channel for the travel and tourism industry: the typical profile of an affiliate has moved from being a sole operator running his or her affiliate marketing operations from their bedroom in their spare hours as a second job to that of a professional company employing staff, with its own brand name and presence in the marketplace and operating in multiple vertical markets beyond travel. Likewise merchants have become more sophisticated in their approach to this aspect of online marketing and the larger merchants now have dedicated teams of affiliate managers working in conjunction with professional affiliate networks to develop programs tailored to the needs of their affiliates.

Despite this dramatic growth there are still many aspects of this phenomenon which present opportunities for further research and interviews with key stakeholders have highlighted the following priorities:

Interconnections and interdependencies between affiliate marketing and other online activities are yet to be fully analysed and understood; in particular the role that affiliate marketing plays in the marketing mix and the accurate tracking of ROI in such activities was seen as crucially important. Likewise the emergence of Web 2.0, social networks and user generated content are regarded as possible fertile grounds for affiliate marketing activities but steps in this direction are still very tentative and adequate business models are yet to be fully explored and understood, therefore further research in this area was also considered of high value. Finally many interviewees stated the need to better understand the customer journey as it moves across an increasingly complex maze of affiliates, sub affiliate and merchants sites: how are customers attracted by different affiliate site typologies?, what is the level of awareness of the customer in relation to the commercial agreements between the merchant and the affiliate? and how does this affect brand values?

A limitation to this research was that due to time and resource constraints it was not possible to carry out interviews with affiliates and a broader sample of merchants.

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Capital City Tourism: Online Destination Image of Washington, DC

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Abstract

National capital cities symbolize the image and prestige of a nation. Different from general urban tourism, "capital city tourism" is an emerging topic in tourism research. Being both a capital and a destination, capital cities possess a unique image that is favourable in tourism promotion. This study explores the destination image of national capital cities through qualitative content analysis of travel-related websites on Washington, DC. Six analytical themes are identified: History, Wealth, Power, Diversity, Ideal, and Patriotism. Findings suggest that national capital cities incorporate political messages in its destination image, promoting not only the city itself as a destination but also national pride and identity.

Keywords: capital city tourism; destination image; websites; qualitative content analysis

1 Introduction

Like most urban areas, national capital cities have multiple functions. For symbolic purposes, their environment is usually well-maintained and designed with beautiful parks and monuments (C. M. Hall, 2002). To function as political centrality, they also demand more office buildings and better infrastructure (Campbell, 2003). In addition, capital cities are popular travel destinations. The well-designed cityscape becomes a unique tourism environment (Gottmann, 1983). Clusters of attractions and facilities form easily-accessible tourist zones (Gordon, 2006). Superior connectivity in land and air transportation facilitates domestic and international travel (Ritchie & Maitland, 2007). Apart from such practical advantages, the symbolic function of capital cities is also favourable in tourism (Dube & Gordon, 2000). Constructed with grand buildings, memorials, and monuments, capital cities represent national glory and identity, which in turn impacts their destination image (Daum, 2005). The rich symbolism in the physical environment of capital cities and the embedded meanings and messages constitute a great part of the destination image of national capital cities.

The purpose of this study is to explore the unique image of capital cities as both a national symbol and a travel destination so as to understand how the national capital

status of a city impacts its destination image. Travel websites on Washington, DC are examined to reveal the underlying themes in the image construction of the capital. The specific objectives of this study are: 1) to identify the focal themes in the online destination image of Washington, DC, 2) to explore the visual techniques used in constructing such an image, and 3) to make sense of the significance and meanings of DC's image construction in the context of capital cities. For national capital cities, political symbolism, such as national identity and patriotism, may be incorporated into its destination image, distinguishing capital cities from other urban destinations.

2 Background

In order to examine the destination image of national capital cities, this study analyzes the travel-related websites on Washington, DC. Due to recent advancement of Information Technologies, the Internet has become one of the most influential technologies applied in the field of tourism by both travellers and destinations (Buhalis & Law, 2008). Research has shown that "the use of the Internet for planning, reservation, booking and payment of travel products and services" has the highest sales and growth numbers in comparison to other industries online (Govers & Go, 2003, p. 14). The number of travellers using hotel websites to make reservations is on the increase (Jeong, Oh, & Gregoire, 2003). And in 2004, "nearly 60 % of adult Web surfers have shopped for travel-related services on the Internet in the last 6 month" (Govers & Go, 2005, p. 79).

Moreover, online travel information are increasingly important in tourism promotion because they constitute a large part of the tourists' perception of the destination (Choi, Lehto, & Morrison, 2007; Gretzel, Yuan, & Fesenmaier, 2000). Websites can utilize photos, videos, animations, three-dimensional maps, and virtual tours to provide virtual experiences, changing the way tourists perceive and consume the image of destinations (Cho, Wang, & Fesenmaier, 2002; Govers, Go, & Kumar, 2007). The Internet is also useful for destination marketers, for the advancement of new technologies facilitate information distribution and increase the wide variety of travel information online (Buhalis & Law, 2008; Park & Gretzel, 2007; Wang & Fesenmaier, 2006). Websites, blogs, newsletters, RSS feeds, and instant-messaging enable tourism promoters to focus on specific events and attractions within the destination and cater to the needs of individual tourists. Such information can be frequently updated, thus providing the most current, up-to-date travel information and destination image.

Being an important tool in tourism marketing, websites provide a good source of data for destination image analysis. Specifically, this study focuses on public and government-related websites with information for potential tourists. Being the seat of the government, most tourist attractions in Washington, DC are managed by the government or public organizations. The objectives of public, non-for-profit websites are more likely to be in accordance with the original plan and design of the capital city. On the other hand, the destination image projected by private and business websites generally varies from that of the public sector (Choi, Lehto, & Morrison, 2007; Govers & Go, 2005), and are thus not included in the present study.

Washington, DC is selected as a case study on tourism and capital cities for two reasons. First, Washington, DC is the earliest political capital of the New World, and has become a role model for other planned capital cities (Gottmann, 1983). Second, Washington, DC is significant as a tourist destination. According to in-flight surveys and visitor arrivals information, Washington, DC was ranked the 8th in the "Top Cities Visited by Overseas Travelers" from 2000 to 2006 (U.S Department of Commerce, International Trade Administration, Office of Travel and Tourism Industries, 2007). And with 36.9 million visitors and a sales number of 22.8 million hotel rooms in 2006, Washington, DC was ranked the 6th in Forbes Traveler's list of "America's 30 Most Visited Cities" (USA Today, 2007). Washington, DC's leading position both as a political capital and a top destination makes it a good target of analysis for capital city tourism.

The significance of tourism in capital cities was first acknowledged outside the field of tourism. In urban planning, research has identified the unique features of capital cities, many of which are favourable in tourism. Gottmann (1983) pointed out the attributes of capital cities, including "a special hosting environment," a variety of ancillary activities, and "good accessibility" (p. 88). Specifically, the environment of capital cities is different in that they are "larger, more subsidized, or more bombastic" (Campbell, 2003, p. 4), and marked with more monuments, government buildings, universities, theatres, and concert halls (P. Hall, 2000). In addition, these facilities are usually grouped together, allowing tourists to visit all the sites at ease (Gordon, 2006).

In tourism studies, C. M. Hall (2002) first called attention to capital cities and their tourism implications, arguing that while the capital act as "showpiece" for a nation, this role has "positive spin-offs for tourism" as well (p. 246). Then in a recent special issue of the *Journal of Travel and Tourism Marketing* (2007), entitled "Marketing National Capital Cities," the distinctive features of capital city tourism were summarized: 1) national focus, 2) clusters of cultural resources, and 3) connectivity (Ritchie & Maitland, 2007). This special issue explored the use of national capital status in tourism marketing and destination branding. Findings suggested that capital cities may have positive impacts on destination marketing (Haven-Tang, Jones, & Webb, 2007; Smith, 2007), as well as negative implications (Mules, Pforr, & Ritchie, 2007; Peirce & Ritchie, 2007). Therefore, capital cities often face dilemmas in marketing positioning (Byrne & Skinner, 2007; Peirce & Ritchie, 2007; Puczko, Ratz, & Smith, 2007).

In response to the lack of research on tourism and capital cities, this study examines the image of Washington, DC in the context of capital city tourism. Being the United States capital, DC is "a powerful symbol not only of our nation but also of democracy and freedom" (Washington, DC Convention & Tourism Corporation [WCTC], 2007). By analyzing the image of Washington, DC in travel-related websites, this research explores how the city's capital status impacts its destination image. As both a planned national capital and a popular destination, is the online destination image of DC constructed with a political significance? How are political messages, such as the symbolization of nationhood and advocacy of patriotism, embedded in these websites?

3 Methods

This study is an exploratory and descriptive analysis of the online destination image of Washington, DC. Thirteen websites related to tourism in Washington, DC were selected through purposive and snowball sampling. The official government website of the District of Columbia, with a "Visitor Information" section, as well as the Official Tourism Website of Washington, DC were identified through a simple Google search with the key word "Washington DC." After the initial web search, snowball sampling of the website links provided by the two official sites were explored, and the public and government websites relevant to this study were selected, resulting in a total sample size of 13 websites and 329 webpages. Due to non-random sampling procedures, the findings of this study cannot be generalized to the commercial websites on Washington, DC, or to that of other national capital cities.

To examine the destination image of Washington, DC, this study employs qualitative content analysis of the photographs from selected websites. The content of the photos is analyzed through "the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Qualitative content analysis includes manifest content and latent content (Albers & James, 1988; Priest, Roberts, & Woods, 2002). The manifest content can be identified through the process of naming and translation, while analyzing images at a latent level involves the subjective interpretation of "the structure and set of rules – the codes – that transform a picture's compositional appearance into a shared and meaningful message" (Albers & James, 1988, p. 142).

The manifest and latent analysis in this study follow the conventional approach as outlined by Hsieh and Shannon (2005). Due to the lack of existing theory and literature, there were no predetermined coding categories. Instead, focal themes were generated directly from the data. First, all collected data were examined once to obtain a sense of the overall picture. During the initial coding, the manifest content of the photos was translated by asking questions such as: What kind of environment is shown in the photo? Is it natural or man-built? What is the colour, age, condition, and cleanliness of the buildings and cityscape? What symbols and icons are there in the photo? From what angle is the photo taken? How is lighting used in the photo? For the latent content, the question scheme includes: What kind of image does the photo construct and how does it do so? What is the focus of the photo? What photo techniques are used to portray the capital city? What do the colour, lighting, and photo composition emphasize? What do the symbols and icons mean?

Second, the data was examined several times to sort visual images into subcategories, and retrieve appropriate examples for each subcategory. At the manifest level, the different types of sceneries and the pictorial elements that are selected to represent Washington, DC are identified. The next step was to organize the subcategories into meaningful clusters, until overarching analytical themes were identified. From latent content analysis, the themes derived are the underlying patterns and meanings in the

construction of the image of Washington, DC for both political and tourism purposes. Finally, definitions and examples of each category were formulated.

4 Findings and Discussion

Overall, the types of website images selected for this analysis fall into the following categories: 1) government office buildings, 2) memorials and monuments, 3) historic and heritage sites, 4) cultural facilities, 5) ethnic neighbourhoods, and 6) parks and gardens. These categories reveal that the destination image of Washington, DC consists of more built environments than the natural environments. Even in photos composed of both buildings and nature, the focus is usually the building or architecture, with natural elements, such as grass, trees and flowers, as decorations.

Besides the different types of environments, this study identifies the underlying themes in the destination image of Washington, DC on travel-related websites. The image of Washington, DC is constructed through six main themes: 1) History, 2) Wealth, 3) Power, 4) Diversity, 5) Ideal, and 6) Patriotism. As the data is collected from travel-related websites, research findings suggest that political ideology is incorporated into the destination image of capital cities. Through the exhibition of its political and symbolic environment on tourism websites, Washington, DC is not only promoting itself as the national capital but also constructing the image and nationhood of the United States of America.

4.1 History

Needless to say, tourism websites usually portray a positive image of the destination. But besides showing the beautiful scenery and cityscape of Washington, DC, the sample websites imbue certain political elements in their representation of DC to create the image of a great capital within a great nation. First, Washington, DC is portrayed as a city with history. As U.S. history is relatively short in comparison to many Asian and European countries, it is necessary for DC to create a sense of historic importance to secure its capital status and honour the history of the nation.

Research findings reveal that tourism websites seek to create a historic atmosphere in DC. Government offices and public organizations often choose black and white photos for their websites to show the historic presence of Washington, DC. Of the 13 sample websites, 8 websites select black and white images in their depiction of the capital city. For example, Cultural Tourism DC (2007) uses black and white photos of the U.S. Capitol and historic neighbourhoods. The Explore DC website (2001) also displays several black and white photos and historic sketches of famous buildings.

Fig. 1. Historic Union Station (U.S. Senate, 2007)

While some websites show black and white photos selectively, others provide a black and white section. White House (2008) devotes a special section showing the historical views of the White House gardens and grounds, using black and white photos from the nineteenth and early twentieth century exclusively. U.S. Senate (2007) has photos and descriptions of nearly 100 attractions in the DC area, and every single photo they choose is black and white. Of particular interest is the Library of Congress (2008). Its website includes black and white photos of a bird's eye view of the Capitol Hill area and the three library buildings. Interestingly, only the exterior of the buildings is shown in black and white; the photos of the interior décor are in colour.

4.2 Wealth

Wealth is another part of the prestige that a nation wishes to display to the world. Besides showing numbers like annual personal income, gross domestic product, and foreign exchange reserves, the wealth of a nation can be demonstrated through the image of its capital city. Indeed, tourism websites on Washington, DC often exhibits the grandeur of its buildings and monuments. Website images show the expensive material used to construct the city. For example, most buildings and monuments in Washington, DC are made of white marble. And at the top of the Library of Congress dome sits the Torch of Learning, which is made of gold (District of Columbia, n.d.).

The height and weight of a piece of architecture signifies the amount of materials used, and is another way to reflect its costliness. Thus, websites tend to select photos that can show the size of the buildings in Washington, DC. At 555 feet and 5/8 inch, the Washington Monument is the most prominent in the city. Photos of the Washington Monument are often looking up in an elevating angle, emphasizing the height of the monument (District of Columbia, n.d.; National Mall & Memorial Parks [NAMA], 2008). The Washington Convention Center, on the other hand, is known for its huge size. Website images from a bird's eye view demonstrate how the Convention Center stretches over six city blocks (District of Columbia, n.d.).

Fig. 2. Washington Monument (NAMA, 2008)

Fig. 3. Washington Convention Center (District of Columbia, n.d.)

4.3 Power

A great nation must be powerful, with the strength and ability to defend its land and protect its citizens. Power is associated with many places in Washington, DC, particularly the Pentagon and the White House. The White House is the office and residence of the U.S. presidents. On the White House website, a "Military" section is established for the White House Military Office, including Air Force One, Camp David and Marine One, to demonstrate the White House security and military support. As the "Military" section is not specifically designed for potential tourists, the images within are not included in the data collection. However, in the "Tours: Grounds & Garden" section of the White House website (2008), Marine One, the president's helicopter, appears numerous times in the photos of the White House gardens. Among all the grass, trees and flowers, the frequent appearance of a helicopter stands out in the photos. The presence of Marine One, along with the photo descriptions, indicates the president's authority and the military strength of the nation.

Fig. 4. Marine One (White House, 2008)

Fig. 5. Marine One (White House, 2008)

4.4 Diversity

The United States is a relatively new nation composed of immigrants, from early European settlers to the more recent African, Asian and Latino immigration flow. Its history of immigration results in the ethnic multiplicity of the nation. While some countries take pride in their heritage and long ancestry, the U.S. celebrates its cultural and ethnic diversity.

As the U.S. capital, Washington, DC also embodies the image of diversity. Travel-related websites often promote the diverse neighbourhoods of Washington, DC. As

each ethnic neighbourhood possesses its own unique feature, websites often select images of certain icons or historic figures to represent the neighbourhood. For example, U Street is most noted for the Duke Ellington mural directly above the metro station. Woodley Park features a giant mural of Marilyn Monroe overlooking the neighbourhood. The mural of an American cowboy above a row of busy restaurants is the most common portrait of the multicultural Adams Morgan. And the "Friendship Arch" of Chinatown is the most representative scene of the downtown area. The images of ethnic neighbourhoods signify the city's celebration of diversity and also add to its tourism appeal in showing that DC is not just a place of memorials and monuments. In all, the diverse neighbourhoods in DC are an essential part of American culture and also perform important tourism functions.

Fig. 6. U Street&Adams Morgan (WCTC, 2007)

Fig. 7. Chinatown (WCTC, 2007)

4.5 Ideal

In addition to being historic, wealthy, powerful, and diverse, the capital also symbolizes the ideal of a nation. Specifically, the image of Washington, DC is constructed as "the ideal" through the use of colour and illumination. First, most buildings and monuments in Washington, DC are white. Take for example the Washington Monument, U.S. Capitol, White House, Lincoln Memorial, and Jefferson Memorial. The colour white is generally "associated with light, goodness, innocence, purity, and virginity. It is considered to be the colour of perfection" (Color Wheel Pro, 2007). Constructed in white marble, Washington, DC is portrayed as a city of ideal and perfection, where its buildings and monuments symbolize the spirit of the nation.

Washington, DC is also famous for its night scene. As the major sites in DC, such as the U.S. Capitol, Washington Monument, and Lincoln Memorial, are illuminated at night, websites promote night time tours and display photos of the National Mall at night. Illumination signifies the importance of the attractions, and the ideals they represent. For one thing, the lighted places become the focus the photos. For another, the lighting provides a sense of guidance, leading to hope and to a brighter future. In one photo, the street lights on a bridge lead to the bright Lincoln Memorial. And while the whole Memorial is lit, the brightest point of the photo is the marble statue of Lincoln. Illumination gives the Lincoln Memorial an image of ideal and perfection.

Fig. 8. Lincoln Memorial (NAMA, 2008)

Fig. 9. Lincoln Memorial (WCTC, 2007)

4.6 Patriotism

As the capital, Washington, DC also promotes patriotism for the nation. On the sample websites, images of national symbols can arouse patriotic emotions. The symbols of America include the national flag, stars, and the bald eagle. The most popular pictorial element in the websites images of Washington, DC is definitely the American flag. Flags are shown atop or in front of almost every building and monument. Even in some photos where the flag is not present, there are items in colours red, white and blue. Red, white and blue are "reminiscent of the American flag" and "immediately convey notions of patriotism" (Princeton Online, 2008). For example, a bouquet of flowers is placed in front of the Vietnam Veterans Memorial. Not only are the flowers red, white, and blue, but so is the ribbon that holds up the bouquet. In another photo, a red, white and blue kite with stars and stripes in flying high next to the Washington Monument. A boat anchored in the C & O Canal in Georgetown is also painted red, white and blue. Apart from individual photos, several websites are designed entirely in red, white and blue, such as the District of Columbia (n.d.), WCTC (2007), DC Visitor Information Center (2007), and U.S. Senate (2007). The obvious use of flag colours is meant to associate the image of DC with patriotism.

Fig. 10. Vietnam Veterans Memorial (District of Columbia, n.d.)

Fig. 11. C & O Canal (WCTC, 2007)

Patriotism can also be aroused by relating to wars, memorials, and casualties. In one photo of the Vietnam Veterans Memorial, a single red flower was placed against the

black granite walls. Being “a very emotionally intense color,” red is the colour of “fire and blood, so it is associated with energy, war, danger, strength, power, determination as well as passion, desire, and love” (Color Wheel Pro, 2007). The red flower signifies the blood and the sacrifice of the Vietnam veterans, and arouses passion and love for the nation. In another photo of the World War II Memorial, a field of 4,000 gold stars is displayed to symbolize the 400,000 who gave their lives. Through the use of symbolism, the destination image of Washington, DC is constructed with a patriotic atmosphere.

5 Conclusion

Capital cities require a unique environment to represent the image and identity of the nation. The touristic image of the capital is influenced by the political agenda of the nation. The purpose of this study is to reveal the underlying patterns in the destination image of capital cities, by examining the travel-related websites on Washington, DC. Six common themes in the destination image of the U.S. capital are identified. First, Washington, DC is portrayed as a place of history to increase the historical significance of the city and the nation through the use of black and white images on the websites. Second, the city also showcases its wealth by highlighting the size and grandeur of its buildings and architecture. Third, through the online display of military power and technologies in the national capital, the U.S. reinforces its image as a powerful nation. Fourth, the cultural diversity in the nation is celebrated by picturing the ethnic neighbourhoods in Washington, DC. Fifth, the national capital status of the city is sustained through an image of ideal and perfection. Sixth, the websites use colours and symbols in the images to arouse feelings of patriotism.

The contribution of this study is three-fold. First, this study employs qualitative content analysis in the interpretation of visual data. Previous research on online destination image mostly used quantitative methods, e.g. Choi, Lehto, & Morrison (2007) and Govers & Go (2005). In fact, various scholars have pointed out the scarcity of qualitative methods as the main technique in studying destination images (Gallarza, Saura, & Garcia, 2002; Govers & Go, 2003; Pike, 2002). Therefore, more qualitative methods are needed to increase the methodological diversity of destination image research. In addition, the image of a destination is not merely the sum of its physical attributes; symbolic elements, along with physical attributes, constitute a holistic impression of the destination (Echtner & Ritchie, 1993; Govers, Go, & Kumar, 2007; MacKay & Fesenmaier, 2000). Therefore, both qualitative and quantitative methods should be used to achieve a holistic understanding of destination image.

Second, this study contributes to existing research on capital city tourism, including the image of national capitals, the symbolic functions of capital cities, and how capital status influences tourism development. In addition, this study offers insight into some of the current issues of capital city tourism (Mules, Pforr, & Ritchie, 2007; Peirce & Ritchie, 2007). The case of Washington, DC provides possible solutions to the problem of negative images and the dilemmas of national capital cities in their struggle between the political capital and the diverse urban dimensions of the city.

This exploratory research hopes to inspire more studies in the under-researched field of capital city tourism.

Third, from the practical perspective, this study provides guidance to tourism practitioners for their destination image and branding. The research findings include not only the representational themes, but more specifically, the techniques used in creating such an image. For example, in composing and selecting images, colours, symbols, illumination, reflections, and photo composition are all elements which can be used to convey meanings and significance. Tourism developers can apply these methods in the design of their brochures, websites, newsletters, and other promotional materials. While the techniques provided in this study may be suitable for different types of destinations, they are particularly useful for capital cities in creating the image of a national capital and a sense of nationhood and patriotism.

The political status and tourism significance of Washington, DC is different from that of other capital cities. Therefore, the representative themes outlined in this research cannot be generalized to other national capitals. Future research need to take on other capital cities and do a comparative analysis of different national capitals. In addition, although the results of this study cannot be generalized, other capital cities may wish to employ similar themes and structure in constructing their destination image. Thus, comparative research is needed to determine the feasibility of such application.

Furthermore, destination image research can be classified into three directions: intrinsic, extrinsic, and dynamic (Hunter, 2008). This study only focuses on the intrinsic properties of destination image, i.e. the styles of the images and the messages contained. Therefore, it is suggested that future research explore the extrinsic properties of destination image, by examining the reality versus representation of capital cities, as well as the dynamic properties of destination image, which refers to the power of image to influence the tourists' perception of the capital city. Such research is necessary to unravel the complexity of destination image in the context of tourism and capital cities.

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E-Mail Service Quality of Profit and Not for Profit Organisations in the Tourism Industry

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Abstract

The use of the Internet by companies to present themselves and enabling interactive communication with their customers has been common for years. Despite the vast application of corporate e-mail for information exchange there seem to be no standards for appropriate e-mail communication in the event of a complaint. Profit organisations in particular should have implemented effective service recovery and communication strategies to engage in valuable interaction and relationships with their customers. Thus, this study investigates the e-mail communication behaviour of profit organisations and non profit organisations (NPOs) in tourism. Their replies in general and their reactions to inquiries and complaints in particular were studied. A mystery study among 136 airlines and 152 National Tourist Offices (NTOs) offers valuable insights. The results indicate a low response rate for both types of organisations. Airlines seem to have a better service recovery strategy resulting in more polite replies to complaints.

Keywords: e-mail service quality, complaint handling, service recovery strategy.

1 Introduction

The online travel market is experiencing an ongoing growth (Marcussen, 2008) and B2C communication via the Internet plays an increasing role. Organisations are aware of the importance of the Internet using it as a tool to enhance customer relationships (Sultan & Rohm, 2004). However, they face the challenge to meet the customers' high expectations towards e-services. Van Riel, Semeijn, & Janssen (2003) showed that online customers have a very low zone of tolerance in terms of security and reliability of an e-service. Quick responses to e-mail inquiries and complaints are perceived as an element of quality when communicating via e-mail (Zeithaml, 2002). In the event of a complaint, the response behaviour is even more important (Mattila & Mount, 2003; Menon & Dubé, 2007; Schoefer & Ennew, 2004). Once a customer makes a complaint a fast reaction is a necessity for an ongoing customer relationship (Shaw, 2007). If the complaint is addressed properly customer satisfaction even increases (Strauss & Hill, 2001).

The aim of this study is to test corporate e-mail response behaviour in two important tourism sectors (airlines and NTOs) through a mystery study. NTOs are mainly government funded and can be characterised as non-profit organisations (NPOs). These are compared to airlines, whose main goal is to make profit. Mystery studies

are particularly useful in the service area (Hesselink & Wiele, 2003; Wilson, 1998) and were frequently applied in tourism (Beck & Miao, 2003; Hudson, Snaith, Miller, & Hudson, 2001). Therefore, this approach is used to examine e-mail responses to inquiries and complaints.

The paper contributes to both, research and practice in several ways: (i) the relevant measurement criteria for e-mail quality are identified through literature review; (ii) the results indicate that there are differences regarding the response between airlines and NTOs; (iii) further, the results show that companies treat inquiries and complaints differently; (iv) industry players get recommendations on how to effectively reply to their clients' e-mails and how to optimise their complaint handling strategy.

The remainder of this article proceeds as follows. The study subjects are explained in further detail. Then the literature on mystery studies is reviewed for identifying relevant e-mail service evaluation criteria which lead to hypotheses development. The following section details the method employed and presents the results. The paper closes with conclusions and recommendations for future research.

2 The Study Context

The travel products and services are among the most popular goods on the Internet (Palmer, 2004). The major part of online tourism sales, 57%, is generated by air travel, hotels account for 17%, package tours 15%, rail 7% and rental cars accounted for 4% of the sales in 2007 (Marcussen, 2008). Furthermore, the relevance of the Internet and National Tourist Offices as information source has been discussed by researchers (Gursoy & McLeary, 2004).

Airlines can be clearly characterised as for profit organisations. Their situation is different from the NTOs facing heavy competition, substitution and the increasing power of customers (Porter, 1980; Shaw, 2007). However, airlines might benefit from disintermediation but only if they realise their full potential regarding their booking capabilities and their direct communication with the customers. This is particularly applying to communication and reservation via the Internet as this channel became a very important one (Shaw, 2007). On the one hand, the Internet allows airlines to enlarge their customer base (Shaw, 2007). On the other hand, the switching costs for customers are low as competitors are only one click away. This trend was even fuelled by low-cost carriers (LCCs) or no-frills airlines which have provoked this evolution by "disintermediating" and offering direct selling solely via the Internet and/or telephone (Shaw, 2007). Full service carriers or network carriers (NCs) provide online booking functionalities and e-mail communication as well but the competition triggered by LCCs has changed the structure of the airline business. In Europe, low cost carriers already accounted for 14% of available seat miles (O'Connell & Williams, 2005).

National Tourism Organisations serve as an intermediary between the guest and the travel product and service provider. In many cases they are the first point of contact of the guest with the destination. Therefore, both (airlines and NTOs) are of high

significance, the first because of their high volume of online sales, the latter because of their crucial function for the traveller. National Tourism Organisations (or National Tourism Offices) are completely or partly funded by governments (Davidson & Maitland, 1997). Most of the EU countries obtain the majority of their budget from government sources. This is also reflected in their primary objective, not to earn profits but to perform activities which are not conducted by the private sector in most countries (Davidson & Maitland, 1997). Baum (1994) found out in his survey among NTOs that 86% of the NTOs have the aim to develop tourism in their country. Activities considered being prevalent for NTOs are marketing, provision of tourism information and a certain effort in statistics (Davidson & Maitland, 1997).

3 Literature Review and Hypotheses Development

Mystery studies have been employed to assess services and are a popular and efficient method to investigate e-mail service quality in tourism (Lingenfelder, Wieseke, & Schmidt, 2003; Wilson, 1998). In services mystery studies have been widely used to assess performance of personnel and have been applied to electronic service encounters as well (e.g. Strauss & Hill, 2001). The usage of mystery studies will continue with increased interest in measuring service quality throughout the last years (Wilson, 2001). The mystery study is a technique which is consistent and unbiased being able to give actionable results and valuable insights (Lovelock & Wirtz, 2007; O'Neill, 2001).

Zehrer and Pechlaner (2006) investigated a European Alpine destination and its tourism organisations by means of a guest mystery study. Their main area of evaluation was the speed of response and breadth of information provided since high e-service quality is a decisive competitive advantage. Matzler, Pechlaner, Abfalter, & Wolf (2005) investigated hotels' e-mail response behaviour differentiating between the hotel categories according to their star rating, regions, size, off-season versus high season, and urban versus rural area. Lingenfelder, Wieseke, and Schmidt (2003) conducted a mystery study about the service of quality of travel agencies. Further examples of mystery studies focusing on e-mail service quality, the subject of this study, are detailed in Table 1.

Literature reveals that the main criteria for e-mail communication are responsiveness and quality of reply. The first one generally refers to response time and rate, the latter to characteristics such as politeness and addressing the sender by name. Research on complaint handling provides evidence that responsiveness is also referred to as procedural justice and conveys concepts like delay in processing the complaint, accessibility, timing/speed and flexibility to adapt to the customers' needs (Schoefer & Ennew, 2004; Tax, Brown, & Chandrashekaran, 1998). It is also stressed that these factors are even more important when dealing with complaints. In this study complaints will also be investigated, thus the notion of responsiveness from the service recovery literature should be included. Therefore, responsiveness in this study is (Schoefer & Ennew, 2004; Strauss & Hill, 2001) response rate and promptness of reply. This encompasses all the factual aspects involved with the actual interaction between customer and company.

Table 1. E-Mail Service Quality Studies

Authors	Tourism sector	E-mail type	Evaluation Criteria
Dickinger & Bauernfeind (2008)	Airlines	Inquiry and complaint	Reply criteria: Responsiveness (response time and rate, completeness of response, follow up possibilities, encouragement for further messages), Quality of the reply (empathy: usage of names, we/I/our company/us; politeness: salutation, thanking, inclusion of sender/receiver identity).
Zehrer & Pechlaner (2006)	Destination organisations	Inquiry	Reply Criteria: Response behaviour (response time and rate), Information breadth (answering the inquiry, provision of additional information).
Matzler, Pechlaner, Abfalter, & Wolf (2005)	Hotels	Inquiry	Reply criteria: Response rate, Response time, Information depth of replies (number of questions answered). Hotel criteria: star rating, regions, size, off-season & high season, urban & rural area.
Murphy & Tan (2003)	Travel agents	Inquiry	Reply criteria: Response rate and speed, response quality (polite, personal, employee/customer name, answer question, identify agency). Agents' criteria: Age of organisation, web site available, branded e-mails used, affiliated agents vs. non-affiliated agents, first class travel vs. economy class travel.
Murphy, Olaru, Schegg & Frey (2003)	Hotels	Inquiry	Reply criteria: Responsiveness, Quality of the reply (following English norms, thanking, salutation, identity of hotel and receptionist, attachments) Hotel criteria: Category, linguistic region, geographic region.
Frey, Schegg & Murphy (2003)	Hotels	Inquiry	Reply criteria: Responsiveness (response time, question answered), quality (polite, information, name used, thanked guest, identification of sender/hotel, attachment, English used) Hotel criteria: star rating, size, geographic location, linguistic region, online tools available.

Quality of reply is generally expressed by politeness, answering the questions and using the senders and receivers names. In complaint handling literature we reveal that showing empathy is a central element of service recovery (Tax et al., 1998). Generally, delivering high quality replies is of even greater importance in the case of a complaint (Blodgett, Hill, & Tax, 1997; Schoefer & Ennew, 2004). The concept of showing empathy is also referred to as interactional justice, i.e. the way a customer is treated in the service recovery process (Karande, Magnini, & Tam, 2007). Thus, in

this setting, we include politeness and empathy. Politeness is understood as an appropriate salutation and thanking the customer for sending the e-mail. Empathy is considered as caring and individualized attention. Therefore, quality of reply was measured in this study by i) thanking the customer for the e-mail ii) starting the e-mail with a salutation and iii) writing personalised responses by including the customer's name.

In some mystery studies differences of organisations were taken into account. Primarily for hotel categories differences in their responsiveness and quality of reply were suggested (Frey et al., 2003; Matzler et al., 2005; Murphy et al., 2003). Another study investigated differences based on travel agents' organisational structure and age (Murphy & Tan, 2003). This implies that we should also find differences between an organisation focused on profit, such as an airline, and an organisation focused on information provision, such as an NTO.

Based on the above discussion we propose:

H1 There is a difference in the responsiveness and quality of reply in e-mail communication between profit and not for profit organisations.

H2 There is a difference in the responsiveness and quality of reply between inquiries and complaints.

4 Methodology

Before approaching airlines and NTOs comprehensive lists of e-mail addresses were compiled. In total 152 NTOs from all continents were considered in the study. To compile this sample The Tourism Offices Worldwide Directory (www.towd.com), websites of the World Tourism Organisation (www.unwto.org) and the European Travel Commission (www.etc-corporate.org) were consulted. The airline sample is made up of 136 airlines listed by the International Air Transport Association (www.iatia.org). Only airlines offering passenger transportation, excluding those serving less than three routes, are considered.

A total of four messages are sent to each firm from an individual e-mail address to overcome filter programs employed to reduce spam (Pechlaner, Rienzner, Matzler, & Osti, 2002). Inquiries and complaints are sent to the customer care e-mail addresses found on the websites. The e-mail addresses use common English names and are from commercial e-mail providers such as hotmail.com and gmx.com. Each of the inquiry and complaint is sent by a male and a female sender respectively. All of the messages are written in English (see Appendix 1). For the NTOs the complaints deal with a lack of information on sights and accommodation and the inquiries with sending of information material for trip planning and events in the destination. For the airlines the complaints deal with the quality of the snacks on board and air-conditioning. The inquiries are about online booking and the transportation of a pet on board. Depending on the availability of a form or e-mail address one of these means for contact is chosen. The software package SPSS is used to analyse the data.

5 Results

The results indicate that the overall response rate is not particularly high with 37%, more than one half of the e-mails (56%) remain unanswered and 7% bounced back (Table 2). The overall response time was satisfactorily with 48.5% of the e-mails being answered already the same day. Only in 20.4% of the cases it took the organisations longer than 3 days to reply to the inquiry or complaint. As far as the quality of reply is concerned more than one third of the e-mails were not thanked for. E-mails are generally started with a greeting. However, personalising the e-mail with the name of the customer was only done for 75% of the responses.

Table 2. Responsiveness

Evaluation Criteria	**NTOs**			**Airlines**			**Overall Average**
	Inquiries	Comp-laints	Total NTOs	Inquiries	Comp-laints	Total Airlines	
Response							
Yes	40.5 %	32.6%	36.5%	38.5%	38%	38.2%	37.3%
No	50.0%	56.9%	53.5%	57.1%	59.1%	58.3%	55.7%
Bounce back	9.5%	10.5%	10.0%	4.3%	2.9%	3.5%	6.9%
Response time							
same day	61.1%	46.5%	54.7%	61.2%	27.8%	42.0%	48.5%
1 day	11.4%	16.2%	13.5%	11.1%	10.1%	10.5%	12.1%
2 days	9.8%	16.2%	12.6%	12.2%	13.4%	12.9%	12.8%
3 days	4.9%	6.1%	5.4%	3.3%	9.2%	6.7%	6.0%
More than 3 days	12.2%	15.1%	13.6%	12.2%	39.4%	27.7%	20.4%

Results from the analysis of responsiveness and the quality criteria will be outlined comparing not only NTOs and airlines but also inquiries to complaints. Only minor differences arise when comparing the response rate of airlines (38.2%) to NTOs (36.5%). However, there was a variation when looking at the bounce back rates. One tenth of the e-mails sent to NTOs bounced back compared to only 3.5% in case of the airlines. NTOs also show a difference in their response rates regarding inquiries and complaints with 40.5% of the inquiries being answered but only 32.6% of the complaints. When comparing the response rate of inquiries to complaints, no significant differences arise.

In terms of response time NTOs seem to be quicker responding more often the same day (54.7% versus 42% of the airlines, $p<0.01$). They even answer complaints faster than the airlines (46.5% versus 27.8%). Furthermore, it takes them less frequently more than three days to reply (13.6% versus 20.4% of the airlines, $p<0.01$). Obviously both types of organisations answer inquiries much faster than complaints. Significant differences arise when comparing the response times of inquiries to complaints ($p<0.001$). In the case of the airlines there is an extraordinary high difference with

61.2% of the inquiries being answered the same day but only 27.8% of the complaints.

The results on quality of the replies indicate that airlines show higher consideration of politeness (Table 3). Airlines thanked the customer more often for the e-mail (68.9% versus 59.9% of the NTOs, not significant) when looking at the answers irrespective whether it was an inquiry or a complaint. They used the customer's name in the greeting significantly more often than NTOs (80.9% versus 69.8% of the NTOs, $p<0.001$).

Table 3. Quality of replies

Evaluation Criteria	**NTOs**			**Airlines**			**Total Mystery Study**
	Inquiries	Comp-laints	Total NTOs	Inquiries	Comp-laints	Total Airlines	
Thanking for the e-mail	55.3%	65.7%	59.9%	57.8%	77.3%	68.9%	64.3%
Salutation in the beginning	93.5%	91.9%	92.8%	86.7%	96.6%	92.3%	92.6%
Customer's name used in the greeting	67.5%	72.7%	69.8%	67.8%	90.8%	80.9%	75.2%

It appeared further that airlines are more aware of the importance of service recovery than NTOs. All of the politeness criteria i.e. thanking for the e-mail (77.3% for the complaints versus 57.8% for the inquiries, $p<0.005$), including a salutation in the beginning (complaints: 96.6%, inquiries: 86.7%, $p<0.01$), greeting the customer by the name (complaints: 90.8%, inquiries: 67.8%, $p<0.001$) showed significant differences between inquiries and complaints. When comparing the response quality of inquiries and complaints overall it appears that the customer is significantly more thanked for the e-mail when replying to a complaint than an inquiry ($p<0.001$). Furthermore, the customer's name is more often used in the answer to a complaint ($p<0.001$). Finally, when comparing gender differences of the person answering the e-mail only slight differences appear in favour of the female employees. They were thanking the customer more often for the e-mail and were more likely to include a greeting in the beginning. However, no significant differences were found in terms of the response rate.

In summary, hypothesis 1 assuming that there is a difference in the response behaviour between for profit and non profit organisations was partly confirmed. Significant differences were found regarding the response time. NTOs seem to answer much faster than airlines. This suggests that the main aim of these organizations, i.e. providing travellers with information, is taken seriously. However, airlines seem to react more professionally. As far as quality criteria such as using the customer's name is concerned, airlines perform better than NTOs. This also accounts for politeness

where airlines outperform NTOs. Thus, the level of professionalism is considered to be higher for airlines.

Hypothesis 2, postulating a difference in the response behaviour of inquiries versus complaints was confirmed for most of the quality criteria. It seems that interactional justice is higher for complaints than for inquiries. This means, that a customer who already experienced service failure is treated better by thanking him for the e-mail and also by using the respective customer's name. This hints at the fact that companies are aware that already disappointed customers need to be treated in a nicer way. However, the results regarding response time show that inquiries are answered much faster. Potential explanations are the fact that it takes more time to resolve complaints and really provide meaningful advice. Just replying to a question companies get asked more frequently might not use up that much time. Therefore the replies to an inquiry do not take that long.

6 Conclusion and Future Research

This section briefly summarizes the study results and provides implications for management and research. Furthermore, limitations of the study are reflected.

6.1 Managerial Implications

The above results demonstrate that both organisations should urgently improve their response strategies for inquiries and complaints particularly in terms of the response rates. There is room for improvement concerning the response times especially when investigating the complaints. This is particularly important since customers, who are already dissatisfied, want their problems to be solved quickly. Criteria of politeness need to be taken more serious. Greeting the customer by name or thanking for the e-mail should be a prerequisite when answering any customer e-mail.

NTOs should investigate the reason why an extraordinary high amount of e-mails directed towards them is bounced back. One reason could be that the web pages did not provide the most current e-mail addresses. Some NTOs may also lack the manpower and competence for professional web pages.

While airlines seem to have realised the importance of service recovery when considering the quality of reply, NTOs are clearly a step behind. Although they are answering complaints faster than airlines their response rates for complaints are worse. Furthermore, their quality of reply is worse. They should develop a strategy for complaint handling including politeness as there does not appear to be a great difference in the communication strategies. The way airlines deal with complaints conveys the feeling that the employees follow a service recovery strategy by showing empathy and a higher degree of politeness. We could argue that for-profit organisations have either more experience or better training in complaint management than NTOs.

6.2 Implications for Research

Future research could include additional tourism sectors as this study considered only one example for the profit and not for profit tourism organisations. Furthermore, additional responsiveness and quality of reply criteria could give a fuller picture of the organisations' response behaviour.

Considering organisation's criteria such as size or age of the organisation could be helpful to identify further influencing factors for e-mail reply behaviour. A study reflecting the organisations' point of view considering their reasons for non-response or low quality of response could provide additional insights and improve the customer relationship management sustainably. Companies for instance could consciously decide not to reply to certain complaints or inquiries. Furthermore, exploring relationships between e-mail criteria and objective criteria such as booking figures and number of passengers for airlines and arrivals or bed nights in the case of tourist offices could reveal whether there is any causality.

Regarding the e-mails as such, content analysis could further enhance the findings by applying linguistic criteria and exploring semantic differences. Finally, the development of guidelines for e-communication could be a helpful tool for organisations to provide better e-service quality.

6.3 Limitations

The study at hand has some limitations that need to be discussed. An analysis based on the geographical areas the airlines and national tourist boards are based in could provide further insights. Also size of the airlines or economic performance could serve as indicators to explain some of the variance in the results. Most challenging, however, is the phrasing of the inquiries and complaints for both organisational types. Variations in the inquiries and complaints might lead to different results. On the one hand, if the messages sent to the airlines in particular would include precise flight numbers and names the results might be different. On the other hand, by communicating rather general issues to both, airlines and NTOs, we secured that answers were possible.

Appendix

Inquiry Airline:

Dear Sir/Madam,
I am planning on flying with your airline. I was wondering whether you could tell me soon whether it would be possible to bring my pet rabbit on board your plane? Thank you for your assistance. I look forward to hearing from you soon.
Kind Regards,

Dear Sir/Madam,
Before I book my flight, I was wondering whether you could tell me
what the weight limit for hand luggage is? Thank you for your trouble.
I look forward to hearing from you.
Best Regards,
Tim Watts

Sarah Miller
(sarahmiller81@hotmail.com)

(timothy.watts@yahoo.com)

Complaint Airline:

Dear Sir/Madam,
the cabin temperature on my most recent flights was so low that I caught a very nasty cold. As you can imagine, the flight experience is terrible when you are freezing during the whole trip.
Could you please advise your crew to turn the air-conditioning on a lower setting? This would make the flights considerably more comfortable.
Thank you for considering my feedback.
I am looking forward to your response.
Kind Regards,
Karen Parks
(karen.parks@hotmail.com)

Dear Sir/Madam,
I have realized that lately the quality of the snacks and refreshments offered on board has decreased. The taste was poor and they did not really look fresh either.
I have always liked the service on board of your flights, but this experience means that I cannot guarantee you my custom in the future.
I hope that you take my complaint into consideration. I look forward to hearing from you soon.
Best Regards,
Max Foster
(max.foster@yahoo.com)

Inquiry NTO:

Dear Sir/Madam,
I am planning to visit your country in the next couple of months. Prior to my visit I would like to have some more information about the capital city. It would be most appreciated if you could send me some relevant material by e-mail.
Thank you for assistance.
Kind regards,
Carla M. Walsh
(carlamwalsh@yahoo.com)

Dear Sir/Madam,
I am planning to spend my holiday in your country in September this year. Are there any special events taking place during that period that you would recommend?
Thank you for help.
Kind regards,
Barney Coleman
(barney_coleman@hotmail.com)

Complaint NTO:

Dear Sir/Madam,
I was looking for some information on attractions in your capital on your website, however the poor navigation and structure of the website make it rather difficult. It would be very helpful to make the online information more readily accessible and easier to find.
Thank you for considering my feedback.
I look forward to hearing from you soon.
Kind regards,

Dear Sir/Madam,
I visited your web site to find accommodation for my stay in your country. The range of accommodation listed on the website is so poor that I could not find anything suitable. Accommodation is a crucial element of any travel experience therefore it would be of great service if you consider updating your website more regularly and uploading all available types of

Anna Milton
(miltonanna@yahoo.com)

accommodation in your country.
I hope you take my complaint into consideration. I am looking forward to your response.
Kind regards,
Francis Stanton
(francisstanton@hotmail.com)

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Information Convergence in the Long Tail: The Case of Tourism Destination Information

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Abstract

Tourism information on the Internet is spreading through a wide range of different websites. In addition to the official destination or attraction websites, many are unofficial websites such as blogs, wiki, social networks, which offer destination information. Hence official websites, being destination or attraction sites, are challenged by unofficial ones. Actually these two different types of websites often diffuse similar content in terms of topics and subjects but in different forms. This study explores the information market around a given tourism destination and investigates the characteristics and quality of the available websites. It underlines the importance of consumer generated content and its strategic role for the promotion. Finally, several ways of exploiting the official and unofficial contents are explored and the topic of the possible information convergence, thanks to folksonomies, is discussed.

Keywords: web 2.0, user generated content, information convergence, destination systems

1 Introduction

The World Wide Web is growing fast and thousands of players are entering the information market every day. The number of firms connected to the Internet is constantly increasing (eBusiness Watch, 2006) and the world Internet usage growth in the period 2000-2007 was 265.6% (internetworldstats.com, 2008). This means that geographical and cultural boundaries are no longer obstacles for global communication and for global commerce. Information has become available both from official sources and unofficial sources (Anderson, 2006). Websites (official or unofficial) are competing to reach the end users, trying to satisfy their specific information needs. Additionally, the User Generated Content (UGC) phenomenon is growing dramatically. Web 2.0 is being recognized as the new trend of online communication (O'Reilly, 2005). Google, and other search engines, are integrating UGC within their organic search results. As the Internet becomes the primary source of information (Fox, 2002), the issue of locating relevant information is crucial because, as stated by Nielsen Media, over 80% of searchers use web search engines to locate online information (Nielsen Media, 1997). Search engines (e.g. Google, Yahoo!, MSN Live) have become very popular, with Google.com dominate the global

search market (Comescore, 2008). However, the rapid growth of information on the Internet creates new opportunities, challenges and even problems for end users to find the right information (Santosa et al, 2005).

This study analyzes search engine results in a traditionally information intensive domain: eTourism (Gretzel et al., 2000; Buhalis, 2003). Within this domain, the issues of information availability quality and credibility are crucial for the success of a tourism destination. Thus, the general objective of this study is to analyze the information market around a given destination, starting from the most relevant keywords which the end user inputs in the search engine to reach the official destination website. In addition, a study about information sources and providers, as well as content quality has been carried out for the unofficial information providers (section 4). Lastly, the study explores how online content and information sources can be exploited and integrated (being official or unofficial) to provide suitable information for perspective travellers. Finally, folksonomies, as one of the possible strategies for the tourism information convergence will be introduced and briefly examined in the discussion section (section 5).

2 Literature Review

World Wide Web is now facing its first (r)evolution: web2.0 (O'Reilly, 2005) offering a "second generation of web-based communities and hosted services […] which aim to facilitate collaboration and sharing between users". In this "read/write web" the end user has become the information consumer, player and provider (Nicholas et al., 2007). Information does not only transmit in one direction, from the website to the user, but also from the user to the web and it is made available for all other users. Chris Anderson introduced the concept of Long Tail (Anderson, 2006). He explained that institutional and official websites only count for 20% of the public websites on the Internet; blogs, social networks and small websites represents the remaining 80%. Anderson remarked that there is almost everything in the Long Tail: the information is present and spread in a galaxy of small websites, blogs, and communities (Baggio et al., 2007). Web2.0 websites are being referred to as social websites because their contents can be easily generated and published by users (Kamel Boulos and Wheelert, 2007). This leads to an information overload, in which an individual cannot process all the communication input, often leading to breakdown (Rogers and Agarwala-Rogers, 1975; Jones et al., 2004), and information entropy (Hiltz and Turoff, 1985). Hence there is a need of incoming messages to be organized in order to be able to manage the message and turn it to useful information. Internet users are overloaded and overwhelmed by information (official or unofficial) (Choi et al., 2007). Hence, the main challenge both for users and search engines is to manage the information entropy (Santosa et al., 2005). Recent studies, both in academic and business fields, are trying to analyze the users' behaviour while performing an online research (e.g. Rose & Levinson, 2004). This behaviour is related to two main factors: (i) the number of research terms is very poor (Silverstein, 1999; Pu, 2000) and (ii) the relevant results are found in the first three page of the search engine (iProspect, 2006). The most used search engine worldwide is Google (58.2% of the US market share),

while Yahoo! is second with 22.9% of the market share (Comescore,2008). Hence, search engines (and especially Google) are the principal gateways used for accessing information on the Internet (e.g. Rose et al., 1999). Some studies underline the importance of content quality of retrieved results (where content means text graphics, images audio and videos) studying the relationship between user satisfaction and search engine results (Rumpraidt and Donnel, 1999). This topic is becoming more and more important due to the recent inclusion of blogs, videos and other user generated content into Google organic results. Lederer, Maupin, Sena and Zhuang, (2000) found that information quality is strictly related to the perceived usefulness of a website whilst McKinney, Yoon and Zahedi (2002), defined information quality as based on "user's perception of the quality of information presented on a website". Jarvenpaa and Todd (1997) demonstrated that clarity and visual appeal of the information in all its components leads to positive comments by customers, enhanced enjoyment, and supports better purchase decisions (Koufaris, 2002). Cantoni and Tardini (2006) highlighted that information, content and quality have been the main concerns of the knowledge society. In addition, information quality has also been treated as an important issue while dealing with usability (Triacca et al., 2005): high information quality enhances the whole end user experience of a given website (Garrett, 2003). Various models and frameworks have been proposed by researchers to address online information quality (McKinney et al., 2002; Kahn and Stong in 1998). Alexander and Tate (1999) gave five parameters to evaluate the information quality of a website: (i) Accuracy (what? and how?), (ii) authority (who?), (iii) Objectivity (why?), (iv) currency (when?) and (v) coverage (what? and for whom?).

Since the early 2000s, usability researchers (e.g. Triacca et al., 2005) tried to deal with the quality of information and not only with the surface oriented features of the websites (Garrett, 2003). Starting from the classification given by Alexander and Tate (1999), the MiLE+ Methodology (Milano-Lugano Evaluation Method) (Triacca et al., 2005; Bolchini and Garzotto 2008) defined the following criteria to deal with content quality, as demonstrated in Table 1. The issues of satisfaction with search results and information quality are highly relevant in an information intensive domain such as tourism (Poon, 1993). In the tourism field, relevant information is spread in a galaxy of different websites (Baggio et al., 2007) such as official destination and attraction websites, but also in blogs (Thevenot, 2007), recommendation systems (Ricci, 2002) and social networks.

This research focuses on online information about London tourism which is offered by the official website of the London Destination Management Organization - DMO - (www.visitlondon.com) but also by a galaxy of different unofficial players or Long Tail (Anderson, 2004). The Internet has become the primary way used by DMOs to communicate with prospective tourists (Buhalis, 2003). During the last few years both the ways of purchasing tourism goods (Werthner and Klein, 1999) and the ways by which tourists gather information (Buhalis, 2003) and comment on their travel experience (Gretzel and Yoo, 2008), have changed dramatically (Sheldon, 1997).

Table 1. MiLe+ guidelines for content quality and usability

#°	Investigated Dimension	Explanation
#1	Accuracy	It states if a text describes adequately the referenced world, and if it is consistent in itself.
#2	Currency	The electronic communication over the web is supposed to be delivered in the precise moment the reader accesses it.
#3	Coverage	It defines the borders of the topics covered by the given website.
#4	Objectivity	The content objectivity indicates the commitment of the sender with respect to the conveyed content
#5	Authority	It defines both, the adequacy of the author to the text and adequacy of the author to the reader.
#6	Conciseness	People rarely read Web pages word by word: they prefer to read on the screen few lines (15-25 lines)

ICTs developments have enormous implications for the operation, structure and strategy of tourism organizations (Buhalis, 2003; Buhalis and Law, 2008; Lee, 2001). A variety of different information providers (Cantoni et al., 2007) are competing with official websites to gather the end-user attention. Users feel free to post on the web comments, reviews, pictures and even videos about specific subjects (O'Connor, 2008). These can be viewed by other users and can consequently influence the decision making and purchase process. Thus, the Internet is becoming one of the most important sources of information acquisition (Pan and Fesenmaier, 2006). However, the issues of information overload and entropy persist in the tourism field because tourists are often overwhelmed by the large amount of information available on the web and it becomes difficult to locate what they are looking for (Pan and Fesenmaier, 2000; Choi et al., 2007). Given this context, the objectives of this paper are: to explore information sources and providers for a given destination, to examine official and unofficial providers and to assess the level of quality of this content.

3 Methodology

In order to investigate the research objectives, a comprehensive method strategy (mostly qualitative but also quantitative) was designed. Firstly, possible keywords for the given site www.visitlondon.com were identified. Information Retrieval (IR) researchers often deal with the study of the keywords which the user uses as input for their researches with the search engines (e.g. Pu, 2000). Their main concerns are related to the technical aspects of the search activity (e.g. number of words used as input keywords). Information retrieval and related aspects are becoming popular also in the tourism field: researchers are mainly concerned about search engine results page and its strengths and weaknesses (e.g. Xiang et al., 2008).

For this reason, this study focuses on a small part of the online tourism domain, namely the one closely related to the London DMO website: having it as a reference point researchers investigate the information competitors which are actually challenging this websites starting from the most popular keywords which are typed by the potential travellers in the search engines.

Identifying such keywords could be very easy if the researchers were able to analyze the website log-files (Cantoni and Ceriani, 2006). Log files can actually store all the keywords used by users to interrogate search engines. During a log-files study keywords can be founded and analyzed (Pitkow, 1997). However in this study, the log files of the www.visitlondon.com were unavailable. Hence Google Keywords (https://adwords.google.com/select/KeywordToolExternal) was used. This instrument is useful for search engine optimisation (SEO) activities, as it basically examines the website contents and gives a set of keywords that may be used for the promotion and optimization of the website on Google. This research assumes that this set of keywords is also used by end users to find information about London tourism. The results of Google Keyword tool is a set of keywords divided into different groups. Each group has the name of the most important and recurrent keyword, a kind of "first level keyword". This study considers only the first level keyword (9 keywords) as indicated in the list below.

Keywords for visitlondon.com

1. London	4. London theatre	7. London visitor
2. London eye	5. London tourism	8. Ticket London
3. London hotel	6. London tourist	9. Visit London

These keywords were then used to perform a search activity in Google. Only the first three pages of Google results were taken into account as relevant in the search activity. As search results may vary, it is important to underline that the searches were conducted on www.google.co.uk, from Bournemouth (UK), on March 8th, 2008 in English. Nine different searches were performed using the set of keywords quoted above. Finally the evaluation of websites, in terms of functions, quality and even usability is a topic of interest for the tourism domain (e.g. Buhalis and Spada, 2000). Various methods have been used and usability and heuristic evaluation is one of these (Shanshan et al., 2008). From the search engine results some other data have been collected including the information providers (official *versus* unofficial). Moreover the quality of information was also evaluated using an one (totally unsatisfied) to five (totally satisfied) scale with the heuristics presented above from the MiLE+ methodology (Table 1). Evaluation was carried out by a usability expert as required by the MiLE+ methodology.

It is important to underline the main differences among official and unofficial websites which have been used to classify the websites: on one side official websites (or institutional websites) are all official web sites that appear in the search results. This category comprises the website of the Bath Tourism Organization as well as other official websites such as the University of Bath, Bath City Council web site, but also official hotel websites, official industry websites, etc. All the quoted above websites have a kind of institutional mission to accomplish and they have to follow market, political or editorial rules. On the other side, unofficial websites (or not institutional websites) are all websites that are not official. They do not have an institutional mission related to the city or to the tourism organization or a company. They are part of the so-called long tail and they do not have political or editorial rules

to follow. Examples of these websites are: Wikipedia.org, Wikitravel.org, IgoUgo.com, Tripadvisor.com as well as simple personal websites.

4 Results

4.1 Information Providers

The set of nine keywords was submitted to Google. For each of the nine keywords the first three result pages were analyzed (10 results per page, total of 270 results). The first analysis was performed with a popular desktop search engine optimisation software (webceo.com) in order to understand the ranking of VisitLondon.com website for the given set of keyword. For example, the website ranks first in Google.co.uk for the keyword "London". Subsequently, search results were classified as follows: unique results were counted for each keyword (i.e. websites appearing twice or more with the same address in the same search results were eliminated). Then starting from the unique results, official websites (London DMO and other official attraction websites, schools, and in general institutional websites which have to follow political and market based editorial rules) and unofficial websites (UGC websites and personal websites) were counted. Finally, a small percentage of websites that were not working or not relevant have been classified. Table 2 synthesizes the results obtained after performing the research. The value in each column is explained and commented below.

Table 2. Search results classification.

Kewords	Google Ranking	Unique results	Visit London	Other Official	Un Official ws	NW/NR
London	1	30	1	14	13	2
London eye	9	28	2	3	19	4
London hotel	/	28	0	7	20	1
London theatre	/	25	0	6	19	0
London tourism	1	29	2	5	15	7
London tourist	1	28	2	6	18	2
London visitor	1	27	2	9	16	0
Ticket London	/	28	0	1	27	0
Visit London	1	26	7	10	8	1
Total		249	16	61	155	17

Google Ranking (second column): for three keywords, the London official DMO website is not present (London Hotel, London Theatre and Ticket London). In the other cases, the London DMO ranks first, except for the keyword London Eye. Unique results (third column) describe the real number of documents retrieved by the search engine. Sometimes for commercial purposes or simply redundancy the same results may appear twice or more within the search results page. Only identical results have been considered as redundant. Visit London (fourth column) defines the occurrences of the official London DMO website and sub-domains. Other Official (fifth column) defines the number of other official websites, such as the ones from the government, city and other institutions. Unofficial websites (sixth column) illustrates the number of unofficial websites that does not belong to the destination management organization, the government, nor to an institution. The number of not working or not

relevant websites (seventh column) shows the number of websites that are not working (broken link) or not relevant (such as the results for "City of London" in Canada). Table 2 shows that only in two cases (keywords "London" and "Visit London") the number of resulting official websites is bigger than unofficial websites. In the other cases, the number of official websites is smaller than the unofficial websites. For the keyword "London" out of 30 unique results, 13 are unofficial, 1 is visitlondon.com and 13 are a galaxy of different websites (namely company websites, online newspaper, government websites, special events websites and educational webs sites). In the case of "Visit London", out of 26 unique results, 8 are unofficial, 7 are from VisitLondon.com and 10 are from other official websites (namely government websites, company related websites, educational and attraction websites). For the rest of the analysis the three keywords "London Hotel", "London Theatre" and "Ticket London" were eliminated. This is mainly because the official DMO website does not appear in the ranking, and it could not be considered as a competitor for this information market.

Table 3 shows the unofficial results obtained for six keywords in which the London DMO is competing in the information market. The second column represents the unofficial results, the third column represents the User Generated Contents (UGC) results. Table 3 demonstrates that, for the keyword "London" in the first three pages of the Google.co.uk search results (30 results), 13 are unofficial websites and out of these 13 unofficial websites 6 hosts UGC. Out of the total 89 unofficial information providers 32 websites host user-generated content. Among them, 9 are web logs (blogs), 4 are wiki, 8 host photos created by users, 1 hosts videos created by users, 5 allow travellers to write articles or reviews, and finally 12 allow comments on given pieces of information. Only a few websites are well known, including the popular photo sharing site Flickr.com and video sharing site YouTube.com.

Table 3. Unofficial websites and User Generated Contents websites

Kewords	Unofficial ws	UGC ws
London	13	6
London eye	19	5
London tourism	15	8
London tourist	18	5
London visitor	16	6
Visit London	8	2
Total	89	32

4.2 Information Quality

The quality of information was evaluated with an one (totally unsatisfied) to five (totally satisfied) scale with the heuristics presented previously from the MiLE+ methodology (Table 1).

Results showed that official websites have a strong authority (average value 4.8), very good accuracy and objectivity (average value 4.2) and good currency (average value

3.8). Unofficial websites have a good accuracy and currency (average values is respectively 3.6 and 3.5) as well as sufficient coverage and conciseness (average is respectively 3.8 and 3.9). However, they are weak on objectivity and authority (average values 2.6 and 2.5). Figure 1 shows that official websites are better than unofficial websites in all the categories chosen for the analysis. Only when web2.0 websites were split from the unofficial websites, as shown in Table 3, there was more competition.

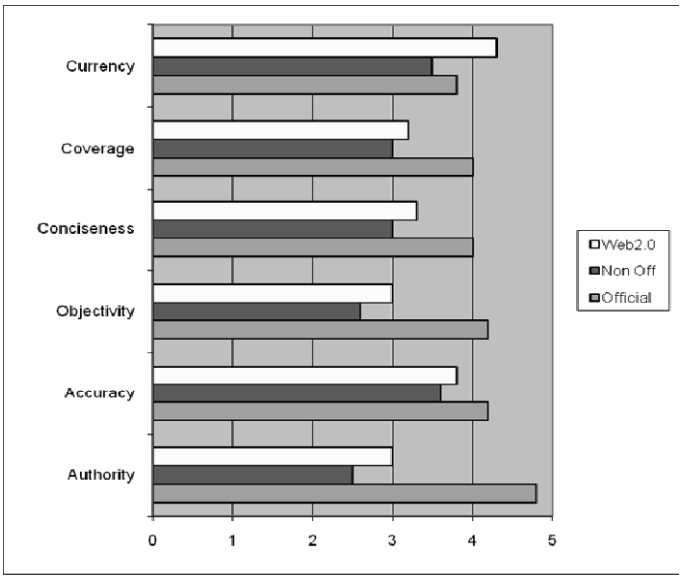

Fig. 1. Content quality comparison.

For one category (currency) web2.0 websites are better than official and unofficial websites. This is due to the fact that web2.0 websites are stronger at bringing contents up to date. As stated by Nicholas, Huntington, Jamali and Dobrowolski (2007), the end user has become the information consumer, indeed, the information player and provider, committed to participate in discussion and contribute to topics of interest. This includes rating of accommodation, posting of pictures, and sharing suggestions and recommendations. This lead to the problems of: content quality, authority and accuracy. Official websites are still seen as vehicles for institutional communication, although their content may be less up to date (mostly because content is very generic without time statements). Official websites transmit the institutional point of view, and are trustable by users.

What seems to be a critical issue for the unofficial and web2.0 websites is objectivity. Objectivity "indicates the commitment of the sender with respect to the conveyed content" (Triacca et al., 2005). For example, it must be clear if a message is an advertisement or not (e.g. the sender may be paid or benefit to say something). Official websites have their own funding sources. Hence, creating revenue through the web is not their primarily concern. In contrast, unofficial websites somehow try to generate revenue from the web to ensure their sustainability. In some cases, (e.g.

igougo.com and tripadvisor.com) user-generated content (e.g. hotel reviews, pictures) are instrumental to support the tourist decision to book a certain hotel in the real world, whilst promoting the offerings of their mother companies. In other cases (e.g. uktravel.com, krysstal.com) the websites provide useful information but contain sponsored links and advertisements with the same appearance of the website content that may confuse the users. It is only the experienced users that can navigate through this minefield of information.

5 Discussion and Future Work

The results of this study show that there are an increasing number of both official and unofficial providers on the web that are competing to satisfy users' information needs. As demonstrated by the analysis, official websites are very strong when dealing with the authority and objectivity of the contents, while unofficial websites (particularly web2.0 websites) are stronger with regards to currency and perhaps relevance of information. The information market structure surrounding a DMO website is very complex and diverse. Official DMOs have information providers that may be classified as official partners. Besides, a galaxy of unofficial websites may be used by the official website as content/service suppliers. For example, VisitLondon.com gathers information also from a web2.0 partner, tripadvisor.co.uk - http://www.visitlondon.com/people/tripadvisor. Finally, other information providers may be interconnected one to another within the net (Figure 2).

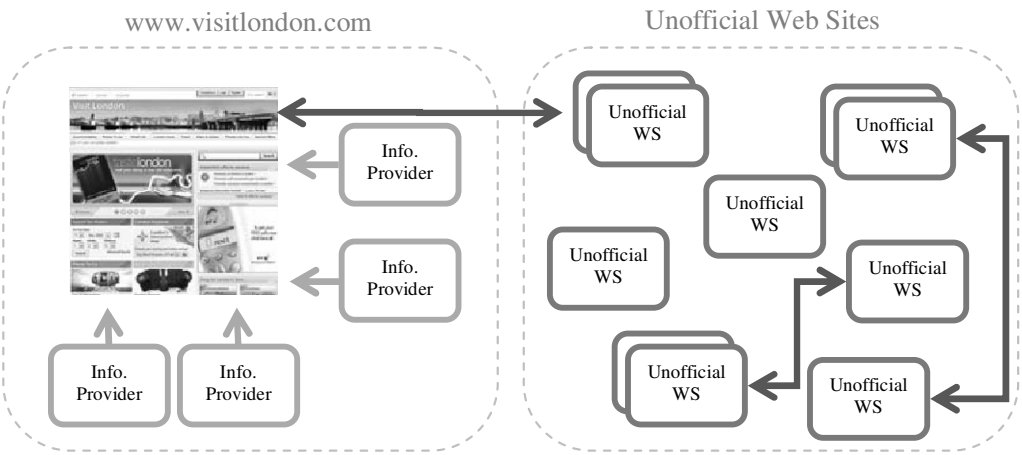

Fig. 2. Representation of a DMO online network

When surfing the web and looking for information, prospective travellers are offered a wide range of information providers and a plethora of websites. One possible way to avoid time dispersion on the web, and to have relevant results from a research on the web, could be to implement a web2.0 method to manage content: namely social tagging and folksonomies (Vander Wal, 2004). Users are asked to assign a tag (a short description or a word) to the website they are browsing. The tag is a description of the content and services of a given websites resulting to an informal network of

websites described by users. Folksonomy represents a kind of bottom-up classification. In practical terms, users assign a set of terms – called tags – to individual pieces of content in order to group or classify those pieces for retrieval. Some examples of successful folksonomies are del.icio.us.com (http://del.icio.us/), steve.museum (http://www.steve.museum/) and Flick (Flickr.com). In folksonomies, users are not forced to use the same tags. However, the usage of tags with similar interests tends to converge to a shared vocabulary. One of the success factors of the folksonomies is that no specific skills are needed for participating and even no common language is required (Hotho et al., 2006). Promoting a bottom up classification of tourism content can reduce the possibility of wasting time during the search activity. Potential tourists that are going to visit a specific destination could learn from the experience of others; this means that the entire range of information players (official and unofficial) may compete to give the best service to users.

6 Conclusions

This study aimed to shape the information market, taking the example of London as a tourism destination. Different websites (official and unofficial) are competing to satisfy the users' information needs. Internet information providers carry different types of information, with different media (text, pictures, videos, blogs). Information quality is one of the most important topics in information entropy. The research demonstrates that unofficial websites lack in content authority and objectivity, while official websites lack in content currency. Folksonomy is proposed as strategy for underpinning the information overload and for harvesting the relevant content both form official and unofficial websites. Future research should concentrate on the methodology for designing and implementing such a system in order to help travellers find the most relevant information for a given tourism related topic.

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Development of Technology Training for Destination Marketing Organisations

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Abstract

Most DMOs are not familiar with new technologies, and they have not had opportunities to learn about and evaluate dynamically changing technologies. Therefore, this study aims to (a) develop educational content in an effort to provide tourism professionals with basic training in new technologies and (b) discover their opinions about technologies through training programs. As training content, tourism-related technologies were separated into Web-based technologies and hardware-based. In addition to the development of training content, this study examined how familiar tourism professionals in DMOs are with these technologies, the perceived usefulness of such technologies, and the DMOs' willingness to use them after a training program on new tourism technologies. Findings suggest that most tourism professionals were not familiar with these technologies and that YouTube was ranked as the most helpful in their destination marketing, followed by RSS feeds and Google Earth.

Keywords: Tourism technology, Training content, Destination Marketing Oganisations (DMO), YouTube, Podcast, RSS feed.

1 Introduction

Information and communication technologies (ICTs) and recent technological revolutions have deeply affected destination marketing and promotion (Bentley, 1996; Buhalis, 1998; Buhalis & Licata, 2002; Schwanen & Kwan, 2008). In particular, with the emergence of Web 2.0, Internet users play the roles of co-marketers, co-designers, and co-producers of tourism information, generating a considerable amount of information (Sigara, 2007). Moreover, under Web 2.0, diverse technologies have been introduced that increase travellers' accessibility, and DMOs are paying more attention to new technologies that meet the needs of sophisticated travellers (Buhalis, 1998). Law and Jogaratnam (2005) indicated that only when DMOs and tourism-related managers fully understand innovative technologies and have the ability to use them can these technologies be effective for destination promotion.

Despite the importance of keeping up with innovative technologies, most DMOs are not familiar with new technologies, and they have not had opportunities to learn about and evaluate such dynamically changing technologies (Kothari & Fesenmaier, 2007). While most technology-related studies have focused on Web-based technologies, only scant attention has been paid to educating DMOs and introducing them to practical technologies. To be more exact, the majority of studies have concentrated on information and communication, such as the information-search process, the usefulness of websites, service quality, distribution systems, and so on. Even though Bender (2007) reviewed and introduced new technologies with regard to destination marketing, the article only introduced map-related technologies.

Undoubtedly, it is necessary to provide DMOs with opportunities to learn new skills related to emergent technologies. Therefore, this study aims to (a) develop educational content in an effort to provide tourism professionals with basic training in new technologies and (b) discover their opinions about technologies through training programs. To achieve this goal, this study will first review literature and blogs related to tourism technology and use that information to suggest innovative technologies. Second, through a real training program with DMO officials from small- to medium-sized cities in a Midwestern U.S. state, this study will ascertain their familiarity with innovative technologies and how much DMOs recognize the importance and usefulness of technology to their organisations. Lastly, implications from these technologies and suggestions for future training programs will be discussed.

2 Development of Training Content

The list of new technologies was selected under three guidelines. First, technologies that have been mentioned most in the literature and tourism technology-related blogs were chosen. We also sent e-mails to eight tourism technology experts, including professors and tourism professionals, asking for recommendations of useful technologies. However, because the technologies recommended by these experts related mostly to social networking, we relied more on literature and blogs. Four major blogs focusing on travel-related technologies were selected and reviewed: Tourism Tide (http://www.tourismtide.com), Travel & Tourism Technology Trends (http://www.tourismtechnology.rezgo.com), TravolutionBlog (http://travolution.blogspot.com), and dottourism (http://www.dottourism.com). Second, technologies that require a sizable cost to implement were excluded. Third, technologies that do not require a high level of technical skill to use were selected; that is, it is expected that DMOs could use the selected technologies with minimal instruction and practice. For example, the self-service kiosk was one of the most frequently mentioned technologies in the literature and blogs. However, a kiosk system requires great expense to hire experts and purchase the hardware, so it was excluded from the list of innovative technologies. Moreover, given that technologies rapidly evolve, it was necessary to limit the review period for blogs in an effort to include only the latest technologies. Therefore, this study only reviewed technologies posted in the aforementioned blogs between January 1, 2007, and May 1, 2008. Suggested technologies consist of two main categories: Web-based technologies (map-related technologies, YouTube, virtual tours, Second Life, RSS feeds, and social networking)

and hardware-based technologies (podcasts, compact video cameras, tracking devices, portable navigation devices, and multifunction mobile phones).

2.1 Web-Based Technologies.

Map technologies

Map-related technologies have been mainly developed by Google and Yahoo. Among them, Google provides the most innovative functions such as My Map, Street View, Google Earth and Mash-up. Unlike other online maps such as Quickmaps and the US National Atlas agency, the unique function of the Google Map is that it enables users to link My maps with other travel-related content such as restaurant review, photos, and videos, making the content much richer.

Google My Maps. Google My Maps is a user-generated destination map. Google My Maps allows Internet users to map favourite locations and create their own points of interest on a map, adding descriptions and information to share with potential travellers. Therefore, the tourism industry, especially local and small businesses which do not have enough funds to make their own websites can create their own niche guides with various content, which can be shared with potential travellers all over the world.

Google Street View. The most remarkable feature of Google Maps is the function of street view that shows places from a pedestrian's perspective (Bender, 2007). It provides highly realistic view and virtual tour from a variety of angles (360° panoramic street-level image). By using arrow keys, users can control their direction and tour speed. In addition, by moving the icon (a virtual person) to a certain point, they can move to different places and attractions very quickly. Although this feature is not available for all cities in the world, the range has been continuously expanding.

Google Earth. Google Earth is a virtual global program that shows places with satellite and 3D images. It lets people fly and travel anywhere on earth to view satellite imagery, maps, terrain, 3D buildings and even explore galaxies in the sky. Besides the function of searching location, it enables people to map locations by uploading videos and photos with links to information about them. Along with Street View, potential travellers can experience the real image of the destination through Google Earth before they travel.

Mash-up. Mash-up is a content aggregation technology. Contents from two or more websites are aggregated and combined into an integrated application. The key concept is to provide linkage to other sources (Dearstyne, 2007). Among various types of Mash-ups, one useful type for DMOs is an interactive map linked from travel-related websites to help travellers find as much travel information as possible at the same place. It provides a service that marks the locations of certain facilities, such as hotels and nearby attractions, on online maps. Along with the mapping function, the Mash-up displays the seamless combination of multiple sources of content and software to create a new and valuable service to travellers (Sigala, 2007). As many travel

industries, such as hotel chains and DMOs, use Mash-up functions in their webpage, travellers visiting these websites can explore possible attractions around the destination. Several guides to create Mash-ups are available on the website of Programmable (www.programmableweb.com/howto).

YouTube

YouTube is a video sharing community website based on user generated content. Users upload and share their video clips with brief stories. You-tube enables people across the world to experience and engage with attractions and entertainment through sharing video clips. YouTube has about 48 million users in the US alone and is the eighth most visited website in the world. As its popularity increases, YouTube has been recognized as one of the most effective ways for national destination marketing. The tourism ministries over the world are gearing up to take advantages of YouTube, launching themselves as a Brand Channel on YouTube, and their promotional videos will now be available on the popular video sharing website. For example, a couple of months back India Tourism Ministry launched its 'Incredible India' campaign (http://www.youtube.com/India) on YouTube. Besides India, many countries (e.g., Korea, Japan, New Zealand, Taiwan, and so on.) promote their attractions and national campaign, uploading video clips on YouTube.

Along with national level campaigns, as individual tourists also upload their video clips taken at a wide variety of destinations, they help future travellers understand destinations better. In addition, because videos from tourists contain diverse subjects, such as culture, shopping, business, educational tips and so on, potential tourists can experience not only attractions, but also unique culture and industry of the destination. Such video may also be perceived as more truthful representation of a destination as they are not advertisements produced to entice travellers to make a travel purchase.

Virtual Tour

A virtual tour can be expressed as a direct travel experience without actually travelling to the destination that employs usage of a sequence of hyperlinked video images or image-based models of the real destination and multimedia support elements (e.g. sound, narration, and text). In addition virtual tours may also include panoramic images, interactive photos, and animation (Wan, Tsaur, Chiu & Chiou, 2007). Given that the majority of travel constraints are time and money, virtual tours can play a vital role in saving these valuable resources. Furthermore, for DMOs and the travel industry, it helps travellers make better decisions before they purchase by providing them with vivid images of destinations (see http://www.everyscape.com/washington-dc.aspx and http://www.senate.gov/vtoru/1high.htm). Therefore, it would be an effective way to promote new or existing destinations.

Second Life

Second Life is an internet-based virtual world (http://secondlife.com). In Second Life, users take on a new persona other than their real life. They may then create a new product or service (e.g. events, game, and facilities), visit other lands and attractions, meet and interact with each other through motional avatars. It might be described as one of type of virtual tours, but it differs from virtual tours in that Second Life does not try to show the exact same features of the destination. In addition, all networks in Second Life are implemented in real time.

Tourism-related industries, especially hotels and resorts (e.g. Hyatt), use Second Life for consulting architects and their guests on how to improve their hotel design and architecture. In fact, Second Life users created and designed the first Aloft hotel (http://www.virtualaloft.com) which in real life will open and operate in 2008 (Sigala, 2007). Moreover, like YouTube, it is being used for national destination marketing. Several countries have already launched their offices for marketing and promotions in Second Life, and famous islands, cities and facilities have created their virtual travel for promotion. (e.g. Mexico, Korea, New York, and so on).

RSS feeds

RSS is an acronym for Really Simple Syndication. The basic idea is to aggregate content and information at one digital space which is updated from each different websites. By using RSS feeds, people do not have to visit and revisit websites that they are interested in to check newly updated information and news. Once users put the address of websites into RSS reader, the latest headlines or the new information uploaded in websites are automatically displayed in one place (Ractham and Zhang, 2006). As all information is linked with the original webpage, people can gain access to the full story by clicking the embedded links. Therefore, people can keep connect with information they follow while saving time to visit other websites. In addition, as users select websites that they are interested in themselves, they can be free from the delivery of unnecessary information like spam mails.

For DMOs, RSS feeds can play a vital role in both getting and delivering information about travel. For example, as officials in DMOs use RSS feeds, they can stay in touch with tourism related information, such as new technologies or their competition. Also, by providing the web environment where travellers can subscribe to content and information using RSS feed, DMOs can save time to send promotional e-mail such as event schedules or new destination information.

Social Networking

According to Rheingold (1993), “social networking (virtual communities) is a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and other networks”(p.57-58). According to the Hitwise’ report (2007), web users spend longer on social networking sites than they do elsewhere. This is, especially, true for users of

the leading social networking site. For example, Facebook, the number two site, keeps its users for an average of 21 minutes and 15 seconds. This compares with an average of just 12 minutes across all internet sites (Simons, 2007).

Social networks are mainly based on user-generated content (e.g. videos and photos), peer-to-peer reviews, recommendations and general advice. Therefore, the most important advantages of social networks are the richness and credibility of information. Since most information in social networking sites is made not by DMOs (suppliers), but by travellers themselves, the amount and diversity of information are much superior to that in traditional marketing website by DMOs or the travel industry. Also, most social networking sites are not viewed as commercial websites, and it is likely that travellers could have greater confidence about things they read on social networking sites (Fox, 2008).

2.2 Hardware-Based Technologies

Podcast

Podcasting refers to the uploading and downloading of audio and video files by users from websites. According to Bausch and Han (2006), "Podcasting is a relatively new technology that enables users to quickly and easily download multimedia files, including audio and video, for playback on mobile devices including iPods and other MP3 players, as well as cell phones" (p.1). Although the main purpose of podcasting is to distribute information and content to mobile devices such as those noted above (Cebeci & Tekdal, 2006). Therefore, having a mobile device is one important requirement for most podcasts.

From a tourism perspective, podcasts can provide travellers with audio or audio plus video tours. As the latest mobile devices, especially iPods, are equipped for video play as well as listening, travellers can download tour files from a website and listen and view tours either at home prior to visiting or as a travel guide at destinations. For example, the Chicago Office of Tourism and Cultural Tourism Washington D.C launched an audio tour site within its official website, where people can download tour files for either audio or video tours (http://www.downloadchicagotours.com and http://www.culturaltourismdc.org).

Compact Video Camera

There is no doubt that the lower cost and increased convenience of compact video cameras has rapidly increased the use and richness of content for virtual tours and other internet uses. Generally video cameras are perceived as bigger than still photo cameras, and the large size and relatively heavy weight of video cameras may make travellers reluctant to use them. However, the newest models of compact video cameras are smaller and lighter, and some like the Flip camera are extremely simple to use. As the number of travellers using compact video cameras increase, it is inevitable that more video clips of destination will be uploaded on blogs and travel-related websites.

Photo Tracking Device

Tracking devices are one kind of GPS technology, which can record the location where photos are taken. For example, Sony and Canon Companies have released handheld location tracking devices (e.g. Sony GPS) for travellers who want tag their photos with geo-referenced data. The basic principle of tracking devices is that when travellers take photos, their camera records time, and when tracking devices are used, they also record time along with location information. Then, by using map-matching software, travellers can place photos, with location and time information, on a digital map. With this software, photos are automatically displayed on the map with the exact time and location they were taken, thus freeing travellers from remembering where or when they took their photos.

As a matter of fact, some travel-related sites (e.g., http://www.story.travel.com and picasa.google.com) provide Web spaces where travellers can upload their photos with GPS information without mapping process. From these sites, travellers can see the itinerary of other travellers with photos and their travel stories, and check more accurate travelling time from one to another place.

PND (Portable Navigation Devices)

Portable Navigation Devices (PND) are similar to GPS devices and rely on the same basic technology. Most outdoor GPS products simply indicate the user's location in a 2D format, and cannot indicate off-road and natural resources (Intermap Technology, 2007). However, using PND with interactive 3D rendering software such as Accuterra map content (http://www.intermap.com), travellers, especially recreationists, can track their location with 3D format and for example check campgrounds, peaks, trail heads, and accurate elevation information.

According to Intermap Technology (2007), "PNDs present users with a closer sense of reality by allowing them to easily and accurately locate points of interest and hazards, even providing information to help users decide where to go for help in case of serious injury" (p.1). It is not easy to guide travellers visiting national parks or natural-based areas due to wide range of features. However, PNDs containing location and attraction information (e.g., wildlife, historic figures, floods and so on) can play a role in explaining resources, guiding travellers, and ensuring their safety. In fact, Yosemite National Park (http://www.lowerfallsloop.com) began to provide PND service that includes video and audio tours as well as location information to travellers in 2008.

Multifunction Mobile Phone

According to The International Telecommunication Union (ICT), 50% of all people over the world are expected to use a mobile phone in 2008. Also, Joyce (2008) indicated mobile adoption as one of Top 5 Travel & Tourism Technology Trends for 2008. Now mobile phones are multifunctional; that is, they can perform diverse functions such as Internet searching, transportation schedules, booking system for

hotel and flight, and GPSs (Berger, Lehmann, & Lehner, 2003; Buhalis & Law, 2008). Among these, the latest function of mobile phones is that they have become GPS navigation devices that include travel-guide services, such as real-time travel information about restaurants and hotels.

Therefore, it has become very important for DMOs to provide mobile environment on their websites or at destinations. Generally, for content for mobile phones have different file formats DMOs should make sure that map related content and information are optimized for display and usability over mobile phones as well as how their attractions via major map portals appear in the mobile environment.

3 Teaching Process

In order to give instructions for using the chosen technologies and determine what DMO officials think about these technologies, a workshop was held and sponsored by the Central Illinois Tourism Development Office on May 5, 2008. An official invitation letter was sent inviting regional officials in charge of destination marketing to attend. A total of 20 tourism professionals participated in the workshop. The workshop lasted for 4 hours and was divided into three sections: Web-based technology, hardware-based technology, and a discussion section, where participants evaluated the workshop and gave comments regarding better training processes. The seminar involved the use of several example websites and actual devices in order to help tourism professionals better understand the chosen technologies. Basically, the workshop consisted of (a) an introduction and demonstration of the technologies, (b) examination of several websites where these technologies were being used for destination marketing, and (c) a discussion of their implications. In the discussion section, tourism professionals freely expressed their difficulties keeping up with changing technologies. They evaluated the workshop and made suggestions to improve future workshops. At the end of the discussion section, tourism professionals were asked to complete a survey.

4 Survey Results

A survey was distributed to the participants at the end of the workshop to assess their familiarity with the chosen technologies and their usefulness for destination marketing. They were also asked to evaluate the workshop's delivery. All participants returned completed surveys on the day of the workshop. The survey consisted of three main parts: familiarity with the presented technologies, their usefulness, and evaluation and comments. After the workshop, tourism professionals were asked to indicate their familiarity with the presented technologies on a 5-point scale, ranging from 1 (not too familiar) to 5 (extremely familiar). In particular, questions of familiarity were asked after the workshop because participants may not have known about the presented technologies prior their demonstrations. Rockwell and Kohn (1989) argued that a pretest taken at the beginning of an educational program may lead to invalid results because participants may have limited knowledge to respond accurately to the questions asked on a pretest. In addition, participants were asked to choose the five technologies that would be most helpful to their organisation

(Question 1) and which they are most likely to use (Question 2). Q2 differs from Q1 in that Q2 asks for information regarding personal preference.

Table 1. Familiarity with the presented technologies

	My Maps	Google Street View	Google Earth	Mash-Ups	YouTube	Virtual Tour	Second Life
Valid (N)	20	20	20	20	20	20	20
Mean	1.60	1.45	2.50	1.30	3.30	2.74	1.05
SD	0.94	0.76	1.15	0.80	1.22	1.10	0.22
	RSS Feeds	Social Networking	Podcasts	Compact Video Cameras	Tracking Devices	PND	Multifunction Mobile Phones
Valid (N)	20	20	20	20	20	20	20
Mean	1.60	2.85	2.50	2.55	2.30	1.40	2.90
SD	0.68	1.60	1.05	1.23	1.17	0.60	1.48

Table 1 shows the result of the questions regarding tourism professionals' familiarity with the chosen technologies. On the whole, most participants were not familiar with the presented technologies. The mean of the summated score for all technologies is 2.15. As detailed in Table 1, participants are more familiar with YouTube (M = 3.30) and multifunction mobile phones (M = 2.90) than with other technologies such as social networking (M = 2.85) and virtual tours (M = 2.74). On the other hand, participants indicated Second Life as the most unfamiliar technology, followed by mash-ups (M = 1.30) and PND (M = 1.40). The participants' relatively low familiarity implies that tourism professionals are likely to need to learn more basic skills related to technologies.

Fig.1 shows the frequency regarding participants' views of the usefulness of the presented technologies. For Q1, YouTube (F = 14) was most frequently chosen by participants as the most helpful technology to their organisation, followed by RSS feeds (F = 13) and Google Earth (F = 11. For Q2 regarding individual preferences, participants selected YouTube (F = 16), RSS feeds (F = 13), and My Maps (F = 13) most often.

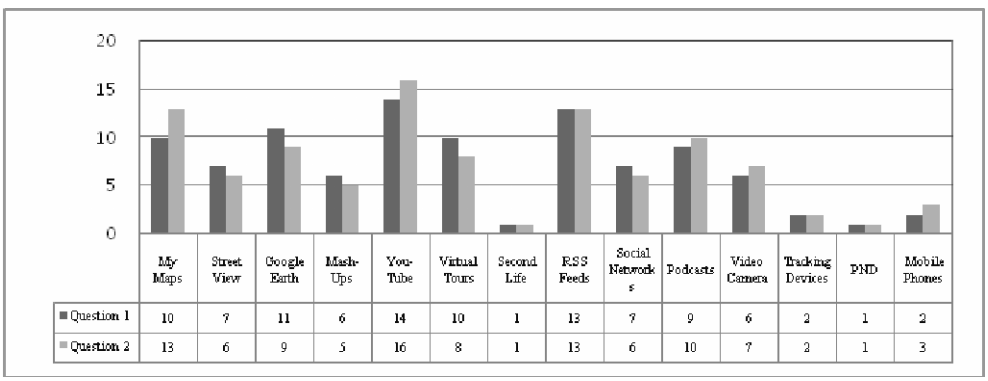

Fig. 1. The frequency on questions of the usefulness of presented technologies

Tourism professionals in DMOs are mostly willing to use YouTube, RSS feeds, Google Earth, and My Maps both personally and for their organisation. As mentioned before, using RSS feeds, tourism professionals in DMOs can keep up with travel-related information. Also, during the workshop, we introduced useful tourism technology-related websites and demonstrated how to get and track information from these sites through RSS feeds. Therefore, the reason that tourism professional in DMOs ranked RSS feeds highly can be explained by their effort to keep abreast of rapidly changing technologies. Except for podcasts, participants did not rank most hardware-based technologies or Second Life highly. Cost and lack of time to use them may explain these results. Although high-cost technologies were excluded from the study, technologies such as Second Life, PND, and tracking devices incur some costs for use in destination marketing. In fact, highly ranked technologies such as YouTube, RSS feeds, and My Maps can be employed without any investment. Moreover, tourism professionals seem to have a tendency to choose less complicated and less time-consuming technologies. In fact, YouTube, RSS feeds, and My Maps are less difficult to use in comparison to others.

In the last part of the survey, participants were asked to evaluate the workshop and provide comments for the next workshop. Although we did not try to measure the satisfaction of the workshop with a numeric scale, over 90% of participants expressed positive satisfaction (e.g., “I learned a lot and feel confident”, “It sparks many ideas”, “It was great”, and “Spoke on my level”). Two main themes can be generalized from the comments and evaluation of the workshop. First, as expected, they wanted to have this training on a regular basis and to be exposed to more tourism-related technologies. Surprisingly, this workshop was their first opportunity to learn about tourism-related technologies. Second, they rated the workshop highly in that it provided them with a broad picture about technologies and implications for their organisation. Even though most tourism professionals acknowledged that this workshop did not give them a lot of knowledge about the various technologies, they said that afterward they felt more confident about how these technologies could be used.

5 Discussion and Conclusion

This study explored a variety of innovative technologies that make destination marketing more effective and facilitate travel. It also examined the practical implications of these new technologies for DMOs and tourism professionals. Tourism-related technologies were separated into Web-based technologies and hardware-based technology. In addition to the development of training content related to tourism technologies, this study examined how familiar tourism professionals in DMOs are with these technologies, the perceived usefulness of such technologies, and the DMOs’ willingness to use them after a workshop on new tourism technologies.

Travel-related technologies have three clear implications for DMOs. The first is the importance of social networking. Travellers are no longer passive recipients of information. They search and ask for information and read about other people’s opinions and experiences until they find what they want, all in an effort to reduce the

uncertainty of travel. Therefore, it is necessary to provide interactive spaces for social networking between DMOs and travellers, as well as among travellers themselves. In addition, as social networking sites are based on comments, feedback, and peer-to-peer reviews from fellow travellers, these websites can be the easiest and most effective means to monitor how travellers perceive promoted destinations and what kinds of problems these destinations have.

The second implication is the change in the flow of destination information. The role of DMOs in traditional information flow was only to collect tour information such as attractions, hotels, and other facilities and provide them to potential tourists. With the traditional way to provide information, the range of tourism environments to which the DMOs can deal is limited because the process of information collection relies heavily on DMO employees. However, with new technologies, active tourist groups play a vital role as information providers not only to potential tourists, but also to the DMOs. Therefore, the range of tourism environment which the DMO can cover with is much wider than that of traditional DMOs.

The third implication is linking with other travel-related websites. DMOs must not forget why many travellers use portal travel websites such as Expedia, Hotwire, and Priceline. The answer is very simple: Travellers can book all related travel such as hotels, tickets, and rental cars at one site. Travellers basically want all-in-one sites where they can get enough information and make purchases. Moreover, one in ten Internet users have a blog, and 485 billion images will be taken in 2008. Travellers are likely to upload these photos and their travel stories to their blogs or social networking sites. Therefore, linking to other travel-related websites, blogs, and information sources plays a vital role in making information plentiful and creating all-in-one sites, thus reducing the time taken to visit other websites.

With regard to the training program, although tourism professionals in DMOs are willing to use and learn tourism-related technologies, they have not had many learning opportunities. Judging from the results of this survey and workshop, tourism professionals in DMOs are not as familiar with travel-related technologies as they should be. Therefore, providing basic training opportunities and a broad picture of available technologies should be a high priority.

For more systematic educational content development, it is suggested to produce a manual where specific features of technologies, examples and ways to operate them are provided, and to launch an official educational website. The manual and the website can help DMO officials practice technologies and adopt them to their organization. An electronic version of the manual that can be downloaded from the official educational website is recommended rather than a hard copy version for two reasons: a) it provides easy access to example websites through hyperlinks, and b) given that technologies evolve rapidly, an electronic manual can be frequently updated. In addition, the educational website will provide a communication channel between instructors and DMO officials.

6 Limitations and Future Studies

In order to introduce innovative technologies to DMOs, this study mainly reviewed blogs and literature. However, other technologies useful for destination marketing are probably available. It is also possible that certain technologies that were excluded could be considered useful depending on how they are defined or which aspect of the technology is emphasized. Also, due to the small sample size, these results may not represent the situation of all tourism professionals in DMOs. Moreover, perhaps DMO officials' willingness to use presented technologies will not last or lead to real adoption of technologies for their organization because it is possible that participants were affected by our demonstration effort.

For these reasons, the following are some suggestions for future studies. First, a follow-up study should be conducted to look at actual impacts of the learning experience such things as what DMO officials do for their organisation after a workshop or what kinds of problems they encounter. A follow-up study will help determine what DMO officials need in order to use innovative technologies in their organisation. Second, the technologies used in this study should be extended to include newer and different technologies. As mentioned before, technologies can evolve quickly. Besides literature and blogs, other media such as tourism-related Web sites and technology-related newspapers can provide more information about tourism-related technologies.

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The Credibility of Online News: The Case of the Iceland Tourist Guide Association's Website and *e*-Newsletter

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Abstract

The Iceland Tourist Guide Association's website (www.touristguide.is) represents the association online. Members find the news published on the association's website and *e*-newsletter more credible than news published by the mainstream web, and print media in Iceland. The ITGA's level of news credibility was established by conducting a quantitative empirical survey among members. The outcome provides important information on which the association can build its online strategy in terms of serving the needs of its members and capitalise on the website's public relations potential.

Keywords: Tourism, journalism, news credibility, public relations.

1 Introduction

The Iceland Tourist Guide Association (ITGA) is an association of 500 professional tourist guides. In 2005 the ITGA launched a new website displaying on its front page announcements and news specific to the guiding profession, and the travel industry at large.

Computer and Internet use in Iceland is among the highest in the world. In 2008, 92 percent of the households had a computer and 88 percent of the households had access to the Internet. More than 90 percent of people in the age group 16-74 use a computer and the Internet. More than ¾ of Internet users read news online (Statistics Iceland, 2008). Research shows that Icelandic people prefer reading the news in their own native language (Aldísardóttir, 2000: 245). The most popular online news media in Iceland is mbl.is, which also scores highest in credibility. It is tempting to assume a relationship between news credibility, as perceived by users, and the popularity of news media. As a result, credibility must be the prime asset of any news media.

In terms of mass communication theory new approaches and theories are needed to define the function and purpose, and capabilities of the Internet for an association such as the ITGA. Traditionally, the mass media offered limited content that was interesting to many, whereas the Internet provides vast amounts of content that is interesting to few. The Internet provides the ITGA with an opportunity through strategic use of its website to garner credibility and goodwill with members of the travel industry and the general public at large.

The objective of this study is to establish the credibility of news published on ITGA's website and *e*-newsletter amongst the members of the association. Its outcome provides important information for the association on which to build its future online strategy in terms of how to best serve the needs of its members and capitalise on the website's public relations potential.

2 News credibility

"Credibility is, finally, all we have" – Samuel G. Freedman (2006: 84).

Credibility is often used in the same instance as other related and equally important adjectives in journalism, namely reliability and true. According to Dictionary.com, credibility means by definition capable of being believed; believable. For example, a credible statement. By definition, reliability means something that may be relied on; dependable in achievement, accuracy, honesty, etc. For example, reliable information. By definition, true means being in accordance with the actual state or conditions; conforming to reality or fact; not false: a true story.

Undoubtedly, all three terms can be used in surveys in order to probe people's perceptions of the quality of online journalism. During literature review, it seemed these three adjectives were interchangeable. For example, McQuail (2005: 200) explains what truth in journalism means and uses "reliability" in brackets.

It is hard, without specific research on people's understanding of these three adjectives in terms of journalism, to guess whether or not exchanging one of the above mentioned adjectives for another would affect the results of the empirical survey of the present study. Therefore, no attempt is made to distinguish between these three adjectives. For the sake of conformity, the adjective credibility will be used. On a final note on the definition of credibility, Sundar explained that credibility in the context of online news meant "global evaluation of the objectivity of the story" (Sundar, 1999: 380).

Credibility, when placed in context with news, usually means high-quality information, which begs the question: what is quality information? To qualify as quality information, it must be up-to-date, relevant, accurate, and understandable to the person who needs it at the time he or she needs it. Various scholars have tried to define the concept of credibility, e.g. David K. Berlo, et al. (1969/70 in Flanagin and Metzger, 2000) who suggested three scales to measure credibility: safety (safe–unsafe, etc.), qualification (trained–untrained, etc.) and dynamism (aggressive–meek, etc.). Researchers have also used the words bias, fairness, accuracy, believability, and objectivity in order to describe the phenomenon. Fogg and Tseng (1999, quoted in Fogg et al., 2002) say credibility can be defined as believability. Credible information is believable information. It is important to note that credibility is a perceived quality.

The most consistent dimension of media credibility in studies has been believability. Flanagin and Metzger (2000) investigated perceptions of Internet information

credibility in comparison to other media. They concluded that the Internet was as credible as television, radio, and magazines, but not newspapers. They found that credibility varied by medium among different types of information sought by audiences, such as news and entertainment. Respondents reported that they did not verify information found on the Internet, but this finding also varied by the type of information needed. The amount of experience using the Internet and how an individual perceived the information were associated with efforts to verify online information (Abdulla et al., 2002).

According to Fogg, the public seems to judge website information much in the same way as they judge a book by its cover – by its look: "I would like to think that when people go on the Web they're very tough integrators of information, they compare sources, they think really hard," says Fogg, "but the truth of the matter – and I didn't want to find this in the research but it's very clear – is that people do judge a website by how it looks. That's the first test of the website. And if it doesn't look credible or it doesn't look like what they expect it to be, they go elsewhere. It doesn't get a second test. And it's not so different from other things in life. It's the way we judge automobiles and politicians" (Fogg, et al., 2002).

Journalists report fairly and public relations officers represent one party and its interest. Therefore, people tend to have more faith in a story written by a journalist than by a public relations officer representing a company or an institution. This is known as journalist's privilege. "Within the new journalism on the Internet, the public relations function is an active player in reporting to narrow, specific publics as well as to general audiences" (Walsh, 2006: 384). Walsh goes on to say that there are two areas in which the public relations officer must perform correctly in order to maintain the journalist's privilege: communication abuse and fair and accurate reporting. In the first area, the advice is to treat all with respect, i.e. courtesy, and to limit the communication to narrow, specific audiences who have some direct interest in the issue. In the second area, the advice is to adhere to fair and accurate reporting to larger general publics. These findings have quite important implications for the editorial policy for the future effectiveness of the ITGA's website.

The popularity of weblogs in Iceland and elsewhere indicates peoples' need to express them selves in writing. This evolution has resulted in a phenomenal increase in content that is sometimes newsworthy. But is it really news? Michael Schudson (in Singer, 1998) began his book *The Power of News*, published in 1995, by inviting readers to imagine a world in which everyone is able to deliver information directly to everyone else through a computer, a world in which everyone can be his or her own journalist. Schudson suggests that people would quickly become desperate to figure out which sources were legitimate and would soon be begging for help in sorting through the endless information. Furthermore, he said, they would prefer to have that help come from a source that was at least relatively savvy about what all those other people were talking about, relatively nonpartisan and therefore relatively trustworthy. Journalism, in short, would pretty quickly be reinvented. The world Schudson describes is, of course, more or less the world in which we live, one in which every politician, advertiser, hobbyist, and lunatic is able to communicate with us directly

through our computers. So perhaps it is time to revisit gatekeeping theory in this new environment. Though the role is undoubtedly changing, it seems unlikely to lose all relevance any time soon (Singer, 1998).

Aside from the search engines, the most popular and widely used sites on the Web include many of those produced by employees of traditional media outlets, from CNN to USA Today to ESPN. People are even willing to pay $49 a year for access to the online Wall Street Journal. In other words, they are turning to their favourite selectors, organizers, and packagers of information – ones whose brand identity they know and, at least to some extent, trust. On the opposite side of the scale is Matt Drudge, who is the pseudonymous online scribe who boasts of having no editor. He has no credibility (Singer, 1998).

3 Research design

An online survey using the SurveyShare.com online survey tool was conducted amongst the members of the ITGA from December 20, 2006 to January 7, 2007. An e-mail was sent to 374 members, asking them to take part in the survey, and a second e-mail several days later to remind them to complete the survey.

A total of 87 members took part (23.3 percent), of which 42 percent were men and 58 percent women which reflects the gender ratio within the association. Nearly 80 percent of the subjects are between the age of 35 to 64. Age group distribution of survey subjects is balanced and it roughly reflects the observed age distribution of members in the association. Nearly 80 percent are age 35-64.

The average member in the sample visited the website 4.22 times in the month previous to the survey. If the members who never visited the website are excluded from the sample, the average use increases to 4.65 per month. The numerical value for the members' frequency of website use was calculated using this formula: [Never (number of subjects x 0) + 1-4 times (number of subjects x 2.5) + 5-8 times (number of subjects x 6.5) + 9-15 times (number of subjects x 12) + 16-20 times (number of subjects x 18.5) + 21 times or more (number of subjects x 25)] / total number of answers.

The survey reveals that nearly 7 out of 10 access the website from home, and 3 out of 10 access it from work. Only one subject reported accessing it from school (all school levels including university). Nearly 7 out of 10 visit the site 1-4 times a month. Almost 1 out of 10 did not visit the website in the month before the survey, and 1 in 10 visited the website more often than nine times during this period. Over 8 out of 10 visited the website 1-8 times in the month previous. Further, 52 percent of the members include the ITGA's website in their "favourites" in their Web browser, but none include it as their start page.

4 Credibility of the ITGA's website and *e*-newsletter

This section reflects the outcome of the online survey conducted amongst online members of the ITGA. The main finding is that the members of the ITGA perceive the news on the association's website and *e*-newsletter to be more credible than the news on other online news websites, and newspapers in Iceland.

Table 1 lists the Iceland Tourist Guide Association's website and five of Iceland's most popular news websites in descending order according to their users' perceived credibility. The table shows that the touristguide.is website scores the highest; thus its users perceive it to be more credible than the others included in the table. However, the reliability of this comparison is compromised in the case of sudurland.is, skessuhorn.is, and vikurfrettir.is because 47, 49, and 51 out of 86 respondents respectively, did not give their opinion about the sites because they chose "did not know," or "does not apply" in the survey.

Table 1. Online news media – Present survey online media credibility score.

	Online news media – Score
Touristguide.is	4.32
Mbl.is (national & local)	3.90
Skessuhorn.is (local news)	3.35
Sudurland.is (local news)	3.34
Vikurfrettir.is (local news)	3.26
Visir.is (national & local)	3.25
Average credibility score	**3.57**

Table 1 survey question: *News on the ITGA's website is credible*. The numerical value or grade for members' attitudes towards the credibility of the ITGA's website, mbl.is, visir.is, sudurland.is, skessuhorn.is, and vikurfrettir.is was calculated using this formula: [Agree (number of subjects x 5) + rather agree (number of subjects x 4) + neither agree or disagree (number of subjects x 3) + rather disagree (number of subjects x 2) + disagree (number of subjects x 1)] / total number of answers. The numerical value is on the scale of 1 to 5.

Table 2 lists the Iceland Tourist Guide Association's website, and Iceland's top three ranking news websites according to Capacent Gallup, in descending order according to their users' perceived credibility. A comparison is made between results from the present survey amongst the members of the ITGA and the Capacent Gallup media poll conducted in November 2006. The table shows that the touristguide.is website scores higher in credibility than mbl.is, ruv.is, and textavarp.is; thus its users perceive it to be more credible than the others included in the table. However, the data sets were not identical, which reduces the reliability of this comparison.

Table 2. Credibility of online news media – Present survey vs. Capacent Gallup survey.

	Online news media – Score
Touristguide.is	4.3
Mbl.is	4.2*
Ruv.is	3.7*
Textavarp.is	3.4*
Average credibility score	**3.9**

* *Capacent Gallup media poll November 2006.*

Table 3 lists newspapers in descending order according to their credibility as perceived by members of the ITGA. The table shows that the ITGA's *e*-newsletter has greater credibility than all daily newspapers in Iceland.

Table 3. Credibility of newspapers/newsletters. The ITGA's *e*-newsletter vs. newspapers in Iceland.

	Newspapers / Newsletters – Score
ITGA's *e*-newsletter	4.25
Morgunblaðið	3.84
Fréttablaðið	3.34
Blaðið	3.07
Average credibility score	**3.62**

Table 3 survey question: *News in ITGA's e-newsletter, (daily newspapers) Morgunblaðið, Fréttablaðið, and Blaðið is credible*. The numerical value or grade for members' attitudes towards the credibility of the ITGA's *e*-newsletter and *Morgunblaðið*, *Fréttablaðið,* and *Blaðið* newspapers was calculated in the same way as in table 1.

Table 4. Credibility of newspapers/newsletters. The importance of checking the author's name.

	Newspapers / Newsletters – Score in percentages
Almost always	68.60
Sometimes	19.77
Seldom	8.14
Never	3.49
Total percentage	**100**

Table 4 survey question: *How often do you check the name of authors of articles in the ITGA's e-newsletter?* Table 4 shows that the readers of the *e*-newsletter are interested in knowing who writes the articles. Almost 69 percent almost always check who wrote the article, and nearly 20 percent sometimes check it. The combined

results from the answers of those who answered "almost always" and those who answered "sometimes" mean that 9 out of 10 members do check the author's name when they read articles. Only 3.5 percent never check the name of the author.

Table 5. Credibility of newspapers/newsletters. The importance of knowing the author.

	Newspapers / Newsletters – Score in percentages
Very important	22.09
Rather important	46.51
Neutral	25.58
Unimportant	3.49
Total percentage	**100**

Table 5 survey question: *How important is it to you to know who the person is who wrote the article?* Table 5 shows that the readers of the *e*-newsletter find it important to know who the person is who wrote the article. About 69 percent of the members find it "rather important" or "very important" to know who the person is who wrote the article. Combined, this means that nearly 7 out of 10 think it is important. A quarter is neutral, while 3.5 percent say it is unimportant to them.

Cross tabulation of questions in table 4 and table 5 reveals that 95 percent of those who almost always check who the author of the article is also find it very important to know who the person is who wrote it. Likewise, 75 percent of those who sometimes check the name of the author find it important to know who wrote it.

5 *E*-newsletter's relevance to the profession

The members of the ITGA who use the website and *e*-newsletter perceive the news in the *e*-newsletter to be relevant to their profession.

Survey question: *I am satisfied with the overall content of the ITGA's e-newsletter.* The numerical value or grade for members' attitudes toward their overall satisfaction with the overall content of the ITGA's *e*-newsletters was calculated in the same way as in table 1. The calculated overall satisfaction score was 4.27 out of 5. Results revealed that 36.5 percent of the members "agreed" and 54.6 percent "rather agreed" with the statement of being satisfied with the overall content of the *e*-newsletter. The combined results reveal that more than 9 out of 10 members are satisfied with it. No members were "rather dissatisfied" or "dissatisfied."

Survey question: *I am satisfied with the usefulness of the information in the ITGA's e-newsletter.* The numerical value or grade for members' attitudes toward their satisfaction with the information value of the ITGA's *e*-newsletter was calculated in the same way as in table 1. The calculated overall satisfaction score was 4.16 out of 5. The results revealed that 34.5 percent of the members "agreed" and 53.4 percent

"rather agreed," which suggests that 88 percent of the members are satisfied. No members "rather disagreed" or "disagreed."

Survey question: *How much do you agree/disagree with the statement that the contents of the ITGA's e-newsletter deal with important issues concerning tourist guides?* The numerical value or grade for members' attitudes towards their satisfaction with the information value of the ITGA's *e*-newsletter was calculated in the same way as table 1. The calculated overall satisfaction score was 4.28 out of 5. The results revealed that 37.7 percent of the members said they "agreed" and 52.9 percent "rather agreed" that they were satisfied. Combined, this means that over 9 out of 10 think that the *e*-newsletter deals with important issues concerning tourist guides. No member said he or she was dissatisfied or very dissatisfied.

5.1 Public relations within Iceland

The members of the ITGA who use the website and *e*-newsletter perceive the *e*-newsletter to be a way to promote the ITGA to stakeholders in tourism.

Table 6. *E*-newsletter's PR potential in Iceland. Members perceived public relations potential of the *e*-newsletter within Iceland.

	E-newsletter PR potential – Score in pct.
Agree	36.47
Rather agree	44.71
Neither agree or disagree	15.29
Rather disagree	2.35
Disagree	1.18
Total	**100**

Table 6 survey question: *The e-newsletter of the ITGA serves in the interest of its members both within the organization as well others (it is sent by e-mail to public institutions, travel agents, and others).* Table 6 shows members' perceived promotion potential of the *e*-newsletter to people and organizations outside of the ITGA. Eight out of ten members agree or rather agree that the *e*-newsletter has public relations potential.

5.2 Public relations outside of Iceland

The members of the ITGA who use the website and *e*-newsletter perceive the *e*-newsletter to be a way to connect with other tourist guides worldwide and earn the association a good name abroad.

Table 7. *E*-newsletter's promotion potential outside of Iceland. Members' perceived public relations' potential of the *e*-newsletter outside of Iceland if published in English.

	E-newsletter PR potential – Score in pct.
Agree	15.29
Rather agree	32.94
Neither agree or disagree	31.76
Rather disagree	11.76
Disagree	8.24
Total	**100**

Survey question: *Publishing the e-newsletter of the ITGA in the English language can benefit the association outside of Iceland.* Table 7 reflects members' perceived promotion potential of the *e*-newsletter, if it were to be written in the English language, to people and organizations outside Iceland. Nearly half (48 percent) agree or rather agree that publishing the *e*-newsletter can promote the association outside of Iceland.

Table 8. *E*-newsletter's perceived potential to link tourist guides in Iceland with tourist guides outside of Iceland, if the *E*-newsletter were to be published in English.

	E-newsletter – Score in percentages
Agree	21.18
Rather agree	41.18
Neither agree or disagree	18.82
Rather disagree	11.76
Disagree	7.06
Total	**100**

Table 8 survey question: *Publishing the e-newsletter of the ITGA in the English language could increase communication between tourist guides in Iceland on the one hand and tourist guides outside of Iceland on the other.* Table 8 reflects members' perceived promotion potential of the *e*-newsletter to tourist guides outside Iceland, if it were to be written in the English language. A third of the members (62 percent) "agree" or "rather agree" that publishing the *e*-newsletter in English could increase communication between members and tourist guides outside of Iceland.

Further, 55 percent of the members "agree" or "rather agree" with the statement that publishing the *e*-newsletter in English would evoke the interest of tourist guides outside of Iceland, thus increasing its current readership. Also, 43 percent of the members "agree" or "rather agree" with the statement that publishing the *e*-newsletter in English could serve the common interest of tourist guides worldwide.

All results of this quantitative empirical survey should be viewed in the light of its limitations.

6 Limitations

The results of this study give only one perspective of user preferences and perception of credibility, as they depend primarily on the data set provided in the present survey and it was conduced amongst ITGA members who use the Internet. An in-depth analysis of non-users among the members of ITGA as well as members of the public would yield a more-reliable data set on which to base conclusions.

A poor response rate may have affected the outcome of the survey. First, no e-mail addresses were available for one third of ITGA's members (33 percent) as the association's records were not up to date and second, only 23.3 percent of the survey recipients replied. The low return rate may have been affected by the short answering period (19 days) or the fact that it was conducted during a traditional holiday time (December 20, 2006 to January 7, 2007).

No attempt was made to assess future technological advancements affecting the credibility of online news, or its social aspect. Similarly, no attempt was made to explore how potential users such as, travel agents, tour operators and tourists, might use and perceive the news credibility of ITGA's website.

7 Conclusions

First, members found the content of the association's website and *e*-newsletter credible. The website scored 4.32, and the *e*-newsletter scored 4.25. The website of the ITGA scores higher than the major online news websites in Iceland when compared to a recent Capacent Gallup media poll: mbl.is (4.2), ruv.is (3.7), and textavarp.is (3.4). The ITGA's *e*-newsletter scored considerably higher for credibility amongst the members of the association than any of the daily national newspapers in Iceland e.g. *Morgunblaðið* (3.84), *Fréttablaðið* (3.34), and *Blaðið* (3.07). The "knowing who the author is" variable may influence the members' perception of credibility. About 69 percent of the members "always check" the name of the author, and another 20 percent "almost always check" the name of the author. When these two answers are combined, they come close to 90 percent. Similarly, 22 percent found it "very important" to know who the person is who wrote the article, and 47 percent found it was "rather important."

Second, members found the news presented in the *e*-newsletter relevant to their profession. In total, 91 percent of the members "agree" or "rather agree" that the content is relevant to them (they are all professional tourist guides). Similarly, 88 percent of the members "agreed" or "rather agreed" that the information presented in the *e*-newsletter was useful. Finally, 91 percent perceive the *e*-newsletter to deal with important issues concerning tourist guides.

Third, members perceive the *e*-newsletter to be a medium that can serve in the interest of the association both in regard to its members as well as to individuals and organizations in Iceland.

Fourth, some members perceive the *e*-newsletter, if published in English, as a medium that can serve in the interest of the association abroad. A total of 48 percent of the members "agree" or "rather agree" with this statement, while nearly 32 percent did not make up their minds. Only about 20 percent "disagree" or "strongly disagree." Further, a total of 62 percent of the members "agree" or "rather agree" with the *e*-newsletter's ability of being able to increase communication between tourist guides in Iceland on the one hand and tourist guides outside of Iceland on the other, if it were to be published in English.

Webmaster user statistic 2005-2008 exhibits continuous increase in the popularity of ITGA's website both in terms of visits and unique users. Average visits per month in 2005 numbered 751; 1,706 in 2006; 2,522 in 2007 and 3,300 in 2008 (January-September). Average monthly unique user statistic reveals 396 unique users in 2005; 763 in 2006; 1,270 in 2007, and 1,587 in 2008 (January-September).

The steady increase in the number of unique users of ITGA's website, as well as the empirical quantitative results gained from the present survey, underpins the basic assumption that news credibility influences the popularity of a news content website. The publicity potential of the website has to some extent been achieved as it is clear that the 500 members of the association can only make up one-third of all unique visitors in 2008. This means that two-thirds are attributed to users outside of the association.

Surveying the perceptions of non-members, via online survey conducted through the ITGA's website, would yield valuable information about the non-members providing important information on which the ITGA could base its future steps in terms of its online strategy. Ongoing changes in Internet technology and the characteristics of its users will lead to new public relations opportunities for organizations such as the ITGA to garner credibility and goodwill.

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Acknowledgements

This paper reflects the results gained from research conducted in partial fulfilment of an MA degree in journalism at the University of Iceland. The chief supervisor was Mr. Thorbjorn Broddason PhD, professor in journalism and media studies at the University of Iceland. The co-supervisor was Mr. Árni Matthíasson, head of mbl.is, the online version of *Morgunblaðið* newspaper. I would like to extend heartfelt gratitude to both supervisors for their valuable input.

Travel Queries on Cities in the United States: Implications for Search Engine Marketing in Tourism

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Abstract

Given the growing importance of online search in travel planning, marketers need to better understand the behavioural aspect of travel planning using search engines. The goal of this study is to identify patterns in online travel-related queries across tourist destinations. Utilizing transaction log files from a number of search engines, the analysis indicates both commonalities and differences in online queries about different cities in the United States. The ratio of travel queries among all queries about a specific city seems to associate with the levels of "touristic" of that city. Also, keywords in travellers' queries reflect the images of the city and those of its competitors. This paper offers insights into the way tourism destinations are searched online and implications for search engine marketing in tourism.

Keywords: travel information search; travel queries; destinations; search engine marketing.

1 Introduction

The Internet has fundamentally changed the way people search for travel products. Recent research has shown that a substantial number of U.S. travellers use the Internet to plan their trips (TIA, 2005). Particularly, search has become a predominant mode of Internet use in that a substantial number of online travellers use search engines for travel planning. A survey conducted by Prophis Research and Consulting Inc. shows that 55% of online US adults who engage in personal travel use search engines to expand their "consideration set" of travel suppliers. This translates into an estimated 49 million US adults using search engines for travel in 2006 (Prophis-Research, 2007). More recently, eMarketer (2008) reported that more than two-thirds of U.S. consumers used search engines as the primary information sources for their summer vacation planning.

Within this context, search engines have become a new "battlefield" of marketing for many travel and tourism businesses, e.g. in various forms of directory listing, keyword purchasing, meta tags, sponsored links, and search engine optimization (Google, 2006; Xiang & Fesenmaier, 2006). Thus, the marketing efforts of tourism

destinations are moving towards the online world, particularly search engines. Search engine marketing (SEM) is growing much faster than traditional advertising. In 2006, advertisers in North America spent US$9.4 billion on search engines, indicating a 62% increase from 2005 and 750% increase from 2002 (Elliot, 2006). Although search engine marketing is becoming increasingly important for the tourism industry in driving the customers to their websites, little research with high relevance has been conducted on this emergent phenomenon to provide guidance for the tourism industry.

One of the conditions for search engine marketing is to understand search engine users' behaviour, particularly keywords they use to search and contexts wherein these keywords are used (Moran & Hunt, 2005). The objective of search engine marketing is, thus, to improve a Website's visibility in search engine result pages by responding to user behaviour. As such, the goal of this research is to investigate travellers' online behaviour when using a search engine for trip planning by primarily focusing on identifying general patterns in travel-related queries across tourist cities in the United States. As a result, this study offers useful insights into strategies in search engine marketing for tourism organizations and destinations.

2 Research Background

The primary task in tourism businesses' marketing and promotional efforts is to ensure relevant information is made visible and accessible to potential visitors (Werthner & Klein, 1999). Xiang and Fesenmaier (2006) argue that travellers' use of search engines can be seen as the initial step in the persuasion process for tourism organizations. Further, Kim and Fesenmaier (2008) posit that the use of search engines can have a significant impact on the formation of one's first impression toward, and subsequently the overall evaluation of, a destination marketing organization's website. As such, search engines have the potential to influence an online traveller's impression, intention, as well as attitude toward a tourist destination and its tourism-related businesses.

However, studies have shown that the visibility of many tourism business's websites to prospective visitors is diminishing. Recently, for example, Wöber (2006) found that many tourism businesses were ranked very low among the search results for travel related queries. This makes it extremely difficult for users to directly access the individual tourism businesses and properties through search engines. In another study conducted by Xiang et al. (2008), it was found that a handful of "big players" dominate search results in Google, leading to the diminishing visibility of numerous small and medium-size tourism enterprises. As such, it is increasingly important for tourism marketers to understand how travellers search information about destinations in order to improve their ranking and visibility in search engines.

As an important component in search engine marketing, search engine optimization (SEO) aims achieving a higher ranking in search engines (Pan, Litvin, & O'Donnell, 2007b). Generally speaking, when exposed to a list of search results, a number of

factors can influence the traveller's evaluation and selection of a specific search result. Particularly, the ranking of a specific search result link along with its relevancy to the search query is widely recognized as the most important factor in influencing the travel information searcher's behaviour. For example, the majority of search engine users do not look beyond the first three pages of search results (Henzinger, 2007). Also, the rank position of a specific search result has been shown to determine whether it will be reviewed and evaluated by an information searcher (Pan *et al.*, 2007a). Search engine marketing can be effective only if these factors are taken into consideration.

Understanding search queries provides the foundation for strategic response to market change through search engines. Studies in information science and related fields have focused on the characteristics of search engine queries, such as the length and depth of search, types of search, and changes of search characteristics over time (Jansen & Molina, 2006). A study of Excite search engine log data in 2001 on geographic searches found that 14.8% of searches are related to place names (Sanderson & Kohler, 2004). Another study on search engine log data in Yahoo revealed that searches on places mainly focus on city (84%), country (14%), and state (3%) (Jones *et al.*, 2006). In the tourism field, Pan and his colleagues have revealed the characteristics of hotel queries (2007b). One conclusion of their study is that searchers usually focus on cities as the geographical boundary, instead of states or countries. For example, a search for a city combined with a specific hotel or a hotel brand is one of most common queries that occur when travellers perform accommodation-related queries (Pan et al., 2007b). More recently, Xiang *et al.* (forthcoming) examined travel queries related to specific destinations and their study shows that, while there is a "long tail" of keywords indicating travellers' individual information needs, a considerable number of keywords are commonly shared by travellers when seeking information about the destination.

While these studies generated useful insights into the nature of travel queries on the Internet, they are limited in their scopes of analysis. Specifically, Pan *et al.* (2007b) only examined one sub-domain of tourism, that is, the lodging sector. The Xiang *et al.* (forthcoming) study, while covering the industry sectors in a more comprehensive way, solely focused on one city as a tourist destination. As such, the generalizability of these studies is limited. In particular, because there is no comparison across different destinations, these studies are limited in providing useful insights into issues, such as how tourism destinations can utilize this knowledge to improve their marketing programs through search engines.

3 Research Questions

In order to develop successful search engine marketing strategies, tourist destinations must understand what online travellers are searching for as well as what destinations they are competing with. With this in mind, three research questions were formulated: 1) What keywords/phrases do travellers use to form queries to search for information about cities in the United States? 2) What are the commonalities and differences in

keywords used to search for those cities? And, 3) How these keywords are associated with those cities?

4 Methods

Research methods employed in this study consisted of a series of text analyses performed on user queries extracted from a number of transaction logs from search engines including Excite (1997, 1999, and 2001), AllTheWeb (2001 and 2002), and AltaVista (2002). These search engines were selected because they shared the same user interface typical for a mainstream search engine. That is, like today's Google, these search engines all employed a textbox to allow users to enter search queries while also providing search results in a list format. Although these transaction logs were fairly dated, they were considered appropriate sources to understand search behaviour, because search engine queries have not changed drastically in the past, particularly in the number of words searchers used to form queries (Jansen & Molina, 2006).

As a general practice, search engine transaction files usually record a number of fields including the user query (i.e., the keywords/phrases a user types into the search box), the time stamp, the user's IP address, and links which the user clicked on. While this research focused on the user queries that were recorded in these transaction logs, other types of information such as time stamps and IP addresses were also used to infer about searching sessions for a specific individual user. In this research, as suggested by Spink *et al.* (2002), search keywords were defined as strings of characters with no space in-between; the combination of keywords typed by a user defined a search query; and user sessions were sequences of search queries in which the time between any two consecutive queries was less than one hour. Table 1 provides an example of a user search session (Pan et al., 2007b).

Table 1. An Example of a User Search Session

Query ID	User Session ID	Time	Query Keywords
50000	0000000000000283b	192749	orlando motel hotel
50101	0000000000000283b	194447	crestwood
50102	0000000000000283b	194831	crestwood hotel
50103	0000000000000283b	195826	crestwood hotel orlando
50104	0000000000000283b	200749	crestwood orlando hotel

Specifically, data analysis involved three steps. The first step involved identifying travel queries. In order to establish the validity of the study, one of the key considerations in this analysis was to determine, among millions of search engine transaction records, which queries were indeed travel related queries. A set of tourist destination names (e.g., "New York City" and "Chicago") were used as the "seed" words to extract all the queries containing these destination names. In order to represent tourist destinations in a more comprehensive way, three-tiers of urban

destinations, small cities, medium-sized cities, and large cities in the United States were selected based upon their 2002 populations. These queries were then grouped together by unique sessions. In total, there were 54,840 queries and 13,649 query sessions which contain the names of those 18 cities. Among them, many were about travel, consumer products, pornography searches, and other. Two content coders were hired to determine whether a specific query (e.g., "Chicago museums") should be considered a travel query within the context of one search session. Inter-coder reliability was checked using Krippendorf's Alpha (2004), which was .86, indicating there was a high level agreement between the two coders. The researcher then went through those queries in disagreement and assigned them as either travel-related or non-travel-related according to the session contexts. In total, 5,032 travel search sessions and 19,016 travel queries were identified.

The second step of analysis aimed at identifying keywords in query sessions for those cities. Data mining software CATPAC (Woelfel, 1998) was used as the main tool to calculate word frequencies because of its capabilities that allow the researcher iterate through the data set easily. A number of important decisions were made in this process: first, certain keywords were stemmed (e.g., converting "parties" into "party") and tokenized (e.g., converting "bread breakfast" and "bread and breakfast" into "bnb"). Second, stop words (e.g., "the", "a") were identified and dropped from the analysis because they do not add meanings to search queries. Third, destination specific words were also dropped, because they do not provide the ground for comparison between destinations. After the data were "cleaned", the number of queries was calculated for each of the pre-identified cities and plotted against their 2002 population to see if there was any relationship.

The third step aimed at examining the associations between common keywords in travel queries and destinations. This was achieved using correspondence analysis based upon a co-occurrence matrix of destinations and keywords. The top 10 destinations with the highest number of travel queries were selected. Also, the top 60 keywords were used because their total frequencies represented approximately 45% of the total frequencies of all unique words. All the query sessions were manually examined to make sure extreme cases were not included and overrepresented. For instance, because the word "gift" occurred more than 50 times in several query sessions about New York City from a single IP address, those specific query sessions were dropped from the analysis. In addition, each unique word was calculated only once when building the co-occurrence to control the effect of potential overrepresentation of certain keywords (some sessions may contain the same keywords multiple times and, sometimes, within the same query). Scripts written in Perl programming language were used to calculate the frequencies of co-occurrences, and correspondence analysis was conducted to examine the association between keywords and destinations based upon the 10 by 60 matrix.

5 Results

The findings of this study are presented in three sections: the first section provides the descriptive statistics on travel related query sessions among all search engine queries, especially on the ratios of travel query sessions among all sessions for all the cities; the second section shows the keywords identified in travel queries with the emphasis on the most frequently used keywords; and, the third section provides the results of the correspondence analysis to show the association between keywords and destinations.

5.1 Identifying Travel-Related Query Sessions for Destinations

Table 2 lists the number of travel query sessions for the pre-identified 18 cities in the United States. These cities were categorized into three tiers: Small Cities (with population less than 150,000), Mid-Sized Cities (with population between 150,000 and 700,000), and Large Cities (with population more than 700,000). As can be seen, a number of cities, including Las Vegas, Chicago, Orlando, and New York City, stood out as the ones with large numbers of travel related queries. Cities such as Americus, Aiken, and Bradenton almost did not attract any travel related queries. The ratio of travel related queries over all queries was also calculated. Interestingly, it seems that this ratio reflects the degree of "touristic" of a city, i.e., the status of being a tourist destination, which is not necessarily related to the size of the city. For example, the travel query ratio for the small city Myrtle Beach is extremely high, while that for a big city like Dallas is fairly low compared to other cities with similar population.

Table 2. Number of Travel Query Sessions for 18 U.S. Cities

Destination Category	City	Num of Travel Query Sessions	Number of Non-Travel Query Sessions	Ratio of Travel Query Sessions	2002 Population
Small Cities	Americus	0	5	0	16,955
	Myrtle Beach	183	87	0.68	24,832
	Aiken	1	34	0.03	26,620
	Bradenton	0	29	0	51,458
	Champaign	11	65	0.14	71,987
	Pueblo	34	81	0.30	103,679
Mid-Sized Cities	Chattanooga	31	77	0.29	156,067
	Orlando	554	485	0.53	197,058
	Las Vegas	1,997	774	0.72	507,461
	Fort Worth	35	111	0.24	569,747
	Baltimore	169	459	0.27	636,302
	Memphis	112	307	0.27	676,323
Large Cities	San Francisco	469	1205	0.28	763,400
	Indianapolis	82	321	0.20	782,538
	San Jose	123	351	0.26	898,713
	Dallas	248	1530	0.14	1,205,785
	Chicago	640	2060	0.24	2,889,446
	New York City	343	636	0.35	8,106,876

To further illustrate this point, the number of travel related queries was plotted against its 2002 population in a 2-dimensional space (Figure 1). Obviously, the number of travel queries is positively related to the status of the cities as a tourist destination, in other words, how "touristic" the cities are. There are no search queries for some small cities which have little tourist content, for example, Americus or Bradenton. This graph clearly indicates Las Vegas, Orlando, Myrtle Beach, located in the upper-left half the graph, are the most "touristic" cities, with Las Vegas being the extreme case. For example, Orlando, as a mid-sized city, also enjoys a high level of being "touristic" with almost equivalent number of travel query sessions with those of San Francisco, Chicago, and New York City. However, on the other side, cities like New York, Fort Worth, and Indianapolis seem to be less "touristic" with disproportionate low number of travel related queries compared to their large populations.

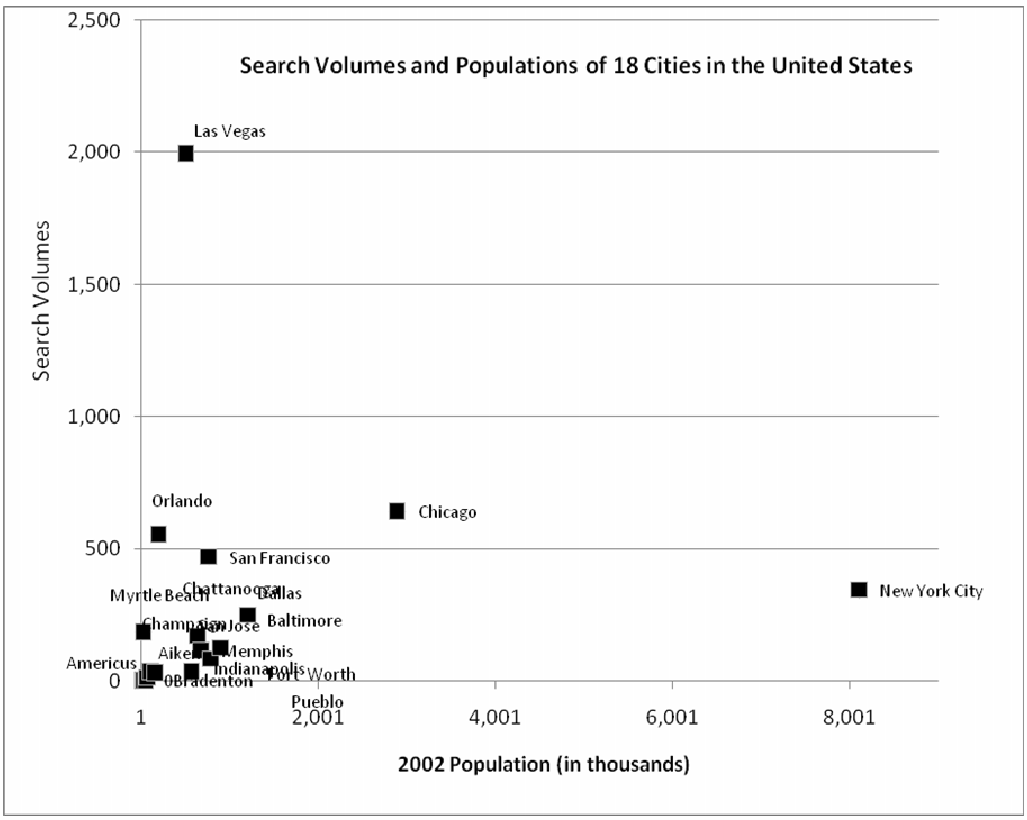

Fig. 1. Relationship between Volumes of Travel Query Sessions and Destinations

The above results show the connections between the volume and the ratios of travel queries to the tourism economy of a specific city. For a city which is largely depending on tourism industry, the ratio and volumes of travel queries will be much higher than other non-touristic cities.

5.2 Identifying Keywords in Travel Related Search Queries

After discounting stop words and destination specific words, there are, in total, only 372 unique keywords in identified travel related queries. This indicates that travellers tend to use very similar keywords to form their queries. Also, the cumulative frequencies of the most frequently used keywords constitute large proportions of all the unique keywords. For instance, the top 30 most frequently used keyword represent approximately 35% of the total frequency of all unique keywords; the top 40 approximately 40%; the top 60 approximately 45%. As reflected in previous studies (Pan et al., 2007b; Xiang et al., forthcoming), this indicates that travellers have a lot in common when they search for tourism products online.

Among all the 18 cities, "hotel" stands out as the most searched keywords. The volume for "hotel" is almost three times than the next keyword "airport". "Airport", "casino", and "beach" all appear more than 300 times. Following those keywords are some general travel related keywords, such as map, vacation, travel, park, and specific destinations, such as "Disney World". Interestingly, "restaurant" has only been searched around 100 times, much less than other aspects of the trip. The results indicate that accommodation and transportation are most searched aspects of a trip, followed by attractions. Dining and shopping are a lot less frequently searched. Due to space limit, the top 30 keywords are listed in Table 3.

Table 3. Top 30 Most Frequently Used Keywords in User Queries

Keyword	Frequency	Keyword	Frequency
hotel	1,144	park	112
airport	394	resort	108
casino	347	restaurant	106
beach	320	art	98
Map	173	international	91
vacation	170	ticket	89
basketball	159	discount	88
disney world	138	golf	83
shuttle	138	club	73
volleyball	135	motel	68
show	128	picture	68
museum	127	rental	66
football	121	theatre	64
airline	118	bar	60
travel	117	entertainment	60

5.3 Associations of Keywords with Destinations

A correspondence analysis was conducted to examine the associations between search keywords and the city names in travel queries. The co-occurrence between those keywords and cities names was used to measure the level of associations, and a co-occurrence matrix was constructed using the top 60 keywords and top 10 city names. The results (Figure 2) clearly indicate that destinations are associated with certain keywords which travellers tend to use, reflecting travellers' knowledge and image about the cities as well as the competing space for certain destinations. It seems that these 10 destinations can be roughly grouped into three clusters in terms of the ways they are related to these keywords in a two dimensional space. The first type is Las Vegas, which is more closely associated with "show", "casino", "palace", and "entertainment". The second type is Orlando, which is highly associated with "disney world", "camp", "shuttle", and "airport". The third type, including cities such as Chicago, San Francisco, New York City, Dallas, Myrtle Beach, San Jose, Memphis, and Baltimore, are all large or medium-sized cities with similar attractions, for example, museum, art, history, festival, and events. Thus, they are clustered together on the map.

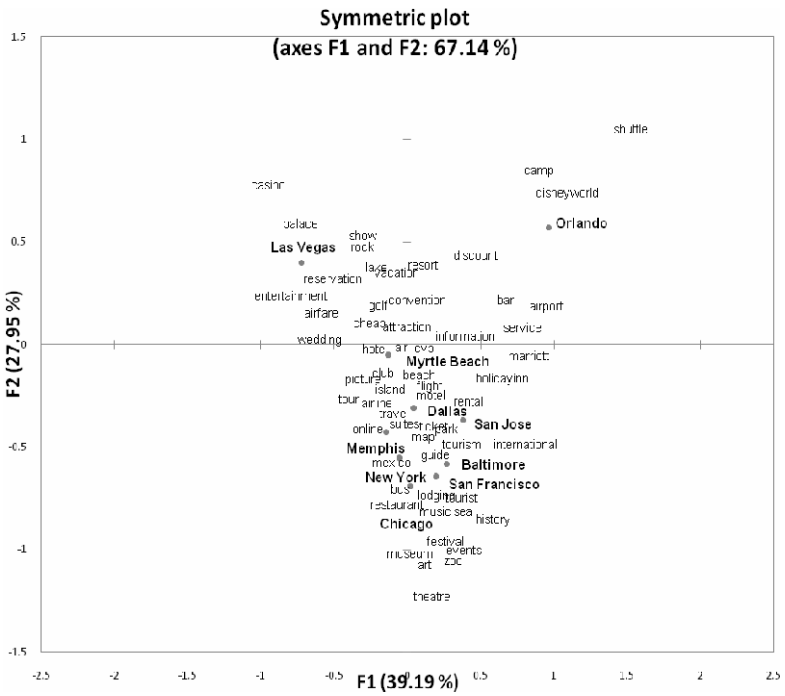

Fig. 2. Correspondence Map of Association between Keywords and Destinations

To further show how these destinations are similar to, and different from, each other, the top search keywords for the 18 destinations were identified and presented in Table 4. Due to the limitation of the space, the top keywords for seven cities were listed. Please note that the numbers of top keywords are differnet for each city, since only keywords with equal number of frequencies were kept. The first observation on these

keywords is that "hotel" is the most seached one across all the cities except in the case of Myrtle Beach; the second observation is that other top keywords are different from each other – from "casino" in Las Vegas, to "golf" in Myrtle Beach, and "museum" in Chicago. Thirdly, it seems that, for those tourist cities, such as Las Vegas, Orlando, and Myrtle Beach, there are more searches on their specific attractions; for the large cities, such as New York City, Chicago, and San Francisco, there are more searches on the location, transportation, map, and general attractions (park, museum, city, etc.).

Table 4. Top Queries for Different Cities

Las Vegas	**Orlando**	**Myrtle Beach**	**New York City**	**Chicago**	**San Francisco**	**Pueblo**
Hotel	Hotel	South Carolina	Hotel	Hotel	Hotel	Hotel
Casino	Airport	Golf	New York	Art	California	Colorado
Miami	Florida	Resort	Map	Museum	Bay	Puerto Rico
Nevada	Shuttle	Hotel	Museum	Illinois	Airport	Bonito
Show	Disney World	Beach	Park	Airport	Area	Mexico
Vacation	Credit	Vacation	City	City	International	Resort
Paris	Furniture	Rentals	Vacation	Restaurant	City	Anasazi
Entertainment	Office	North	Guide	Theatre	Map	Castles
Travel	Discount	Courses	Manhattan	Institute	Sea	Indians
City	Vacation	Motel	Restaurant	Map	Tourist	Wireless
Circus	Used	Ocean	Lawyers	Airline	Travel	Beach
Palace	Repair	Spas	Dallas	Park	Lions	Elisa
Airline	New Orleans	Casino	Rentals	Cleveland	Restaurant	Magellan
Hilton	Las Vegas	Inn	Attorneys	Travel	Ticket	Pacheco
Packages		Airport	Brooklyn	American	Theatre	Rentals
Golf		Club	Bus	University	Art	Techpoint
		Dunes	History	Budapest	Bar	Vail
		Map	Philadelphia	Ticket		York
			Resort			

6 Conclusions

The volume of searches may indicate how "touristic" cities are, though more analysis needed to be done on more cities in the United States. The study shows the interesting relations between the ratio of travel queries (i.e., volume of travel queries to volume of all queries about a city) and city population: the more "touristic" a city is, the more likely there are higher percentages of travel queries. It makes intuitive sense in that in those cities, more travellers will search for those cities, compared to the residents in that city. The travel search volume apparently reflects the size of tourism industry. Thus, there seems to be a direct link between search engine economy for travel with the tourism industry.

The results of the study indicate the commonalities and differences of queries for cities in the United States. In general, there are a relatively small number of keywords commonly used by online travellers to look for information about these destinations. Accommodations and transportations are the most searched ones. For large cities, searches for transportation, maps, parks, and attractions and other general keywords dominate travel queries; for tourist cities, more searches are focusing on specific attractions on those cities. In addition, there are strong associations between keywords used by online travellers and specific destinations due to the knowledge and image pertaining to a specific destination. Using correspondence analysis, the results indicate that those cities can be distinguished by the activities they offer and their "touristic" level.

7 Implications

This study revealed the general patterns in travel related queries in search engines, and it offers several useful insights into search engine marketing for tourism organizations and destinations. First, this study demonstrates that, when destination marketing organizations are conducting search engine marketing campaigns, accommodation related keywords will be the most important choice. Second, it clearly shows that different types of cities may need to adopt different strategies. For example, large scale and non-tourist cities need to focus more on functional searches on transportation, map, and general keywords on attractions; more "touristic" cities (e.g., Las Vegas, Orlando, and Myrtle Beach) can focus on keywords on specific attractions and their tourist highlights. Third, the analysis of query keywords in their associations with destinations revealed the competing space for certain tourist destinations. Particularly, for metropolitan cities with historically and naturally endowed resources there are potentially a large number of destinations with similar products. These destinations need to identify ways to better position themselves in the search engine market. Furthermore, due to possible links between the volumes of search and the tourism economy, tourist destinations and DMOs need to track and monitor search volume carefully. To accomplish these goals, certain tools must be developed to allow tourism organizations to keep track the dynamics in online search market, particularly the use of keywords in the competing space, in order to effectively respond to market change.

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E-Business Readiness, Intensity and Impact - An Austrian Hotel Study

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Abstract

ICT impact studies typically disregard infrastructural, organisational and environmental factors responsible for e-Business adoption. The paper presents an approach which shows how contextual factors determine both e-Business adoption and impact, respectively. The research is grounded in Innovation Diffusion Theory and is empirically based on surveys undertaken in the Austrian hotel sector. By referring to Zhu and Kraemer's (2005) e-Business impact model the approach elucidates how the use of e-Business applications affects the performance of hotel businesses. Data gathered in the course of an online survey is analysed by linear structural equation models.

Keywords: E-Business adoption, ICT impact, hotel sector, technology diffusion

1 Introduction

E-Business is defined as the totality of an organisation's computer supported external and internal business processes (e-Business Watch, 2006, p. 191). With the exception of only few studies (Dedrick et al., 2003; Zhu et al., 2005) e-Business adoption studies typically don't allow clear assertions about ICTS' impact on business success. This paper proposes an approach which shows how the use of e-Business applications is determined by contextual adoption factors and, subsequently, affects the company's performance. The research is grounded in Innovation Diffusion Theory (Rogers, 2003) and is tested by data gathered in 2008 from the Austrian hotel sector. The paper is structured as follows: Section two delivers an overview of methodologies for explaining and measuring e-Business adoption behaviour. Referring to Zhu and Kraemer (2005), section three introduces a framework which combines e-Business adoption measurement with an impact measurement approach comprising both growth and efficiency gains as well as quality improvements of stakeholder relationships. The section also discusses the research design. In section four, after

presenting descriptive results, the measurement models are validated by confirmatory factor analysis. Subsequently, the partial models are interlinked by a linear structural equation modelling approach. The conclusion section summarizes the results and sketches future e-Business diffusion and impact research in tourism.

2 E-Business Adoption and Diffusion

According literature the decision to adopt and use technological innovations within organisations is determined by technological, environmental and adopter specific factors, respectively. For instance, Tornatzky and Fleischer's (1990) Technology-Organization-Environment (TOE) framework ascertains that contextual factors determine adoption behaviour (e.g. the organisational context considers firm size, leadership structures and resource availability, etc.; the environmental context considers the pressure from competitors and customers to adopt new technologies). According to Iacovou et al. (1995) technology adoption is particularly determined through individually recognized advantages from technology employment and through stakeholders' technology needs. A further research vein is bearing on the Technology Acceptance Model (Davis 1989) focusing particularly on decision maker's attitudes (e.g. innovation propensity, skills, etc.). Accordingly, adoption behaviour is influenced by the individual's intention to use a technological system which, in turn, is determined by the perceived usability and utility of that system. TAM has been successfully employed in combination with TOE (Kuan & Chau, 2001; Xu et al., 2004). Similarly, according to Innovation Diffusion Theory (IDT) individuals shape certain attitudes towards a technology which subsequently dominate adoption behaviour (Rogers 2003). If the innovation is perceived as being 'better' than the existing system (relative advantage), easy to apply as well as compatible with existing systems and users' expectations (compatibility), then positive attitudes will arise. As a consequence, it is likely that the adoption decision will be made in favour of the new technological system.

To summarize, adoption research is dealing with behavioural aspects of the adopting individual (*micro level*). By contrast, technology diffusion research identifies the spreading of new technologies at the industry (*macro*) level (Cooper & Zmud, 1990). Diffusion studies further deal with dynamic aspects allowing the early recognition of eventual technological leaps. By accumulating the number of adopters over time the position on the technology life-cycle of a certain e-Business application can be detected on the S-shaped technology diffusion curve (Rogers, 2003). Accordingly, during initial life-cycle phases, decision makers (i.e. innovators and early adopters) ask for information concerning use limitations or infrastructural preconditions. Later on, 'early majorities' require information concerning the volume and nature of electronic transactions in certain economic branches (i.e. benchmarks). Finally, during the mature stages decision makers (i.e. late majorities and laggards) are particularly interested in the typical outcome generated by e-Business applications (WPIIS 1999). It is this management information which Colecchia (1999) provides via her e-Business indicator framework. Accordingly, readiness indicators are interpreted as contextual factors standing behind the technology adoption decision as delineated by the TOE framework (e.g. the technological, economic and social infrastructure,

respectively). Intensity indicators measure usage, volume and the nature of electronic Business transactions. Finally, impact indicators describe '(…) differences made by e-Business applications in terms of efficiency or the creation of new sources of wealth (…)' (Colecchia, 1999, p. 4).

3 E-Business Intensity-Readiness-Impact Framework

Based on the discussed literature, Zhu and Kraemer (2005) introduced an extended e-Business impact model. Their framework integrates adoption measurement with an impact measurement approach comprising growth and efficiency gains as well as quality improvements of stakeholder relationships. In doing so, their model interlinks the widespread universal TOE framework emphasizing technological, organisational and environmental determinants of ICT adoption (e-Business Readiness) with the level of ICT use (e-Business Intensity) and the ICT value induced by various e-Business applications (e-Business Impact). Value creation is defined as positive company effects on both internal operations and external procurement processes (i.e. efficiency driven) and on sales processes (i.e. driven by growth or improved quality of stakeholder relationships) (Wu et al. 2003; Zhu & Kraemer 2005). Based on these considerations the model in Figure 1 is proposed.

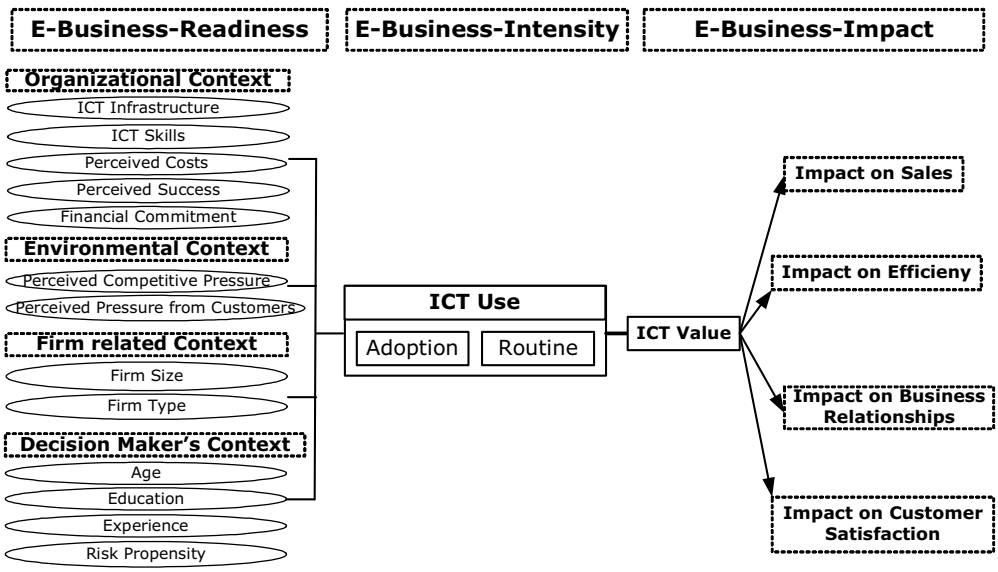

Fig. 1. E-Business Intensity-Readiness-Impact Framework (Source: Adapted from: Zhu & Kramer, 2005)

To validate their model in the retail industry, Zhu and Kraemer (2005) employed factor and multiple regression analyses, respectively. In contrast, the model proposed in this paper is tested by structural equation models based on data gathered from the Austrian hotel sector. Readiness indicators are modelled according to the TOE framework as employed by Xu et al. (2004) concluding: '(…) our study demonstrates

the usefulness of the TOE framework for identifying facilitators and inhibitors of e-business adoption (…)' (ibid 2004, p. 14). However, since the study aim is to explain usage intensities of various e-Business applications in the hotel branch, the indicators are kept as general as possible.

Furthermore, Kuan and Chau argue (2001, p. 507): '(…) The perception-based model using the TOE framework is a useful approach for examining factors affecting the adoption decision (…)'. Accordingly, the research is based on characteristics of e-Business applications subjectively perceived by Austrian hotel managers. With respect to the *organizational context* ICT infrastructure is defined by the organization's technological base equipment and is measured by the manager's perception on how strongly organisation processes are supported by ICTS. In addition, the availability of a modern ICT infrastructure is recorded. ICT skills describe both personnel's and managers' computer competencies and experiences as well as the degree of how much the management supports the implementation of ICT investments and is measured on a subjective scale. Similarly, the assessment of how much costs would potentially increase due to eventual ICT implementations and operations as well as related training measures is gathered on a perception base (Moore & Benbasat, 1999). Also the financial success dimension is measured by individually expected profitability gains as well as general cost reductions through ICTS. According to Iacovou et al. (1995) the *environmental context* is operationalized, on the one hand, by the expected decline of the competitive position due to an absence of actually used e-Business applications and by the amount of strategic information obtained from ICT systems. On the other hand, stakeholders' pressure is measured by perceived expectations of tourists and business partners to use latest e-Business applications in the hotel. With regard to the *firm related context*, the considered firm types are hotel chains, family-owned hotels, pensions, guesthouses and farm holidays. Hotels are further categorized as 0/1/2/3/4/5-star hotels. Finally, according to Grandon and Pearson (2004) *decision maker's context* is measured by age, highest education, years in the same position as well as by the risk propensity. The discussed e-Business Readiness indicators are based on a 6-point scale (1 = completely agree, 6 = completely disagree). Furthermore, data on perceived usage intensity is collected with respect to following e-Business applications typically employed in hotel businesses and discussed in the literature (Go, 1992; Werthner & Klein, 1999; Gretzel & Fesenmaier, 2001a/b; Buhalis, 2003; Fesenmaier et al. 2004):

- Property Management System (PMS)
- Enterprise Resource Planning System (ERP)
- Yield Management System (YMS)
- Intranet (INTR)
- Costing & Accounting System (CAS)
- Electronic Customer Relationship Management System (CRM)
- E-Mail-Marketing (e.g. newsletters) (EMM)
- Personnel Information System (PIS)
- Websites with booking functionality (WBOOK)
- Online Procurement (PROC)
- Online Platforms (OPLA)

Again, hotel managers indicate usage intensity of employed e-Business applications on a 6-point scale (1 = regularly used, 6 = not available at all). Thus, next to the degree of routine it is possible to record the adoption status by the same item. Finally, impact on efficiency is measured by experienced cost savings with both internal, marketing and procurement processes, respectively as well as by the experienced increase of labour productivity. Sales impact is measured by the experienced increase of the booking rate and by the number of new guests, respectively. The impact on the quality of stakeholder relationships is considered through the experienced improvement of relationships with business partners and suppliers. Finally, impact on customer satisfaction is measured by the experienced improvement of guest satisfaction and guest relationships. Impact evaluation is similarly coded on a 6-point scale (6 = completely agree, 1= completely disagree). After conducting pre-tests with six hoteliers an online survey took place during the period between January and March 2008 by addressing the managers of 3,600 hotels from the whole of Austria.

4 Empirical Findings

A totality of 723 completed questionnaires (i.e. 20%) equally distributed over the whole of Austria returned. Participating managers are between 31 and 50 years old and are, anyhow, averagely 11 years in the same leading position. Typically for the small-scaled hotel industry the sample comprises 95% family-owned businesses and only 1% chain hotels. Average firm size stands at 14 full-time employees. However, only 2.5% show more than 50 employees. The typical hotel company adopts 4.5 computers, usually all connected to the Internet. 87% of the managers responded that ICT supports important business processes (%s are stemming from cumulated scale values < 4). Furthermore, 83% confirm the availability of a modern and effective ICT system and 57% are in the process of disposing their own ICT specialists. About 70% are claiming that the level of ICT skills of their personnel would be sufficient. However, 71% of the managers agree that e-Business applications provoke high implementation cost and 48% assume high operation cost. The majority of hotel managers (i.e. 57%) dispose over an ICT budget below € 2,000 per year. Only 5% show budgets amounting above € 10,000. With respect to the environmental context, 95% of the managers agree that e-Business applications are indispensable for remaining competitive in the future. Furthermore, 78% declare that final customers (i.e. tourists) expect from the hotel to adopt latest e-Business applications. Similarly, 71% consider that business partners (e.g. DMOS) strongly demand latest e-Business applications from the hotel company.

Tab.1 displays the adoption share for the e-Business applications under study. Online platforms and online procurement emerged as the most often adopted e-Business applications. A relatively high share is similarly obtained for E-Mail-Marketing. Furthermore, the majority adopted a property management system, an electronic costing and accounting system, a website with booking functionality as well as applications supporting customer relationship management. However, only half of Austrian hotels use an Intranet and only about 40% employ yield management, enterprise resource planning or personal information systems, respectively. In addition, subjectively assessed usage intensities are displayed by corresponding mean

values. As can be seen from Tab. 1, with the exception of online procurement, e-Business Intensity strongly correlates with the share of e-Business adoption.

Table 1. E-Business Intensity: Adoption and Usage Intensity among Total Sample

e-Business Application	Adoption Share	Usage Intensity (Mean)
Distribution via Online Platforms (OPLA)	96%	1.85
Online Procurement (PROC)	88%	3.21
E-Mail-Marketing (EMM)	87%	2.73
Property Management System (PMS)	78%	2.37
Costing & Accounting System (CAS)	78%	3.14
Websites with booking functionality (WBOOK)	68%	2.99
eCustomer Relationship Management (CRM)	67%	3.08
Intranet (INTR)	50%	4.00
Yield Management System (YMS)	42%	4.71
Enterprise Resource Planning System (ERP)	41%	4.86
Personal Information System (PIS)	40%	4.76

Finally, from Fig. 2 can be deduced that Austrian hotel managers experience relatively strong economic impacts generated by e-Business applications.

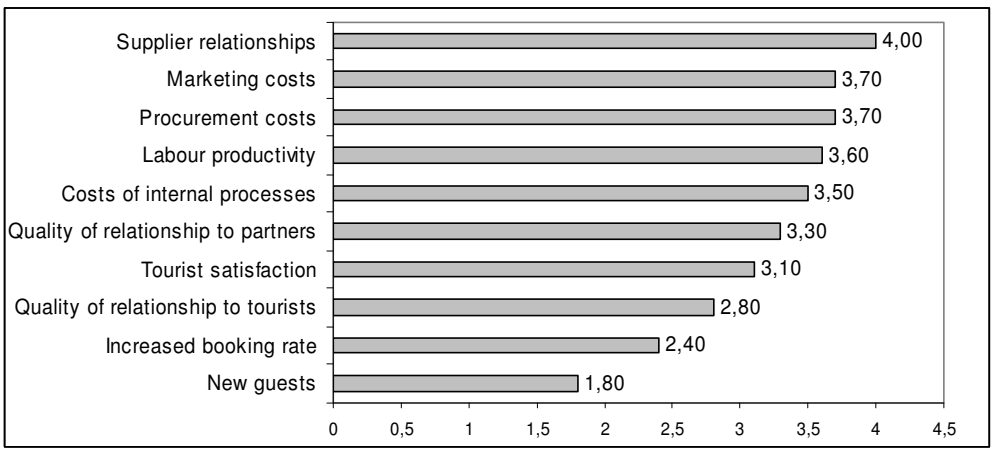

Fig. 2. e-Business Impact for Total Sample

Before going on to explore expected dependency structures within the e-Business Intensity-Readiness-Impact Framework, confirmatory factor analysis is carried out to evaluate construct validity. As both sample size, number of Likert categories and multi-normality satisfies minimal requirements, *maximum likelihood estimation* was used (Hair et al. 2006). To start with the e-Business Readiness model the model fits data well. Both, AGFI and RMSEA are scoring at .936 and .052, respectively. Other fit measures (e.g. CFI, $\chi 2/df$) and construct reliability further approve the model. Finally, all factor loadings are significant (Fig. 3).

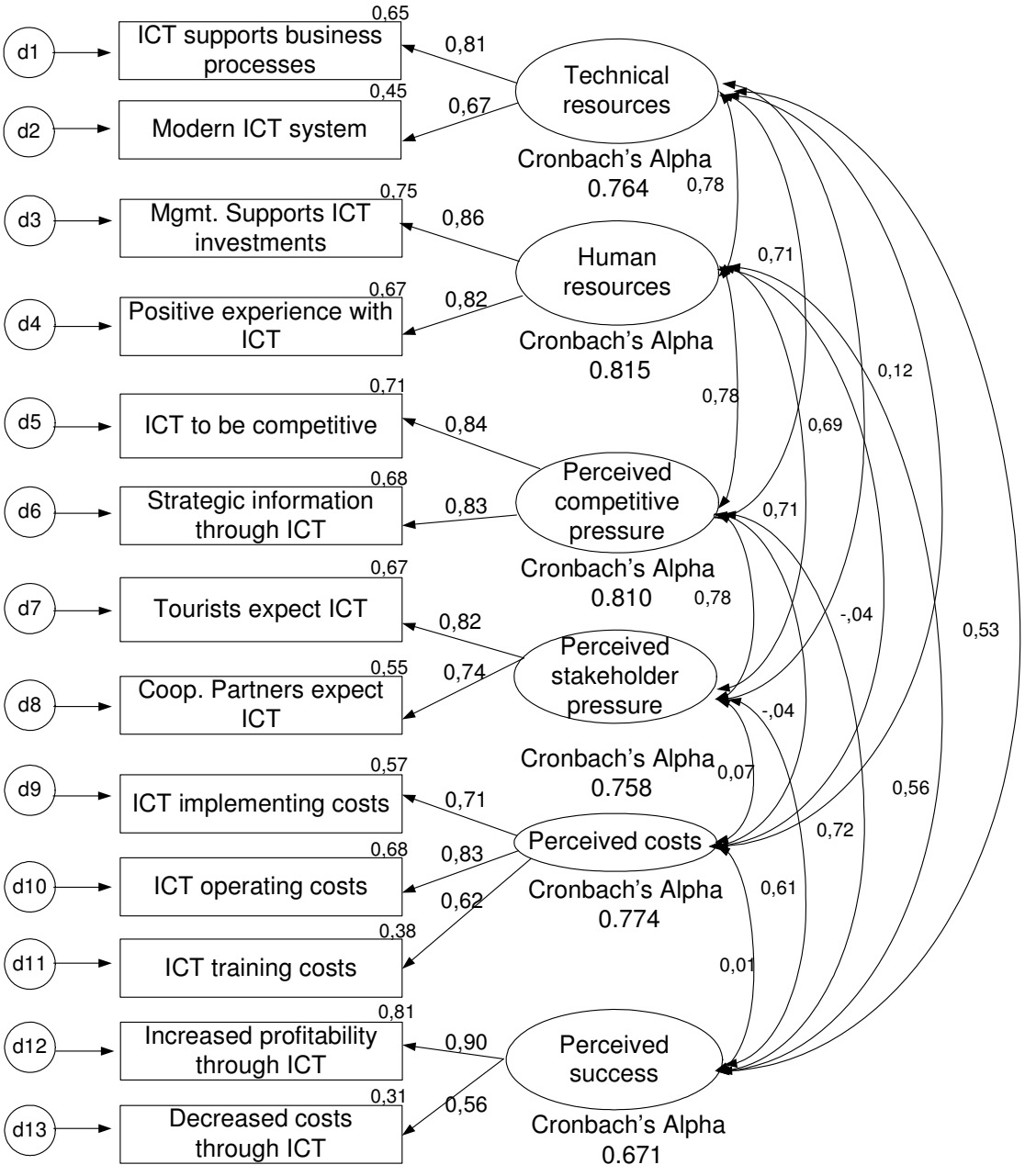

Fig. 3. Validated e-Business Readiness Model

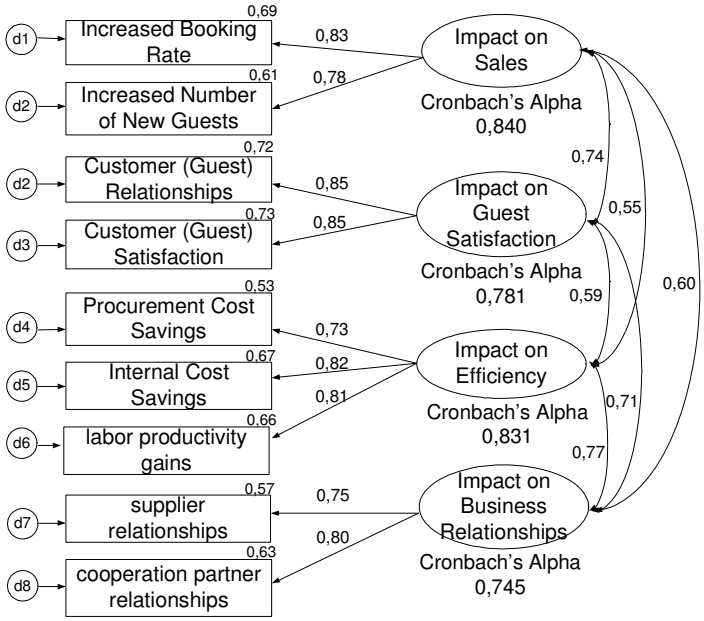

Fig. 4. Validated e-Business Impact Model

After extracting one indicator, also the e-Business Impact model fits data very well. Both, Adj. Goodness of Fit Index (AGFI) and Root Mean Squared Error of Approximation (RMSEA) are scoring at .962 and .050, respectively. All other fit measures (e.g. CFI, $\chi 2$/df) and Cronbach Alpha approve the model and rank above recommended thresholds (Hair et al., 2006).Sample size for 1/2 star hotels stands at n = 88. Thus, SEM runs are conducted only for 3 (n = 367) and 4/5-star hotels (n = 268), respectively. To start with the 3-star segment, the human resource factor (i.e. measured in terms of managerial support and positive ICT experiences) emerged as the main usage determinant for five e-Business applications, namely for enterprise resource planning, yield management, customer relationship management, personal information and online procurement systems, respectively (Tab. 2). Average explanation power stands at R^2 = .84. Furthermore, stakeholder pressure (i.e. measured by tourists' and cooperation partners' ICT needs) strongly influences the use intensity of E-mail Marketing, Intranet, property management systems, websites with booking functionalities as well as distribution via online booking platforms (Tab. 2). Average explanation power stands similarly high at .78. Finally, the financial success factor emerged as main usage determinant for costing and accounting systems. With regard to e-Business impact, the Austrian 3-star hotel segment particularly realizes sales increases (i.e. measured by the perceived increase of the booking rate and the number of new guests). The top four e-Business applications mostly affecting sales improvements are online platforms, websites with booking functionalities, property management systems and E-Mail Marketing (Tab. 2). Efficiency gains in the Austrian 3-star hotel sector are, however, only obtained by costing and accounting systems. Interestingly, in the eyes of the hotel managers,

neither guest satisfaction nor the quality of business relationships can be improved by e-Business applications (Tab. 2).

Table 2. Summary of results from linear structural equation models

e-Business Readiness-Intensity-Impact 3-star hotels (n = 367)											
Readiness	**EMM**	**ERP**	**INTR**	**CAS**	**CRM**	**PIS**	**PMS**	**YMS**	**WBOOK**	**OPLA**	**PROC**
Tech. Res.											
Hum. Res.		.980			.830	.860		.933			.899
Comp. pressure											
Stakeh. pressure	.910		.967				.892		.878	.764	
Perceived costs											
Financial success				.830							
Intensity (R^2)	.828	.961	.936	.689	.806	.740	.795	.870	.770	.584	.808
Sales	.829	.676	.780		.737	.770	.846	.711	.863	.996	.735
Adj. R^2	.687	.457	.608		.544	.594	.716	.505	.745	.992	.540
Guest Sat.											
Adj. R^2											
Efficiency				.839							
Adj. R^2				.704							
Business Rel.											
Adj. R^2											
$\chi 2/df \leq 3.0$	.674	1.042	.855	1.518	.961	.392	.504	1.318	.449	1.468	1.024
AGFI ≥ .90	.989	.983	.986	.970	.984	.994	.992	.978	.993	9.75	.984
RMSEA ≤ .05	.000	.011	.000	.038	.000	.000	.000	.029	.000	.036	.008
CFI ≥ .90	.991	.990	.999	.995	.997	.998	.996	.997	.999	.998	.999

A different picture emerged for the 4/5-star hotel segment. Here, the main motive to use e-Business applications is the perceived stakeholder pressure (i.e. technology needs of tourists and cooperation partners). The latter factor determines the use rate of eight different e-Business applications (Tab. 3). The average R^2 stands at .74. By contrast, perceived financial success is the main adoption factor for E-Mail-Marketing, personal information and online procurement systems, respectively. With regard to e-Business impact, the 4/5-star segment perceives improved sales and business relationships as well as guest satisfaction. However, no efficiency improvements could be measured on a significant level (Tab. 3). Instead, an increase in sales is caused by E-Mail Marketing, websites with booking functionalities and the Intranet. Furthermore, improved relationships with suppliers and cooperation partners (e.g. DMOS, etc.) are mostly attributed to costing and accounting, customer relationship management, yield management and online procurement systems as well as online booking platforms (Tab. 3).

From a managerial perspective the research outcome should be discussed in more detail. First of all, interestingly enough, it emerged that neither cost or technical issues nor the perceived competitive pressure are affecting usage rates corresponding to the eleven e-Business applications under study. It can, thus, be deduced that once e-Business adoption took place, both (i.e. financial) success issues and stakeholder relationships aspects become crucial. Reliable information concerning the economic effects induced by ICTS typically employed in the hotel sector would, therefore, lead to likely higher use rates of previously adopted e-Business applications. Secondly, from the obtained results does not clearly emerge whether the hotel managers are either unable to *generate* or unable to *recognize* efficiency gains from e-Business applications implemented in their organisations. The same holds true for managers in

the 3-star hotels with respect to improved business relationships and guest satisfaction. Thus, further research efforts are needed here to give more reliable answers on these questions (Dedrick et al., 2003; Buhalis & Zoge, 2007).

Table 3. Summary of results from linear structural equation models

e-Business Readiness-Intensity-Impact 4 & 5-star hotels (n= 268)											
Readiness	**EMM**	**ERP**	**INTR**	**CAS**	**CRM**	**PIS**	**PMS**	**YMS**	**WBOOK**	**OPLA**	**PROC**
Tech. Res.											
Hum. Res.											
Comp. pressure											
Stakeh. pressure		.790	.956	.945	.884		.801	.804	.717	.935	
Perceived costs											
Financial success	.812					.705					.639
Intensity (R^2)	.659	.625	.913	.893	.782	.496	.641	.647	.514	.874	.408
Sales	.682		.712						.785		
Adj. R^2	.465		.507						.616		
Guest Sat.		.626							.704		
Adj. R^2		.405							.495		
Efficiency											
Adj. R^2											
Business Rel.				.573	.611			.688		.584	.648
Adj. R^2				.329	.373			.473		.341	.465
$\chi 2/df \leq 3.0$	.366	.854	1.061	.169	.960	1.305	1.078	1.032	1.111	.587	1.668
AGFI ≥ .90	.992	.981	.976	.996	.978	.970	.977	.977	.974	.987	.964
RMSEA ≤ .05	.000	.000	.015	.000	.000	.034	.017	.011	.020	.000	.050
CFI ≥ .90	.990	.991	.999	.998	.999	.995	.999	.999	.992	.999	.991

5 Conclusion and Outlook

To summarize, the conducted research illuminated the adoption of e-Business applications within the Austrian hotel sector. Based on data gathered from managers of 723 Austrian hotels in 2008, both adoption shares and use-intensities have been deduced for eleven e-Business applications typically employed in hotel companies (Sheldon, 1997; Werthner & Klein, 1999; Buhalis, 2003). In addition, the contextual use determinants were identified of those e-Business applications that mostly affect hotels' business performance. For this aim, the perception-based approach grounded on *Innovation Diffusion Theory* (Tornatzky & Fleischer, 1990) as well as the impact model deduced from the *ICT-Value* framework (Zhu & Kraemer, 2005) proved to be highly useful. From a methodological point of few, the use of linear structural equation models supported the empirical testing of the hypothesized relationships between the constructs measuring e-Business readiness, intensity and impact, respectively. In this vein, a promising future approach will be to conduct only one singular structural equation modelling run by simultaneously integrating all intensity indicators. As there is not much generalizable theoretical knowledge about e-Business architectures in hotel branches (Fesenmaier et al., 2004), a similar approach would first combine the e-Business intensity indicators by explorative factor analysis. Furthermore, in order to cross validate the results concerning efficiency gains based upon purely subjective data, they should in the future be compared with efficiency scores obtained by non-parametric methods, such as data envelopment analysis (Sigala et al., 2004). It is finally suggested to employ and further refine the proposed e-Business indicator framework within other sub-sectors of the tourism industry.

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Assessing Low-Cost Carrier eAirline System Success

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Abstract

As many Low-Cost Carrier Airlines have increased their investment in B2C eAirline systems, it is crucial to measure the success of such investments. The DeLone and McLean's model is one model which shown to be a useful framework for assessing success at the organisational level but has not been validated from the customer perspective. This research provides the first empirical test of an adaptation of DeLone and McLean's 2004 IS success model through the assessment of Low-Cost Carrier eAirline systems from the perspective of individual users. A total of 243 useable responses were collected in order to examine the validation of DeLone and McLean's 2004 IS success model from the customer perspective. Structural Equation Modelling techniques are applied to test the validation of the modified DeLone and McLean's eCommerce system success model. The findings reveal several important implications for eAirline research and practice. Limitations of the study which should be addressed in future research are discussed and some recommendations for further research are provided.

Keywords: DeLone and McLean Model, eAirline System, IS Success

1 Introduction

The issue of assessing information system (IS) success has been one of the key areas in the IS research and various metrics and measurements methods were introduced and examined (Davis, 1989; Hartwick and Barki, 1994; Seddon and Kiew, 1994; Seddon, 1997, Seddon et al, 1999; Szajna, 1996, Venkatesh et al, 2003; DeLone & McLean, 1992) in order to assess IS success by researchers for the last two decades (Straub et al, 2002). Recently, these approaches are further developed and updated in order to assess IS system within the context of eCommerce/eBusiness environments (DeLone and McLean, 2004; Wang and Liao, 2008; Garrity et al, 2005). Like other industry, many airline companies have increased their investment in emerging digital technologies and associated customer service applications on their information system. In particular, Low-Cost Carrier (LCC) airline sector became an increasingly important part of the European airline industry (Warnock-Smith and Potter, 2005) and LCC airlines have made a large scale of investments on web-based eCommerce systems due to the nature of their web-based online business which is highly dependent on the successful eCommerce systems. Therefore, assessing the success of such investments on eCommerce systems is one of the key investment decisions for low-cost airline companies. Despite various existing IS success models are employed to evaluate eCommerce systems success recently (Gengatharen and Standing, 2004; Garrity et al, 2005; Pather et al, 2006; Chien and Tsaur, 2007), there is little research that explicitly addresses which IS success models can be extended to investigating

LCC Airline eCommerce systems. The aim of this research is to validate DeLone and McLean's 2004 IS success model through the assessment of Low-Cost Carrier Airline eCommerce systems (LCCAeCS) from the perspective of individual customers. In accordance with the factors identified in the DeLone and McLean's model, the objectives of this study are firstly evaluate the influence of the low-cost airline eCommerce system and its associated service qualities on customer usage and user satisfaction. Secondly, evaluate the influence of customer usage and user satisfaction on individual customer net benefits.

2 Information System Success Models

The investigation of factors and processes that intervene between IT/IS investments and the realisation of their economic value/benefits was the major issues in information systems research and rich streams of research on this issue were developed by various Information Technology (IT) researchers. Most researchers focused on the factors and processes of the user perceptions about information technology and its impacts on their work. Even though different approaches were used by various researchers (DeLone and McLean, 1992), in general there are two main approaches such as user satisfaction and technology acceptance were employed in Information Systems research. The user satisfaction approach was examined by a range of researchers (Bailey and Pearson; 1983, Ives et al; 1983, Melone; 1990, DeLone & McLean; 1992, Seddon; 1997) and literature on the user satisfaction explicitly itemise system and information design attributes (e.g. information accuracy and system reliability), making it a potentially useful diagnostic for system design. Another stream of IS systems success literature is Technology Acceptance Model (TAM). Technology Acceptance approach provides sound predictions of usage by linking behaviours to attitudes and beliefs (ease of use and usefulness) that are consistent in time, target, and context with the behaviour of interest (system usage) and TAM was examined by Davis (1989), Hartwick and Barki (1994), Szajna (1996), Venkatesh et al (2003).

In 1992, DeLone & McLean proposed a comprehensive framework for measuring the performance of information systems and one of the important contributions of DeLone & McLean's model to the literature on IS success measurement was that it was the first study that tried to impose some order on IS researcher's choices of success measures. This original model consists of six success dimensions such as system quality, information quality, use, user satisfaction, individual impact and organisational impact (figure 1). However, there are several weaknesses exist on this model. As Seddon (1997) argued, Usability dimension contains too many meanings in order to be appropriately examined and this category cause some problematic and controversial role in modelling system success (Seddon and Kiew, 1994; Seddon, 1997). In addition, the model does not explain clearly and fully the relationship between User Satisfaction and individual/organisational impacts and also it does not recognise the different meanings of IS success from different stakeholders in an organisation.

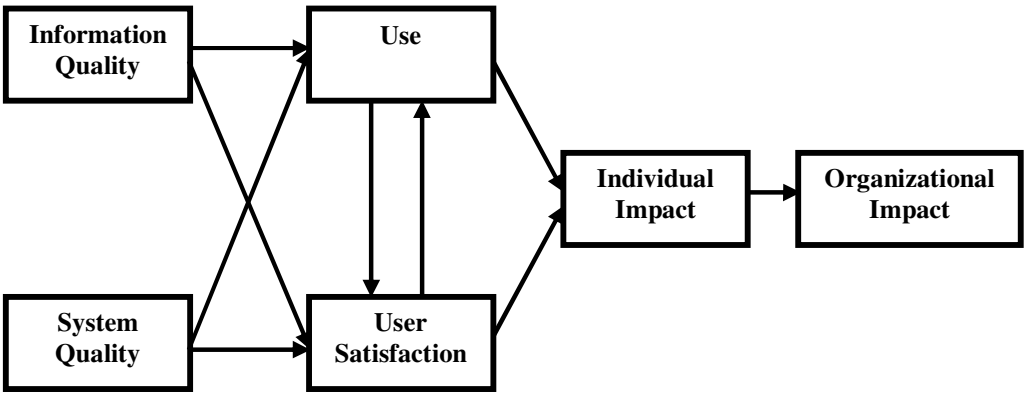

Fig. 1. DeLone and McLean's Model (1992)

Considering the suggestion by Seddon *et al* (1999), DeLone and McLean modernised their original model and proposed updated model with the addition of two new measures (service quality, net benefit) for the assessment of eCommerce system success based on those discussions since 1992 in order to reflect current eCommerce market environment. (DeLone and McLean, 2002; 2003; and 2004). Figure 2 shows the updated DeLone and McLean model which consists of six interrelated dimensions of information systems success such as System Quality, Information Quality, Service Quality, Use, User Satisfaction and Net Benefits. Compared to the original model, there are two new constructs 'Service Quality' and 'Net Benefits' which replaces existing 'Individual/Organisational Impacts'.

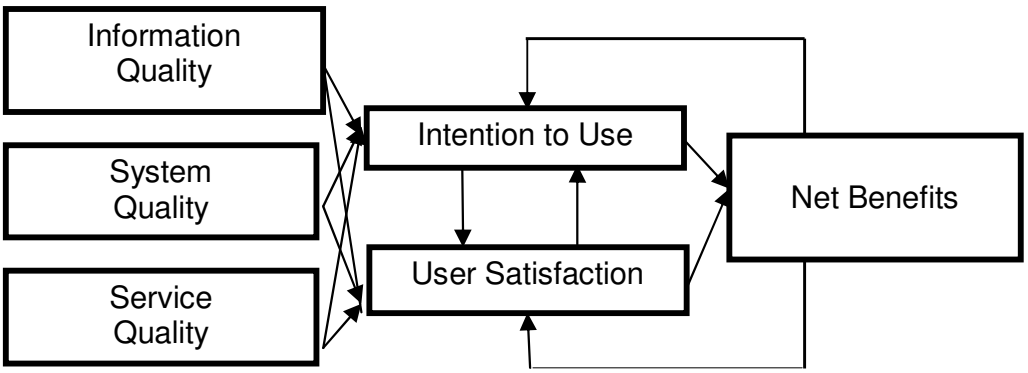

Fig. 2. DeLone & McLean's Information System Model (2004)

Within updated model, Service Quality is added and this is due to the importance of service aspect of IS success/effectiveness. Traditionally, IS effectiveness measures focused on the products rather than the services of the IS function (Pitt et al, 1995) and this may lead to inappropriate measurement approaches if IS service quality aspects are not considered especially within eAirline environment. With regard to 'Net Benefits', DeLone & McLean (2004) reflected Seddon's respecified Model of IS Success (1997) within their updated model and furthermore, the concept of 'Net Benefits' was expanded to multi stakeholders' approach.

Furthermore, according to aim and objectives of this research which examine the validation of DeLone and McLean's 2004 IS success model from the customer perspective, existing success dimensions from DeLone and McLean IS success model (2004) are modified and in particular, intention to use is replaced by customer usage and net benefit is also changed into individual customer net benefits. Table 1 shows the summary of new eCommerce success dimensions and measures.

Table 1. Success Dimensions and Measures

Existing Success Dimensions	**New Success Dimensions**	**Success Measures**
Information Quality	Information Quality	Accuracy, Relevance, Understandability, Completeness, Currency, Dynamic content, Personalized content
System Quality	System Quality	Usability, Ease of use, Ease of navigation, Download time, System response, Reliability, Privacy, Security, Interactivity
Service Quality	Service Quality	Tangibility, Empathy, Assurance, Quick response, Following-up service, on-line support capabilities, FAQ, Customised site intelligence, Order tracking
Intention to Use or Use	Customer Usage	Information search, Receiving customer orders, Accepting customer orders, Customer service request, No. of eCommerce site visits, Length of stay
User Satisfaction	User Satisfaction	Whole customer experience cycle; from information retrieval through to purchase, payment, receipt, and service
Net Benefits	Individual Customer Net Benefits	Enhanced customer supports and services, Improved customer knowledge, Reduced information search time, Improved customer experience, Reduced shopping costs, Entertainment

Within the modified DeLone and McLean eCommerce systems success model, system quality measures the desired characteristics of an eCommerce System and this dimension includes usability (Spiller & Lohse, 1998), adaptability, response time (Spiller & Lohse, 1998, Palmer., 2000), customisation (Palmer, 2000), ease of navigation (Day, 1997; Huff et al, 2000; Han & Noh, 2000; Palmer, 2000; Molla & Licker, 2001), privacy (Hagel & Rayport, 1997; Riggins, 1999 Molla & Licker, 2001) and security (Hagel & Rayport, 1997; Han & Noh, 2000; Molla & Licker, 2001).

Information Quality captures the eCommerce content issues and Web content should be personalised (Barua et al, 2000; Molla & Licker 2001), complete, relevant, dynamic (Parsons et al, 1998) and containing variety of Information (Palmer, 2002) according to customer needs. Service Quality is becoming more important in eCommerce environment as now users are customers rather than employees and therefore, this dimension needs to be investigated and developed further. Quick responsiveness, assurance, empathy, following up service, FAQ, customised site

intelligence are examples of service quality dimension. Customer usage measures from a visit to Web site (D'Ambra & Rice, 2001; Molla & Licker, 2001) and navigation within the site (length of stay) to information retrieval and execution of transaction (number of purchases completed).

User Satisfaction measures customers' perception regarding eCommerce system and it covers the entire customer experience from information retrieval, purchase, payment (Barua et al, 2000; Burn & Barnett, 2000, Jahng et al, 1999; Lee et al,1999), receipt and service (Huff et al, 2000; Plant, 1999). Net Benefits are most important success measures according to DeLone and McLean's IS Success Model (2004) as they capture the balance of the positive and negative impacts of eCommerce on various different stakeholders such as customers, suppliers, employees, organisations and industries. However, individual customer net benefits are considered in this study and this dimension contains improved customer experience (Hoffmann & Novak, 1996), entertainment (D'Ambra & Rice, 2001), reduced shopping costs (D'Ambra & Rice, 2001; Molla & Licker, 2001) and real-time marketing offers.

3 Research Model and Hypotheses

Existing information system success models have received much attention from researchers and practitioners, however which traditional IS success models can be extended to investigating eCommerce systems success in different contexts is unclear (Wang and Liao, 2008). As previously mentioned, the updated DeLone and McLean's model (2004) is one model which has been shown to be a useful framework for assessing success at the organizational level however, it clearly needed further validation before it could serve as a basis for the selection of appropriate IS measures (Wu and Wang, 2006). Moreover, this model has not been validated from the customer perspective especially in the airline industry. According to aforementioned research objectives, following hypotheses are formulated in order to validate the modified DeLone and McLean's eCommerce systems success model (figure 3).

H1. Information quality will positively affect customer usage in the B2C eAirline context
H2. System quality will positively affect customer usage in the B2C eAirline context
H3. Service quality will positively affect customer usage in the B2C eAirline context
H4. Information quality will positively affect user satisfaction in the B2C eAirline context
H5. System quality will positively affect user satisfaction in the B2C eAirline context
H6. Service quality will positively affect user satisfaction in the B2C eAirline context
H7. Customer usage will positively affect user satisfaction in the B2C eAirline context
H8. Customer usage will positively affect individual customer benefits in the B2C eAirline context
H9. User satisfaction will positively affect individual customer benefits in the B2C eAirline context

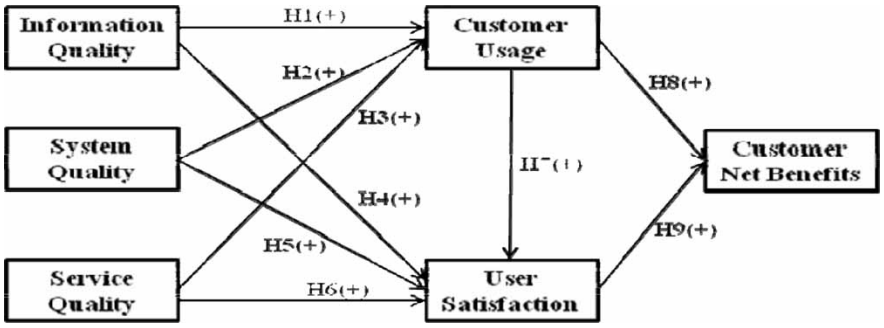

Fig. 3. Modified DeLone and McLean's eCommerce systems success model and Hypotheses

4 Research Methodology

The subjects of this study were university students in Northwest region of England who had a previous experience of using Low-Cost Carrier (LCC) Airlines such as ryanair, easyjet, jet2.com and bmibaby for their holiday in European tourism destinations. University students are used as a particular target group for this research and this is due to the fact that university students are heavy LCC Airline users and their opinions can be highly representative. A total of 243 university students participated in order to assess the success of LCC eAirline system within a controlled computer lab environment with PC access to LCCA website.

The questionnaire was composed of six dimensions. These are information quality, system quality, service quality, customer usage, user satisfaction and individual customer net benefits according to the modified DeLone and McLean eCommerce system success model. All items for each dimension were taken from previously validated instruments and the questionnaire consisted of 45 statements to which respondents were asked to indicate their degree of agreement. All items employed a five point Likert-type scale with 1 being "strongly disagree" 3 being "neutral", and 5 being "strongly agree". With regard to data analysis, a review of the literature review showed that prior studies in systems success used structural equation modelling (SEM), which is a regression-based technique rooted in path analysis. Confirmatory factor analysis was conducted prior to structural equation modelling using AMOS 16.0.

5 Research Findings

5.1 Measurement Model

In order to check the adequacy of items included in the questionnaire, factor analysis with principle component method and varimax rotation were conducted. In addition, Cronbach's alpha was examined to check the reliability of resulting items. An exploratory factor analysis with the criteria of eigen value greater than 1 was used to

check the adequacy of items included. According to confirmatory factory analysis, any irrelevant measurement items were excluded and only 29 items were considered for further analysis. Table 2 shows the results of confirmatory factor analysis including cronbach's alphas, standardised factor loading and composite reliability respectively.

Table 2. Results of Confirmatory Factory Analysis

Construct	Measurement Items	Cronbach's Alphas	Std Loading	Composite Reliability
Information Quality	(1) Relevance	0.83	0.888	0.91
	(2) Accuracy		0.886	
	(3) currency		0.883	
	(4) Easy to understand		0.818	
	(5) completeness		0.794	
System Quality	(1) Reliability	0.92	0.873	0.89
	(2) Easy to use		0.841	
	(3) Accessibility		0.821	
	(4) Security		0.806	
	(5) Flexibility		0.771	
	(6) Attractive web design		0.742	
Service Quality	(1) Follow-up service	0.92	0.843	0.86
	(2) Empathy		0.831	
	(3)Quick response to service request		0.801	
	(4) High service quality		0.789	
	(5) Online support capability		0.744	
Customer Usage	(1) effective order management	0.78	0.845	0.80
	(2) effective payment management		0.834	
	(3) No. of visit		0.803	
	(4) Length of stay		0.723	
User Satisfaction	(1) Performance	0.91	0.904	0.91
	(2) Information retrieval process		0.884	
	(3) payment process		0.884	
	(4) experience		0.881	
	(5) Establishing loyalty		0.757	
Customer Net Benefit	(1) Enhanced customer experience	0.84	0.789	0.77
	(2) Entertainment		0.782	
	(3) Enhanced customer knowledge		0.773	
	(4) Real-time marketing offers		0.659	

In addition, AMOS 16.0 was used in order to test the measurement model and seven common model-fit measures were used to evaluate the model's overall goodness of fit: the ratio of chi-squre to degree-of-freedom (*df*), goodness-of-fit index (GFI), adjusted goodness-of-fit (AGFI), normalised fit index (NFI), comparative fit index (CFI), root mean square residual (RMSR), and root mean square error of approximation (RMSEA). The overall model fit was evaluated statistically by the chi-square test of measurement model was significant ($\chi^2_{(275.45)}$ =624.308, p=.000). In addition, other widely used goodness-of-fit indices consistently showed that the measurement model exhibited a fairly good fit with the data collected (χ^2/d.f =2.27; CFI=0.95; TLI=0.96; RMSEA= 0.06).

5.2 Structural Model

Once the measurement model has been confirmed, the structural model was examined. Figure 4 presented the results of hypotheses testing including standardised path coefficients, *p*-values, and variance explained for each equation in the hypothesised model.

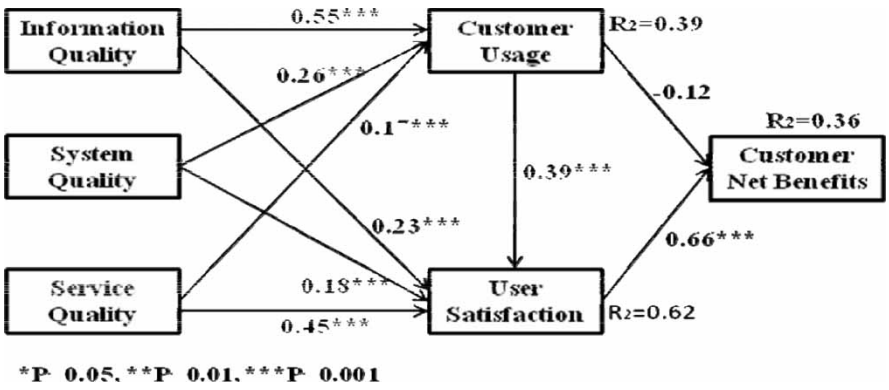

Fig. 4. Results of Hypotheses Testing

The results show that information quality, system quality and service quality had a significant influence on customer usage. Therefore, H1, H2 and H3 were supported (γ=0.55, γ =0.26 and γ =0.17 respectively). With regard to user satisfaction, information quality, system quality and service quality had a significant impact on user satisfaction. H4, H5 and H6 were supported (γ=0.23, γ =0.18 and γ =0.45 respectively). In addition, customer usage had a significant influence on user satisfaction but customer net benefit was not affected by customer usage. Therefore, H7 was supported (γ=0.39) while H8 rejected (γ=-0.12). Finally, user satisfaction had a significant influence on individual customer net benefits and H9 was supported (γ=0.66).

This model demonstrated that thirty six percent of the variance in customer net benefit was explained by user satisfaction and customer usage however user satisfaction had a stronger direct impact than customer usage on customer net benefits. Sixty two percent of the variance in user satisfaction was explained by information quality, system quality and service quality whilst thirty nine percent of the variance in customer usage was explained by information quality, system quality and service quality. Table 3 shows the direct, indirect and total effect of dominants on customer net benefit. The direct and total effect of user satisfaction on individual customer net benefit was 0.66. Despite the direct effect of customer usage on customer net benefit was -0.12, however the total effect of customer usage on customer net benefit was 0.14. This result indicates that user satisfaction had much stronger direct and total effects on customer net benefits than customer usage. Interestingly, Service quality had the strongest total effect on customer net benefit among the three quality related constructs whilst system quality had the weakest total effect on customer net benefit.

Table 3. The Direct, Indirect, and Total Effect of Dominants on Individual Customer Net Benefit

	Direct Effects			Indirect Effects			Total Effects		
	CU	US	CNB	CU	US	CNB	CU	US	CNB
IQ	0.55	0.23			0.21	0.27	0.55	0.44	0.23
SQ	0.26	0.18			0.10	0.15	0.26	0.28	0.15
SV	0.17	0.45			0.07	0.32	0.17	0.51	0.32
CU		0.20	-0.12			0.26		0.39	0.14
US			0.66						0.66

6 Conclusions, Implications and Limitations

The main aim of this research is to validate LCC eAirline system based on the modified DeLone and McLean eCommerce system success model in response to a call for the test of DeLone and McLean's IS success model in different context (i.e. eAirline context). This study considered six success measures including information quality, system quality, service quality, customer usage, user satisfaction and individual customer net benefits and also validated a comprehensive, multidimensional model of LCC eAirline systems success. The results show that information quality, system quality, service quality, customer usage, user satisfaction and individual customer net benefit are valid measures for the assessment of LCC eAirline system success and the hypothesised relationships between the six success measures were significantly supported by the data with exception of the link from customer usage to individual customer net benefits.

This research suggests several key implications for LCCA companies. Firstly, in order to increase customer usage and user satisfaction, LCCA companies should develop B2C eAirline systems which have good information quality, system quality, service quality. Secondly, the results of hypotheses testing revealed that user satisfaction had the strongest direct and total effect on individual customer benefits. This implies that user satisfaction is the key factor for LCCA companies to enhance individual customer net benefits. Therefore, LCCA companies pay more attention to designing and developing user-friendly eAirline systems which enhance maximisation of customer satisfaction throughout whole customer experience cycle from information retrieval to after purchase service (Huff et al, 2000; Plant, 1999). Thirdly, it was found that the total effects of service quality on customer usage, user satisfaction and individual customer benefits are much greater than the total effects of information quality and system quality. This result indicates that beliefs on service quality have a more dominant influence on customer usage, user satisfaction and individual customer net benefits than beliefs about information quality and system quality. Therefore, it is important for managers of LCCA companies to focus on the promotion of the online service quality of LCC eAirline systems. Fourthly, this study demonstrated that six success measures (information quality, system quality, service quality, customer usage, user satisfaction and customer net benefits) are valid for assessing LCC eAirline Systems and therefore, mangers of LCCA companies should

consider these constructs for the evaluation of their eAirline system success. Finally, if LCCA companies assess their eAirline systems using six success measures and monitor periodically from the perspective of customers, they could make appropriate investment decision in order to improve their eAirline systems which lead to enhancement of better understanding of the levels of individual customer benefit.

This study has several limitations and suggestions for future research. First, the sample size used in this study is the limitation of this research. The greater number of sample size than 243 could increase the validity and reliability of testing the proposed model. Second, despite sample used in this study is specific student target group who are heavy users of LCCA, caution should be taken in terms of generalisation of these findings and this model should be tested in different user groups for further research. In addition, the model should be validated in different eAirline context as well as B2C eAirline context and further research should be extended from the evaluation of the benefits of customers to that of various stakeholders of LCC Airline company. Third, different cultural context should be considered in future research. This study validated the proposed model in EU context, but there are other LCCA companies in America, Australia and Asia and for greater generalisation of the proposed model, a cross-cultural validation using a large sample collected in non-EU context is required.

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Information and Communication Technologies in Business and Corporate Travel Management: An Overview

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Abstract

This paper presents an overview of the use of information and communication technologies in business travel and corporate travel management. It distinguishes three areas of implementation: the use of technology as a possible alternative to business travel; the technology needs of business travellers across the travel chain; and technology as a distribution channel for business travel and corporate travel management. There is an abundance of industry-related surveys in this field but a lack of academically-published research. The discussion highlights this problem and identifies areas for potential research. Under each of the three areas discussed, a number of research questions are posed which could lay the foundation for further study and more scientifically rigorous research. Such research could support and give direction to the current industry-related surveys as well as contribute to the development of business and corporate travel management as a scientific discipline.

Keywords: business travel; corporate travel management; self-booking tools; travel distribution.

1 Introduction

Business and corporate travel management has been well-researched from an industry perspective with many surveys being conducted by travel companies such as American Express, Carlson Wagonlit and GetThere.com, research houses such as PhoCusWright and Harris Interactive and trade organisations such as the Association of Corporate Travel Executives (ACTE), the National Business Travel Association (NBTA) and the Institute of Travel Management (ITM). Far less research has been forthcoming from the academic environment with only a limited number of published research papers in this field (Chircu, Kauffman & Keskey, 2001; Denstadli, 2004; Douglas & Lubbe, 2006; 2008; Mason, 2002; 2007). This is particularly true for research into the implementation of information and communication technologies in business and corporate travel. It is evident that there is a need for scientific research to be conducted to deepen the theoretical knowledge base in an area that is currently driven by industry papers and reports that may, as a result of vested interests, lack the rigour of the scientific method and objectivity in interpretation of the results and conclusions drawn. The purpose of this paper is to present an overview of three broad areas of implementation of information and communication technologies in business

travel and corporate travel management and to identify potential areas for further scientific research. The paper begins with a discussion on the use of technology as an alternative to business travel highlighting the adoption of tools such as videoconferencing, teleconferencing and webcasting. Thereafter the technological needs of business travellers whilst travelling on behalf of their organisations, is discussed. Following this the move towards technology as a distribution channel in corporate travel management is investigated by highlighting the adoption of various direct and indirect electronic channels that are available to organisations and business travellers. Specific attention is given to the implementation of self-booking tools in corporate travel management programmes. The paper concludes with a brief summary.

2 Technology as an alternative to business travel

Business travel is only one tool for managing relationships with important constituencies within and outside an organisation. Other tools, such as telephone contact and teleconferencing, overnight delivery of letters and documents, electronic mail and videoconferencing, combined with physical travel could also be utilized to keep business relationships active and productive (Lehman & Niles, 2001). Industry evidence does suggest that there is increasing use of technology as an alternative to business travel but at the same time that constraints exist because technology is not yet optimal as a substitution for face-to-face meetings or could be too costly to implement. According to Quest (in Mill & Morrison, 2006) in the UK, corporate travellers are travelling less because of technology – particularly through the use of remote access and virtual private networking (VPN) but not many travellers believe that such technology is more valuable than face-to-face meetings. European managers maintain that less than three out of every ten meetings require face-to-face communications, and that technology could be utilised as an alternative to gain lost travel time while enhancing productivity and the quality of business level decision-making. Traditional web and voice conferencing combined are probable substitutes to business travel for meetings, but since those services are usually bought on a per-minute or simultaneous user basis, access and usage is often limited to less than 20 per cent of employees in an organisation to prevent escalating subscription costs (Business News Update, 2006). According to Mill and Morrison (2006), in the USA the use of technology to replace business travel seems to have levelled off with just under one-third of travellers reporting the use of teleconferencing, webcasting and videoconferencing to replace at least one business trip. An American Express Survey in 2003 showed that some business travellers use web meetings and teleconferencing in place of travel with 35 per cent saying that they have used such technology – frequently or infrequently – instead of travelling but the majority of respondents disagreed that teleconferencing or web facilities offer an adequate substitute for face-to-face meetings. Even those who give equal consideration to virtual and in-person meetings said that telecommunication is only appropriate for conferring for an hour or less (American Express, 2003). According to a Conference Board of Canada and ACTE study (CBOC & ACTE, 2007) the most important reason for the increase in the use of audio/video conferencing tools is that it is a way to reduce travel expenses. EyeforTravel (2002) reports that a survey done by Wainhouse Research in 2002

revealed that respondents believed that converting in-person meetings to travel alternatives using voice, web and video conferencing would permit them to enhance their business performance and personal lives. The respondents thought that the use of conferencing technologies would permit them to get more work done, make quicker decisions and be more competitive.

Denstadli (2004) undertook research in Norway to assess the impact of videoconferencing on business travel. His results showed relatively limited effects of videoconferencing on business travel and he concluded that travel and personal contact are still viewed as the most successful ways of conducting business. The significance that people put on networking and social communication decreases the likelihood of travel being replaced by videoconferencing (Denstadli, 2004; Lian & Denstadli, 2004). Mason (2002) conducted research amongst travellers as well as travel managers on the impact of the development of video conferencing and the Internet on the demand for business-derived air travel. Most of the respondents to the survey said that these technologies had not had any considerable influence on the number of trips taken. Although these types of communication have little impact on the demand for air travel at present, both groups of respondents (travellers and travel managers) believed that, in five years' time, these technologies would have advanced sufficiently to permit for some substitution. Twenty-two per cent said that internal meetings and some meetings with well-established business partners might be performed by means of some enhanced information technology solution, but the total percentage of such replacement would be small. Nevertheless, the general feeling was that there is no alternative to meeting people face-to-face. In reality, 66 per cent of travel managers believed that their company would increase its volume of business travel in the next five years. A large group believed that their company would increase the number of trips undertaken by more than 15 per cent from the current level (Mason, 2002:65).

The communications tools mentioned above go hand in hand with travel, and serve as introductions, follow-ups and, in some cases, replacements for travel. Because of the unique strengths of face-to-face interaction, physical travel is expected to remain the most vital tool for maintaining relationships. But there are situations where electronic travel alternatives can actually be more effective. The challenge is to be able to identify these situations and assign resources accordingly (Lehman & Niles, 2001:1).

The above discussion briefly highlights the ongoing debate on technology as an alternative to business travel with views expressed by both industry and academia on the increasing use of technology as an alternative to business travel. From this discussion it appears that industry surveys take a more positive view while academic studies indicate a more cautious approach to the level of growth of technology as an alternative to business travel. This debate presents opportunities for more in-depth research and raises a number of research questions, for example: What type of business interaction would drive the use of technology as an alternative to face-to-face meetings? To what extent does the nature and size of the organisation determine the use of technology as an alternative to travel? Is corporate culture a determinant in using technology as an alternative? At what stage of maturity would an organisation

move towards technology as an alternative to travel? Can it be postulated that public and private sector organisations would differ in their adoption of technology as an alternative?

3 The technology needs of business travellers

Since technology is not always an appropriate substitute for travel, travellers are still obliged for various reasons to undertake business trips in the interests of the organisation. Business travellers exhibit varying needs and concerns when undertaking travel. The biggest concern international travellers have relates to the loss of productivity while travelling and one of the worst aspects of business travel is the occurrence of flight delays which is showing an increasing trend (Forbes, 2008; Müller & Santana, 2008; Hotelmarketing, 2007; Skyguide, 2005). The effect of flight delays and cancellations can result in losses to business travellers in both direct monetary costs (i.e. paying for alternative flights/methods of transport; or perhaps additional accommodation and catering if an overnight stay is required), as well as indirect costs through missed business opportunities and time wastage due to excessive waits at airports instead of using their time productively for work related tasks (Bauer, 2000; Suzuki, 2004). Another concern to business travellers is falling behind in office work because of the travelling (American Express, 2002). Technology provides solutions to these problems.

The technology needs of domestic and international business travellers can be identified by viewing the various phases of the trip which Merten and Teufel (2008) refer to as the phases of the passenger process. In this paper phases are further sub-divided and also include the trip to the airport or point of departure to make provision for technology use en route. The phases include distribution (the pre-trip booking stage), point of departure (for example, residence or office), arrival at airport for check-in and baggage processing, security and passport control checks (for international travellers), departure, in-flight/onboard, arrival at destination, deplaning and airport processing, transfers and accommodation. Increasingly sophisticated technology solutions are available to business travellers and they are able to exert more control over the entire travel chain. In the pre-trip phase, at the booking stage, business travellers have a number of options which will be discussed separately in the next section. Before departing from home or office and en route to the airport technology can greatly benefit business travellers through early communication of flight delays to allow them to better manage their time or even make alternative arrangements. Not only is earlier communication essential, but detailed text messages containing information such as the estimated length of the delay and regular updates on the status of the delay can aid business travellers in organising their diaries. As such, the use of mobile technology can represent a valuable tool to airline companies in better managing client relations during and after flight delays and cancellations (Martin 2008). Electronic tickets, web-check-in, common-use self service (CUSS) and bar-coded boarding passes serve to save much time for the business traveller, both prior to his flight and at the airport. A J.D. Power and Associates study found that 38 percent of airline passengers are utilising self check-in kiosks and 17 percent

are checking in online through airline Web sites. The study furthermore established that passengers that make use of kiosks wait half as long for their boarding passes as those who interact with an airline representative (Waisberg, 2006). In flight telephony allows passengers to use their own phones to make and receive calls and text messages and to send and receive data over GPRS and to access the Internet, email or messaging accounts from their laptops.

The value of technology to business travellers is evident since business travellers are generally technologically 'savvy' with almost all having personal computers, most with a high-speed Internet connection (Mill & Morrison 2006). The use of portable technology such as laptops and cellular phones helps many business travellers to stay in control of their workload and according to a survey conducted by American Express (2002) access to email while on a business trip is considered as very important by travellers. In another perspective on the value of technology for business travel, when asked which single amenity travellers would keep while in flight, on-board entertainment was the most popular option, followed by a laptop, on-board email or internet access, and a telephone.

The role of ICTs in air travel and accommodation has been well-researched (Buhalis 2004; Franke, 2007; Sigala, 2005) but again, most research on the needs of passengers in terms of ICTs, especially those of business travellers has been forthcoming from surveys driven by industry representatives such as IATA and SITA. Business travel is a high revenue-generator for both airlines and hotels and the needs of business travellers should enjoy far more in-depth research from academic institutions. A number of research questions can be raised, for example: To what extent can mobile phones alleviate the cost of flight delays to business travellers in the pre-trip phase? Is there an increase in business traveller's productivity through the use of communication technologies en route? Is the availability of specific technologies a determinant in the selection of airlines and hotels?

In the pre-trip booking phase organisations and business travellers are showing an increasing willingness to use self-booking systems. The role of technology in the broader distribution of travel is an area that has gained much attention from academic researchers, but again there is a lack of such research in the business and corporate travel sectors. Business and corporate travel is a high revenue-generating sector for airlines and hotels and also presents a complex environment where dynamic changes are driving new strategies from airlines, hotels and travel management companies, both traditional and online.

4 Technology as a distribution channel in corporate travel management

Traditionally, organisations used corporate travel agencies to purchase travel services from their preferred airline, hotel and car suppliers. These suppliers list, in exchange for a fee, their process and availability information on global distribution systems (GDSs) that travel agencies access through dedicated connections. With the arrival of

e-commerce Internet-based electronic travel reservation systems, also known as self-booking systems or self-booking tools (SBTs) have made inroads in business travel distribution. Business travel displays a number of characteristics which make it eminently suitable to purchase through e-commerce: information is largely uniform and free of emotional involvement and the desired travel product can be described in its entirety by the attributes, destination, travel dates and times, quality classification and price (Schertler & Berger-Koch, 1999). To obtain travel supplier information, self-booking systems initially established electronic connections to the traditional CRSs, and, more recently, to the actual suppliers through direct connections. In general, after an organisation's employees make reservations using these systems, the details are sent to that organisation's corporate travel agency, which then concludes the transaction by examining the quality of the reservation and issuing tickets (Chircu & Kauffman, 2000). With the advent of electronic ticketing, the travel agency can be bypassed.

The online environment for business travel distribution is complex. It could perhaps be best described under three broad categories: First, the "unmanaged" Internet; second, supplier-driven self-booking systems for business travellers; and third, custom-designed self-booking systems for corporate travel management.

The first category, the wider, "unmanaged" Internet provides corporations no chance to manage their travel purchasing. Employees can book travel without any consideration to the corporate travel policy. Even if fares are seemingly lower than those presented through preferred suppliers, tickets booked through the Internet do not add to volume or market-share agreements with preferred suppliers. Bookings are also not captured in all-important management information data that is used for supplier negotiations (Cohen, n.d).

The second category is where suppliers such as airlines (both full service and low-cost airlines), hotels and car rental companies are developing specific links on their web sites to accommodate business travel and to allow organisations (particularly small and medium enterprises with a limited travel budget) to register online and gain the benefits of discounted travel and management information.

The third category is generally a technology partnership between travel management companies (TMCs - traditional and Internet), suppliers such as airlines and hotels, and corporate clients which allow organisations to streamline their operations and to become more cost-effective (Lubbe, 2003). This technological option is utilized in corporate travel and seen as a key part of travel management. Haapaniemi (2000) refers to it as a corporate intranet which permits employees to make their own reservations and file their own expenses online – at their convenience – but under the management of the organisation's travel office. The use of an intranet also improves 'speed to market' when travel programmes are modified. For example, if a company changes preferred airlines, the travel page can notify employees of the switch. The system can easily be altered so that the new airline appears first when reservations are made (Haapaniemi, 2000). The principal functions of a corporate travel intranet are to

supply useful information to the traveller, to maintain relationships with preferred suppliers and to act as a platform for self-service reservations (Cohen, n.d.).

A number of factors determine the implementation of self-booking tools by organisations and travel management companies and the use thereof by travellers. The first factor that needs to be taken into account is that business travel should be divided into what PhoCusWright (2006) refers to as unmanaged and managed (also known as corporate) business travel. "Unmanaged" business travel generally refers to business travel undertaken by employees of small and medium-sized companies with a relatively small travel budget. "Managed" business travel refers to large corporations with substantial travel budgets that generally have a corporate travel management programme under the auspices of a corporate travel department. Self-booking systems that are driven by suppliers such as airlines, car rental companies and hotels are attractive to the unmanaged business travel sector as, on registration into the system they provide the opportunity for travel expenditure savings not otherwise attainable. These systems pose a threat to traditional travel agencies serving this market as they can be bypassed in the distribution system. In the managed corporate travel sector the online booking tool still allows an organisation's employees to search for and purchase tickets through the Internet but it is a customized system for an organisation and its travellers. Corporate booking tools generally incorporate travel policy criteria and preferred supplier discounts. A survey conducted by the Business Travel Research Centre, Cranfield University in collaboration with Amadeus and ACTE (Mason, 2007b) suggests that utilising a self-booking tool has become standard best practice at corporate travel departments and that, as more and more companies implement this technology, corporate travel managers' are searching for ways to integrate this into other processes, such as the corporate intranet, HR database, and expense management. Other factors that determine the adoption and use of self-booking tools are cultural differences, particularly across Europe (Dalgety, 2002; PhoCusWright, 2006), language, currency, fares and pricing, multiple GDSs, differing levels of agency automation and travel management maturity (Dalgety, 2002). Despite the benefits online adoption is still low but increasing rapidly. Based on research conducted by PhoCusWright (2006) online bookings made up only 5% of total corporate travel bookings in 2005 (table 1) but this is expected to grow to 22% in 2008.

Table 1. European Online Corporate Travel Penetration, 2005 – 2008 (US$B)

	Total Corporate Travel	**Online Corporate Travel**	**% Online Penetration**
2005	88.2	4.4	5.0%
2006	90.9	7.3	8.0%
2007	94.6	13.3	14.1%
2008	98.1	21.6	22.0%

Note: Based on gross bookings
Source: Corporate Travel Distribution: European Markets (PhoCusWright, 2006: 15)

The PhoCusWright (2006) study also investigated the online market share by method of booking, comparing the 2005 and 2008 scenarios. These results, shown in figure 1, indicate that bookings through Internet-based TMCs will have increased by 2008 while TMC bookings will be 85% in 2008 as opposed to 95% in 2005.

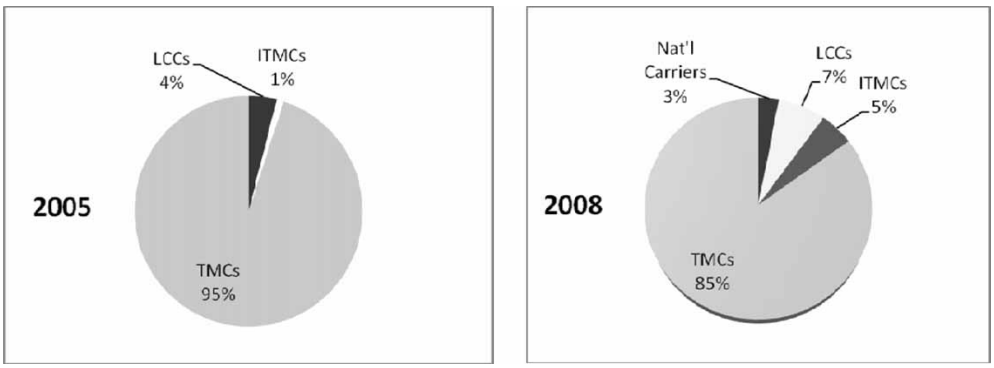

Fig. 1. European Online Market Share, by Method of Booking
Source: Corporate Travel Distribution: European Markets (PhoCusWright, 2006: 16)

A global survey conducted by ACTE and KDS in 2006 confirmed organisations' continual implementation of online travel booking tools. The majority of respondents (travel managers) in the survey said their firms use systems, bringing them the associated benefits of travel cost efficiencies and better management of information. Responses indicated that travellers are becoming progressively more comfortable with making travel arrangements online, with 76 per cent saying that this would be their favoured method for booking a business trip, versus 23 per cent who would still choose to book offline via a travel agent (ACTE & KDS, 2007). A study conducted in South Africa in 2005 amongst selected organisations showed that only 13 per cent encouraged their corporate travellers to use self-booking tools. Reasons for this indicated that control of travel expenditure when self-booking tools are used was perceived as a problem, that corporate travellers still prefer personal contact with a traditional travel agent and organisations believe that complex travel reservations are not suited to the system (Douglas, 2005). In 2007, the Association of Corporate Travel Executives (ACTE, 2007) conducted a survey to determine the current utilisation of self-booking tools amongst South African companies. The survey revealed that only 15 per cent of respondents had implemented self-booking tools (SBT). Of interest to this particular study is that a company's third most important motivating factor in its decision to implement SBTs is to achieve better policy and preferred supplier compliance. Furthermore, companies were asked what their biggest challenge in adoption and implementation was and the results showed inadequate training as the main problem, a lack of senior management support and a lack of a self-service culture. This result is supported in a global study conducted by The Business Travel Research Centre at Cranfield University where respondents thought that effective traveller training, supported by senior management buy-in and promotion of the value of SBT usage through internal company communications, were the most effective ways of increasing adoption (Mason, 2007a). A lack of seamlessness in tool functionality and slow, not easy to use systems as well as

problems with access to desired travel vendors and perceptions that cheaper fares were available via internet travel agents or direct from airline and hotel websites, are other problems identified in various studies (ACTE, 2007; Douglas, 2005; Mason, 2007a). Mason (2007a) concluded that the biggest obstacles to online adoption are: organisational and social issues, travel policy and compliance, lack of senior managerial buy-in and a distrust of the capabilities of technology.

The study by Mason (2007a) also found that using a SBT saves a company money on TMC fees and average airline ticket costs; airline tickets are the travel items most frequently bought through a booking tool; adoption rates have a tendency to be the fastest in the first year of use and then the rate decreases; simply making a booking tool mandatory in the travel policy can bring about a considerable increase in adoption levels and companies with flatter hierarchical corporate structures seem to be able to achieve higher SBT adoption levels.

The above discussion on the adoption of online self-booking tools in the unmanaged and managed business travel environments shows the complexity and dynamic nature of distribution in this sector. The changes taking place in the distribution of business travel holds implications for traditional TMCs who still dominate the markets in Europe and countries such as South Africa. Self-booking tools driven by Internet TMCs and airlines are also showing growth at the expense of TMC driven self-booking systems. These changes present many opportunities for in-depth research into the business and corporate travel market and the impact of the changes driven by technology on the structure of this industry, the changing needs of business travellers and the factors that determine adoption of online self-booking tools in various organisations, settings and cultures.

5 Conclusion

This paper provided an overview of the implementation and use of information and communication technologies in the business travel and corporate travel management sector. The paper shows that most research in this field is driven by industry and that there is a serious lack of scientifically-based research. The paper proposed a number of areas for potential research in three specific categories: technology as a possible alternative to business travel; the technology needs of travellers across the travel chain; and, technology as a distribution channel for business travel and corporate travel management. The paper found that certain technologies such as videoconferencing and the use of laptop Web cameras may substitute some travel, particularly for internal meetings or training, allowing organisers to reach out to a larger audience than might be possible at face-to-face events. Some important research questions were raised during this discussion such as: What type of business interaction would drive the use of technology as an alternative to face-to-face meetings? To what extent does the nature and size of the organisation determine the use of technology as an alternative to travel? Is corporate culture a determinant in using technology as an alternative? At what stage of maturity would an organisation move towards technology as an alternative to travel? Can it be postulated that public

and private sector organisations would differ in their adoption of technology as an alternative?

The second category for future research related to the technology needs of travellers. The discussion emphasized the need for technology to maintain a traveller's level of productivity while travelling for business purposes. It furthermore highlighted the use of mobile technology during the travel process. Once again, a number of research questions were identified, namely: To what extent can mobile phones alleviate the cost of flight delays to business travellers in the pre-trip phase? Is there an increase in business traveller's productivity through the use of communication technologies en route? Is the availability of specific technologies a determinant in the selection of airlines and hotels?

The last category of future research discussed technology as a distribution channel. The online environment for business travel distribution could be best described under three broad categories: First, the "unmanaged" Internet; second, supplier-driven self-booking systems for business travellers; and third, custom-designed self-booking systems for corporate travel management. According to a number of industry research studies the use of these online tools is increasing at the expense of traditional location-based TMCs. This is due to the fact that a SBT in particular saves a company money on TMC fees and average airline ticket costs.

It is believed that by finding answers to the research questions identified above, technology could truly become a substitute for corporate travel, thereby decreasing travel costs for companies as well as managing their carbon emissions. It could furthermore develop to such an extent as to satisfy every technological need that a traveller might have when travelling for business purposes as well as become the preferred distribution channel in corporate travel management.

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Deconstructing Travel Decision Making and Information Search Activities

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Abstract

By applying the uncommon method of a travel panel study lasting for one complete year it was intended to learn more and in a more appropriate way about the planning process of vacation travelling. The planning process was decomposed into nine primary and secondary decision elements. Decisions and changes thereof were reported by panel members every four to five weeks together with the underlying information sources used. Results on the sub-decisions and their characteristics are informative; however reveal the conceptual difficulties and weaknesses of this methodology. Information usage patterns deliver partly acknowledged insights and partly contrasting results especially with respect to prior knowledge and web sources.

Keywords: panel study, internal and external search; trip planning.

1 Introduction

Research into information search behaviour of travellers is already quite diversified. The focal question addresses either the relevance, role and impact of different sources in decision making or their influence on image formation or perceived quality and satisfaction outcomes. Yet, some major deficits are still prevalent. While the Internet and web based information sources proliferate for more than a decade the holistic approach to analyzing travellers' information search behaviour is scarcely visible (e.g. Luo, Feng & Cai, 2004 for an exception). Even rather recent studies on information search behaviour still do not consider one single web based information source (e.g. Gursoy & Chen, 2000; Gursoy & Umbreit, 2004; Beritelli, Bieger & Laesser, 2007). Hence, it is still questionable whether the role and importance of web based information sources can be assessed in a comprehensive way.

Closely related to the overall role of information sources and their content is the issue of their impact. There are at least two basic research questions linked to this problem. Generally, the subjective importance of different information sources has not been investigated very much in tourism research (Zins, 2007). In many instances, average usage levels across particular populations or segments are used as a proxy for deriving importance values of sources. In addition to that, biases are tolerated in most of the reported studies 1. by asking travellers a long time after the planning work has been finished and 2. by not differentiating by the goal or decision making purpose for which internal or external information is considered.

This study contributes to filling gaps in the information search behaviour literature, particularly those three raised in the two previous paragraphs. The paper focuses on sub-decision making within travel planning and the related and underlying information sources used. Data originate from a travel panel study which ran for about 12 months.

2 Literature Review

Travellers engage in information search activities for various purposes. Utilitarian and experiential/hedonic benefits are combined in individually different patterns in order to make ongoing or pre-purchase search activities reasonable (Vogt & Fesenmaier, 1998; Gretzel, Mitsche, Hwang & Fesenmaier, 2006; Koth, Teichmann & Zins, 2006; Cho & Jang, 2008). Hence, the information search behaviour or search strategies are varied. Literature shows that the amount and direction of information usage (Fodness & Murray, 1999) depend on situational influences as well as product and individual characteristics (Lo, Cheung & Law, 2002; Bieger & Laesser, 2004). Regularly, travellers exploit information from one or more sources which can be classified as either commercial/non-commercial or personal/impersonal (Fodness & Murray, 1997). With the proliferation of the Internet initially a new category of information sources joined the list of available suppliers. Over the years, the content of internet based information diversified more or less parallel to traditional information channels. Therefore, it is recommended to distinguish commercial and non-commercial, personal and impersonal or marketing and editorial sources analogously to the conventional sources. Otherwise the attribution of web sources as non-neutral (Lo, Cheung & Law, 2002) or key neutral (Beritelli, Bieger & Laesser, 2007) lacks a sufficient degree of specificity.

Decision making processes are commonly agreed to be complex and a lasting matter. Many scholars tried to find some general models or descriptive frameworks to structure this process to come up with probable sequences or stages and to find some relevant contingent factors influencing the shape of this process (e.g. Jeng & Fesenmaier, 2002). For the purpose of this study only so-called core and only a limited number of secondary decisions (Fesenmaier & Jeng, 2000) are considered sufficient to highlight the information activities prior to departure. Whereas many studies in this area are confined either to one single sub-decision element (e.g. destination or tour operator) or to a limited selection of potential information sources no single study is accessible which emphasises on both dimensions simultaneously in a very comprehensive way.

To get a reliable and valid picture about the complete planning and decision making process some additional concerns have to be addressed. Travel planning involves quite frequently on-going search activities which are not clearly directed to a particular trip or to specific problem solving or decision making (Decrop & Snelders, 2004). Therefore, it is not easy and almost impossible to define and communicate an objective starting point in time for recording the appropriate information activities. This problem appears when applying diary or panel methods and is even more critical for backward looking investigations. Another weak point represents the mapping of

importance or relevance of particular information sources. Information collection is not the same as information processing. Contact with a source does not equate to impact on the decision making process. Duration of investigation and consideration does not necessarily mean degree of influence or importance attributed to a particular source. Finally, to cope with the issue of a lasting process several scholars raised their voice in favour of real longitudinal methodologies (e.g. Kerstetter & Cho, 2004; Jeng & Fesenmaier, 2002; Perdue, 1993).

Briefly summarised, this study looks for more insights into the pattern of travel sub-decisions, duration of travel planning and the involved information sources from a longitudinal perspective which is synchronized with the actual travel planning. 1. It envisages particularly information search activities for a number of core decision elements. Moreover, it addresses differences in decision making and information activities for two aspects which are discussed in previous research. 2. How does prior knowledge and own travel experience impact on the current travel planning activities? Is "internal information" a substitute for additional external sources (e.g. Gursoy & McCleary, 2004a; 2004b; Kerstetter & Cho, 2004) or a complementary source? 3. Are there distinct differences between travellers who make use of information exploited from the WWW and those who do not? Beritelli, Bieger and Laesser (2007) split the Swiss travel market into two major segments based on importance judgments about the WWW. No substantial differences in terms of their information search patterns occurred. In contrast, this study will split respondents into two groups based on their real internet usage as an information source for travel decision making.

3 Methodology

This piece of research is based on a panel approach. This choice can be seen as a compromise between two opposing strategies: either a retrospective study recalling on someone's memory and reconstructing the activities and steps of the trip planning process or a diary method with daily records of relevant actions towards travel decision making. To come closer to the processing details of elaborating a complete travel plan which is deemed to be a rather lasting matter the retrospective approach did not seem to be very reliable. On the other hand the organisation of a diary study at a larger scale would require substantial resources on both sides: the researcher and the respondents. Hence, a panel method appeared to be a reasonable middle way to trace incidents and changes during the travel planning process in an effective and efficient manner.

The panel started in late June 2006 and run for 10 waves with 5 weeks' intervals until June 2007. Those panel participants who opted for an internet based communication were sent an email with an appropriate individualised link to the next panel wave questionnaire. Those participants opting for a conventional medium were sent an individualised questionnaire by regular mail each wave. Each follow-up panel questionnaire was filled with individual responses on the travel planning process from previous waves before it was shown in this personalized way to the respondent.

The recording process was initialised by the respondent stating that a trip is going to be considered seriously. The trip decision making process was decomposed into nine sub-decisions focusing on the most frequently and prominent ones (Decrop, 2006:95): duration, destination, companions, time, expenditures, accommodation, activities, mode of transportation and trip organisation. The respondent could report that one or multiple sub-decisions had been taken during the past four or five weeks. Each time a sub-decision was reported to be taken or revised the questionnaire asked whether a number of information sources were of any relevance for this particular sub-decision except for travel expenditures and travel companions.

4 Results

The following analysis focuses on trip planning cases which have been reported by the panel participants from all over Austria over the course of ten panel waves. Despite the initial registration process prior to the first panel wave only about 60% of the 729 committed panel participants did respond to the first wave. Due to panel mortality and occasional interruptions only 219 complete reports on travel plans are available.

In terms of socio-demographic profile the sample of trip plans is based on travellers who show an almost identical characteristic of the initial sample of registered panel participants (n = 729). In a strict sense, this sample is a convenience sample. It represents rather frequent travellers with an above average propensity for trips abroad (only 16% domestic) and with a slightly higher affinity towards internet usage as compared to the national averages. There are 53% trip plans from independent travellers, 21% packaged trips and 26% organised by a travel agency. In detail, the average age of the respondents is 42 years with a strong share of 51% in the age bracket 25 to 44 years and a second major group with 32% in the following age group up to 64 years. The larger proportion of 62% female panellists does not reflect the true distribution of the travelling population (51%). The panel participants are very travel active. On average, they are engaged in 5.5 trips a year taking short and long term trips, domestic and abroad together. 3 trips have international destinations while 2.5 are domestic. In terms of internet familiarity and usage patterns 75% indicated using the Internet daily, another 21% several times a week and only 4% less than once a week. Only 10% of the respondents had less than 2 years of internet experience. On average the internet usage lasts for about 6 years. There is nobody who did not use the Internet at all so far.

Significant differences in terms of travel destinations chosen appear between those who used their own experience for decision making and those who did not. Domestic travellers employ more frequently their own experience compared to those travelling to European or overseas destinations (Phi coefficient: .28). In contrast, travelling abroad shows a higher propensity to using information from the internet (Phi coeff.: .36). On the other hand, no significant differences appear in this respect between independent travellers and those organising their trip through a travel agency or a tour operator. Tour operator organised trips involve much less own experience compared to independent or travel agency organised trips.

4.1 Sub-decisions in the travel decision making process

Trip planning processes started with the respondents' statement that they seriously consider making a trip in the near future. The process ended by the self-reported statement that sufficient information had been gathered and no additional decision will be taken. The average planning duration based on these limits is 4.5 panel waves which is equivalent to about 22 weeks. The majority lasts 4 waves and less (62%). 30% have a duration of 10 weeks. Yet, the only representative insight into the distribution of the trip planning duration can be drawn from those 114 trip plans starting in wave one. The average duration of these initial trip plans is 5.1 waves or 25.5 weeks.

The following Table 1 highlights the given areas of trip decision making. On average, almost seven sub-decisions are reported to be taken within the observed planning period. The variation among these areas is not very large. Mode of transportation (84%) and travel companions (82%) is given the highest attention followed by accommodation (80%) and the destination (79%). The sub-decisions with a clear lower relevance are travel time (71%) and travel expenditures (66%).

The reported end of the trip planning does not necessarily coincide with the time of departure of the trip. Otherwise it would appear strange that still 18% of the respondents did not decide on the travel companions or 16% did not on the mode of transportation. The only reasonable explanation for such undecided areas like travel time, trip organisation or mode of transportation is that there are still some changes going to happen until real departure. However, they may not be longer an issue of planning and information gathering activities. For other areas it appears to be more plausible that travellers start their journeys without taking decisions in advance.

Table 1. Characteristics of trip decision elements

Sub-decision	*Com-pleted*	*Info activities reported*	*Average frequency of info activities*	*Average frequency of info activities*[1)]	*Corr. with planning duration*
Duration	74%	66%	2.4	3.6	.35
Destination	79%	65%	2.3	3.5	.42
Travel companion	82%	–	–	–	*.32*
Time	71%	57%	1.7	3	.37
Expenditures	66%	–	–	–	.25
Accommodation	80%	68%	2.6	3.8	.47
Activities	74%	61%	2	3.2	.34
Mode of transportation	84%	55%	2	2.6	.43
Trip organisation	76%	57%	1.4	3	.37

Note: 1) based on only those travellers who decided on this item.

The second column of Table 1 highlights if any information sources were considered when making or revising a sub-decision. Accommodation decisions are in most cases (68%) influenced by some external information sources. Duration and destination of the trip are the immediate followers of this rank. With some offset, travel activities with 61%, travel time and type of organisation (57%) and mode of transportation (55%) appear to need a bit less external input. The following columns take into account that sub-decisions could have been changed after an initial determination which allows for the same information category being consulted multiple times. While column three is based on all travellers indicating an average usage frequency of whatever information source for the particular sub-decision the fourth column signifies the average usage intensity only for those travellers who really did take this decision. For accommodation decisions the external information need appears to be highest followed by travel duration and destination. Activities during the trip are on forth position. The last column of Table 1 shows that decision making takes time: for all nine sub-decisions the correlation with the trip planning duration is highly significant. Decisions on accommodation reveal the strongest correlation (.47) followed by the mode of transportation (.43) and destination (.42).

Table 2. Sub-decisions taken by different traveller groups

Sub-decision	*Travellers not using own experience 33%*	*Travellers using own experience 67%*	*Without internet sources*	*With internet sources*
Duration	65%	78%	59%	83%
Destination	69%	84%	62%	90%
Travel companion	65%	88%	73%	85%
Time	60%	76%	53%	82%
Expenditures	63%*)	68%	52%	75%
Accommodation	68%	86%	61%	92%
Activities	64%	80%	60%	84%
Mode of transportation	69%	92%	69%	94%
Trip organisation	63%	82%	54%	90%

Note: *) not significant, all others at least significant at $p < 0.05$.

The core research question about differences among different traveller groups is addressed by the next step in the analysis (see Table 2). The first two columns differentiate between two groups of travellers who either did not or did use their own experience for any of the seven given sub-decisions. The first one accounts for one third of the sample. In general the comparison of both columns demonstrates that travellers not referring to their own travel experience at all take fewer sub-decisions. All differences are significant at least at a p-level of $< .05$ except for travel expenditures. Large differences are visible for mode of transportation, travel time and travel organisation. The following columns right to the latter ones divide travellers who do not make use of internet sources at all from those who are using at least one

external information source from the Internet. The first group accounts for 39% of the sample. When comparing the decision making profile of both information search behaviour groups highly significant differences in the degree of decision making can be observed for all areas (except for travel companion with a p-level < .05). Similarly, travellers using internet sources have a much higher degree of determination of their trips. The differences are extremely large for travel organisation, accommodation, travel time and destination. Interestingly, the self-rated overall travel experience does not seem to have an impact whether own travel experiences are employed during the trip planning or not. In contrast, reported average annual travel frequency shows a weakly significant correlation. On the other hand, self-rated internet experience differs (weakly significant at $p < 0.1$) among the other two traveller groups who are either considering web sources or do not ponder about them.

4.2 Information search activities: entire trip

Before analyzing the information search behaviour attached to each sub-decision the compound information search activities for the entire trip preparation is going to be investigated (see Table 3). The list of information sources consists of one internal (own experience), seven other traditional and eight internet sources. The first column indicates the share of respondents who used this particular information source for one or more sub-decisions. Two thirds rely on their own experience. Other single sources are mentioned much less frequently. Personal information from friends is considered for almost every second trip plan. Overall, 85% of the trip planning activities are based on some sort of external information source.

Tour operator websites, travel agency contacts and conventional tour operator brochures are used by about 40% each. This ranking is followed by two other internet sources: accommodation homepages (37%) and general internet pages (e.g. newspaper travel sections; 36%). Another more neutral source (travel guides and journals) comes next in this ranking with 34% on average. Printed accommodation brochures are much less frequently considered (only 29%) compared to similar information which can be found on the Internet.

Table 3 offers additional insights into the intensity or simply the repeated usage of the mentioned information sources over the course of the trip planning duration. The second column reports on the average usage frequency based on all respondents; the third considers only those trip plans for which a particular source has been reported to be used. Again, own experience leads the ranking whereas information from friends is by far less intense. The list is followed by two other traditional sources: tour operator catalogues and travel agency contacts. Internet sources do not play such a dominant role on average. This rank order does not change a lot if only those respondents are considered who reported to make use of the particular source. The fourth column highlights correlations between source usage and expected travel expenditures. Besides traditional tour operator and travel agency information only non-commercial sources (travel guides and magazines, communities/for a, online tour guides and travel magazines) seem to make a substantial difference.

The following columns (5 and 6) deliver some evidence that travellers have different information search behaviour contingent on their own experience. Overall, travellers stating to use their own experience for decision making exploit various external information sources more extensively. This evidence of differences is statistically significant only for two internet based sources (accommodation and destination office homepages) and four traditional sources: accommodation brochures, destination offices, travel guides and information from friends. In addition to that, the information source activities are compared again between those using the Internet as a source for trip related information and those who do not use the Internet for this purpose (column 7 and 8 of Table 3).

Table 3. Usage and frequency of information sources

Sub-decision	*Usage level of source overall*	*Average frequency of info activities*	*Average frequency of info activities*[1)]	*Correlation with travel expenditure*	*Without own experience*	*With own experience*	*Without internet sources*	*With internet sources*
Internet sources								
Tour operator homepages	41%	1.2	2.9	n.s.	36%	44%	0%	67%
Travel agency homepages	27%	0.7	2.6	n.s.	22%	30%	0%	45%
Communities / fora	13%	0.4	2.8	.22	11%	14%	0%	21%
Accommodation homepages	37%	1.1	2.9	n.s.	*24%*	*44%*	0%	61%
Online tour guides and journals	23%	0.6	2.7	.21	21%	25%	0%	38%
Destination office homepage	26%	0.7	2.7	n.s.	*18%*	*31%*	0%	43%
General internet pages	36%	0.9	2.6	n.s.	28%	40%	0%	58%
Other internet sources	19%	0.4	2.2	n.s.	17%	20%	0%	31%
Traditional sources								
Tour operator catalogues	39%	1.6	4.1	.36	35%	42%	*29%*	*46%*
Travel agency offers	40%	1.5	3.9	.19	35%	42%	*28%*	*47%*
Information from friends	48%	1.9	4	n.s.	*36%*	*54%*	*33%*	*58%*
Accommodation brochures	29%	0.9	3	n.s.	*17%*	*35%*	*20%*	*35%*
Travel guides, magazines	34%	1	3.1	.29	*24%*	*39%*	*21%*	*42%*
Destination information office	21%	0.6	2.8	n.s.	*14%*	*25%*	*12%*	*28%*
Own experience	67%	2.8	4.4	n.s.	0%	100	*54%*	*75%*
None of the above	24%	0.5	2	n.s.	19%	27%	19%	28%

Note: only sources in italic are significant at least at $p < 0.05$; n.s. = not significant; 1) based on only those travellers who used this item.

The upper part of the table does not need further explanation because the differences are by definition. However, all the other explicit traditional information sources are used much more frequently by those who are using information from the Internet for their trip planning. These differences are quite remarkable for the categories "own experience", "information from friends" and "travel guides, journals" and "travel agency offers".

If traditional sources (except own experience) are considered simultaneously they appear to play a role in decision making for almost four out of five travellers (see Table 4). The equivalent ratio for internet based information sources amounts to 61% or six out of ten travellers. On the other hand the share of commercial and non-commercial sources referred to the compound traditional and internet sources used is similar: 90% and 80% respectively. In contrast, traditional personal sources (friends and relatives, travel agents' information) are still dominant (66%) compared to some kind of personal information found on the Internet (13%).

Table 4. Usage and frequency of types of information sources

Sub-decision	*Trip planning overall*	*Total info activities Average*	*Total info activities if taken*	*Correlation with travel expenditure*	*Without own experience*	*With own experience*	*Without internet sources*	*With internet sources*
Internet sources compound	61%	6.0	9.8	n.s.	46%	69%	0%	100
Traditional sources compound	80%	8.1	10.1	n.s.	64%	88%	61%	93%
Internet sources: commercial	56%	3.7	6.6	n.s.	42%	63%	0%	92%
Internet sources: non-commercial	48%	2.3	4.8	n.s.	38%	54%	0%	79%
Traditional sources: commercial	74%	4.6	7.2	.37	50%	71%	46%	76%
Traditional sources: non-commercial	63%	3.0	4.8	.27	46%	71%	41%	76%
Internet sources: personal	13%	0.4	2.8	.22	*11%*	*14%*	0%	21%
Traditional sources: personal	66%	3.5	5.3	n.s.	53%	72%	48%	77%
All sources compound	85%	14.1	16.6	.29	67%	94%	61%	100

Note: sources in italic are not significant, all others at least significant at $p < 0.05$; n.s. not sign.

If the frequency of usage of traditional sources is calculated (8.1) the difference compared to internet sources (6.0) is substantial. If one would argue that this is an effect of the overall lower usage of or access to the Internet (which is probably an outcome of a sampling bias) the adjusted frequency ratios in the third column should be compared. The difference almost disappears so that neither a dominance of internet based source usage/relevance nor an overweight of traditional sources can be identified. The correlation with the expected travel expenditures can be considered as a proxy of the relevance of the particular source category. In general, the correlation

with all information sources used is significant with a coefficient of .29. While traditional sources (commercial and non-commercial ones) show also correlations in the same direction only personal internet sources (i.e. communities and fora) contribute to some degree (corr. = .22) to the overall association.

Finally, differences between groups of travellers with different information usage patterns can be inspected in columns 5 through 8 of Table 4. With the exception of personal internet sources (i.e. communities/fora) all groups of sources are utilized significantly more intensively by travellers relying either on their own experience or on some internet source. The difference for non-commercial traditional sources is especially large.

4.3 Travel sub-decisions and information sources

A final step of analysis consists of comparing source usage frequencies across different sub-decisions. Percentages in Table 5 refer to those travellers who were drawing on information from the listed sources at least once.

The table can be investigated from both directions. Row by row (i.e. by different information source), the strength of relevance can be derived across seven sub-decisions. Column by column (i.e. by each sub-decision) the profile of information sources used can be identified. For reasons of space restrictions only some outstanding findings are commented in the following. Own experience is the single most important source for all sub-decisions. The highest ratio of consideration appears for mode of transportation. Information from friends ranks on second position for the majority of items. For accommodation decisions, however, information from tour operator brochures, accommodation websites and travel agencies are more significant. And, the issue of trip organisation is probably more influenced by more commercial sources: i.e. tour operator brochures and travel agencies.

Table 5. Information sources used (in %) for travel sub-decisions

Sub-decision	*Duration*	*Destination*	*Time*	*Accommodation*	*Activities*	*Mode of transportation*	*Trip organisation*
Internet sources							
Tour operator websites	19	20	13	19	12	11	14
Travel agency websites	12	12	9	11	8	6	6
Communities / for a	7	5	4	6	7	3	3
Hotel/Accommodation websites	19	16	10	24	11	5	15
Online travel guides and journals	9	10	6	6	8	6	8
Destination office websites	12	11	6	9	12	5	9
General internet pages	16	14	10	13	10	9	11
Other internet sources	8	7	5	6	3	7	4
Traditional sources							
Tour operator brochures	20	20	16	26	20	14	19
Travel agencies	20	21	19	24	17	16	19
Friends/relatives	29	31	23	22	22	18	16
Hotel/Accommodation brochures	11	13	9	15	11	7	9
Travel guides, journals	16	17	12	11	17	9	9
Convention & visitor bureaus	8	6	4	6	12	6	8
Own experience	32	40	28	38	37	46	40
None of the above	7	5	11	2	6	11	4

5 Discussion and Implications

This panel based study allowed for some new insights and partial revisions into information search activities and trip planning. 55% of the monitored trip plans last up to half a year. On average, 7 out of 9 sub-decisions are taken to prepare the vacation trip. The more decisions are taken prior to departure the longer the planning tasks endure (corr. = .37). The most frequent sub-decisions are on means of transportation, travel companions and accommodation (in this order). In contrast, decisions on accommodation, travel duration and destination require the most input from external information sources. Only 15% of the analysed trip plans do not need any external information. One third of the travellers do not employ their own travel experience for any of the given sub-decisions. Surprisingly, this phenomenon does not

coincide with a low perception of someone's own travel experience. In addition, own experience does not compensate additional external information. It almost boosts the need for and application of other sources: traditional and web based ones.

The results on the relevance of different information sources are diverse. Overall, own experience and information from friends and relatives are the most consulted sources. Tour operator homepages are ranked on third place. This pattern holds for all inspected sub-decisions except accommodation: in this case information from friends are less important compared to accommodation homepages. A comparison with previous studies on information search behaviour is difficult since some of them concentrate on destination decision making only (e.g. Bieger & Laesser, 2004; Beritelli, Bieger & Laesser, 2007) while others have their focus on vacation planning in general. Sampling structures with particular destination preferences (e.g. domestic vs. abroad, short haul vs. long haul, independent travellers vs. tour operator customers) have a major impact on information sources used.

Finally, the role of web information sources is sensitive to the referred time frame. Information from the Internet is meanwhile relevant for about 60% of vacation travellers. Ten years back the Internet as an information source was mentioned by only 5% on average (Gursoy & Umbreit, 2004: data from 1997). A similar level was reported for the internationally mixed guests travelling to Austria (Zins, 2002: data from 1997 to 2001). However, it has by far not replaced traditional sources relevant for trip planning purposes. Even the usage frequency for decision making is not higher compared to traditional sources. Non-commercial sources are less intensively used in contrast to commercial ones. This difference appears for traditional and web based sources in the same way.

Limitations have already been mentioned in the methodology and results section to some degree. Readdressing the panel study approach, much more experience has to be accumulated with this method enabling researchers to better judge on the reliability and validity of similar studies.

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Acknowledgements

The present panel study was funded by the Jubiläumsfonds der Oesterreichischen Nationalbank and conducted in cooperation with Ruefa and TUI Österreich as sponsors.

Destination Management Systems (DMS): A Reality Check in the Greek Tourism Industry

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Abstract

Despite the importance of DMS on the competitiveness of small and medium tourism enterprises (SMTEs), SMTEs' representation in DMS has been low and problematic. Previous studies have primarily focused on examining DMS adoption from a SMETs' perspective, while being interorganisational systems, DMS's stakeholders may have conflicting and different interests. This study adopts a multi-stakeholders' approach for investigating the factors influencing DMS adoption and operation in the Greek tourism industry. Data were collected from a nation-wide survey targeting all tourism stakeholders and investigating their perceptions about the development, adoption, organisational structure and performance evaluation of DMS. The findings confirmed some conflicting perceptions between private and public organisations, while their practical and theoretical implications are also discussed.

Keywords: destination management systems; adoption; stakeholders; evaluation

1 Introduction

The development and operation of DMS can substantially support and enhance the competitiveness of tourism destinations and specifically of the small and medium tourism enterprises (SMTEs), that represent the majority of firms at many destinations but they lack the technological and financial resources for operating equivalent electronic distribution channels (e.g. Frew & O' Connor, 1999; Archdale, 1993; Frew & Horan, 2007). However, although DMS *raison d'être* is focused on the support of SMTEs, several authors (e.g. Beaver, 1995; Morrison, 2001; Morrison & King, 2002; Frew & Horan, 2007) achieving SMTE DMS representation is low and faced with difficulties, which in turn inhibits the effectiveness of DMS and demotivates other firms joining the DMS's activities (Frew & Horan, 2007). Thus, previous studies investigating DMS adoption have mainly focused on SMTEs' perspectives concerning their use and attitudes about DMS (Frew & O'Connor, 1999; Morrison, 2001; Morrison & King, 2002). However, recent studies providing preliminary evidence of conflicting stakeholders' perceptions about the role and the performance evaluation of DMS (Frew & Horan, 2007) advocate that a multi-stakeholder approach is a more holistic approach for studying DMS adoption and operations. Being inter-organisational information system (IOIS) (Chen & Sheldon, 1997), a multi-stakeholder approach is also a more robust methodological way to study DMS.

This study adapts the framework of IOIS (e.g. Kumar & Crook, 1999; Iacovu et al. 1995; Zhu et al. 2004) for developing a more holistic examination and interpretation of the factors influencing the adoption and operation of DMS in the Greek tourism industry. Data were collected through a nation-wide survey conducted by the E-Business Forum (National Centre of Research & Development) and targeting all tourism stakeholders for investigating their perceptions about the development, adoption, organisational structure and performance evaluation of DMS. The findings contribute to the field by examining DMS adoption and performance evaluation from a multi-stakeholder approach. Practical and theoretical implications are discussed.

2 DMS: Definition and Factors Affecting DMS Adoption

The lack of a commonly agreed terminology of DMS led researchers to create their own DMS conceptualisation depending on their perspective and perceived role of the DMS itself (e.g. Vlitos-Rowe, 1992; Pringle, 1995; Sussman & Baker, 1996; Buhalis & Spada, 2000; Chen & Sheldon, 1997; O'Connor, 1999). However, the inter-organisational role of DMS that aim to link tourism demand with tourism suppliers, and specifically empower SMTEs to distribute their products, has been one of the most widely agreed fields relating to the definition, role and features of DMS. For example, Chen & Sheldon (1997) defined the DMS as an inter-organisational system that links tourist products, suppliers and offers, with consumers and intermediaries in order to enable easy access to complete and up-to-date destination information and allow reservations and purchases. A more comprehensive DMS definition derived from a Delphi survey of researchers and experts advocates (Frew & Horan, 2007: 63): "DMS are systems that consolidate and distribute a comprehensive range of tourism products through a variety of channels and platforms, generally catering for a specific region, and supporting the activities of a destination management organisation within that region. DMS attempt to utilise a customer centric approach to manage and market the destination as a holistic entity, typically providing strong destination related information, real-time reservations, destination management tools and paying particular attention to supporting small & independent tourism suppliers"

Although DMS aim to empower SMTEs by having an e-presence and e-capability, SMTEs' demonstrate low levels of participation and motivation to use DMS. In turn, this limited representation has an vicious circle impact on DMS adoption, because of network externalities effects: the less SMTEs are in the system, the fewer tourists are willing to use it, and so, the fewer SMTEs are willing to subscribe to them. This lack of comprehensiveness and low representation of suppliers in DMS is found as a major cause of failure for several DMS internationally (e.g. Sussmann & Baker, 1996, Mutch, 1996; Daniele, Mistilis & Ward, 2000; Morrison & King, 2002; Tourism Training Victoria, 2002) and research investigating the factors and SMEs' perceptions inhibiting them to adopt DMS has boomed (e.g. Sussman & Baker, 1996; Palmer & McCole, 2000; Archdale, 1994; Palmer, 2004). Low DMS participation is widely attributed to SMTEs' lack of technology skills, which coupled with difficulties in the sign-up process and technology use creates a lack of confidence and trust in the DMS (Sussmann & Baker, 1996; Mutch, 1996; Daniele et al. 2000; Morrison & King, 2002;

Tourism Training Victoria, 2002; Beaver, 1995). The impact of technology factors (such as DMS's reliability, quality and user-friendliness) on DMS adoption is also reported, however studies (e.g. Wang, 2008) advocate that additional organisational and not only technology issues affect SMTEs participation in and success of DMS.

Several studies (Palmer & McCole, 2000; Palmer, 2004; Morrison & King, 2002) revealed the impact of firms' concerns about the DMS utility and performance, i.e. comparison of the participation value and its cost. For example, the majority of the surveyed small serviced accommodation providers in S.W. Ireland disagreed about the participation benefits in Gulliver (Blank & Sussmann, 2000), because although Gulliver was perceived as a cost effective means of promoting their business, while it did not reduce the need for other promotional costs and cooperative marketing efforts. Perceptions about DMS performance and cost-value evaluation were found to be heavily affected by the different perspectives and beliefs of various stakeholders on DMS' role and performance evaluation (Frew & Horan, 2007). For example, although firms perceive and require DMS to generate a substantial number of e-bookings, this is not shared by the DMS operators, who perceive their role mainly responsible for creating, protecting and enhancing the brand image and promotion of the whole destination. Disagreement and different perceptions on DMS's role and performance evaluation may also be responsible for the poor DMS adoption and operation. The cost of DMS membership and/or transaction fee (booking commission) is also found (e.g. Blank & Sussman, 2000; Morrison, 2001; Morrison & King, 2002; Tourism Training Victoria, 2002) as a demotivator for SMEs to join DMS. Commission percentages were also perceived as too high and raised firms' suspiciousness about the transaction auditing process and the reliability of the DMS operator (Palmer, 2004). Firms' reluctance to pay commissions, disclose data of room allocations, prices and availability also inhibited DMS participation (Sussmann & Baker, 1996; Archdale, 1994). Overall, factors related to SMTEs' inter-organizational relationships with the DMS operator and other participating firms influence DMS participation and use. Other studies (Morrison & King, 2002; Tourism Training Victoria, 2002; Morrison, 2001; Daniele et al. 2000) also mentioned communication problems between the DMS operator and tourism firms as an inhibiting factor for DMS participation.

Overall, research shows that low DMS adoption is mainly attributed to organisational, technological and managerial issues related to SMTEs such as: reluctance to use ICT; lack of training (Bedard et al. (2008) stressed the importance of SMTEs IT training); poor strategic management and marketing skills; the short-term operational focus of managers; lack of basic ICT infrastructure (e.g. PMS) that requires DMS connectivity with laborious, time consuming and inefficient manual processes; reluctance to allocate and/or maintain adequate and up-to-date room inventory in DMS; low perceptions about the marketing and cost effectiveness of DMS; inter-organisational relationships (trust, communication and coordination) amongst SMTEs and the DMS operator; reluctance to pay commission for sales and/or participation in DMS. These inhibiting factors combined with the relative low value of DMS bookings/transactions make it very difficult to achieve viable business models and revenues for ensuring DMS survival. DMS participation has frequently been affected by the ineffectiveness of the (usually public) organisation operating the DMS due to its organisational

inefficiencies, poor databases and IT systems, bad communication, trust and co-operation with the tourism sector (Frew & O'Connor, 1999). For example, French (1994) found that the structure of public sector organisations is not suitable for carrying out distribution functions. To address such intra- and inter-organisational problems, there have been many (successful and unsuccessful) attempts to create partnerships between the private and the public sector for developing and operating DMS (Mistilis & Daniele, 2004). Some sectors criticize the formation of PPP for operating a DMS as an anticompetitive behaviour, as subsidising an organisation to provide travel services results in unfair competition to private travel firms (O'Connor, 1999). Arguments for public organisations offering booking services posit that the former are required to ensure DMS comprehensiveness and unbias, as private DMS have little incentive to incorporate/support SMTEs (Hurst, 1992; O'Connor, 1999).

Previous studies have examined the adoption, operation and success of DMS by mainly focusing and penalising SMTEs for poor DMS participation and performance. In examining DMS success criteria, Buhalis & Spada (2000) took a stakeholder perspective, but they focused only on the design of DMS features and services. However, DMS development and success is a more complex issue involving all stakeholders and their (different) perceptions about the role, organisational and finance structure, and the methodology and metrics of DMS performance evaluation. Previous studies are also limited because they have only examined the perceptions of firms being already DMS members excluding others non participating firms.

3 Theoretical Frameworks Explaining DMS Adoption

Being IOIS in tourism, research on the adoption and success of IS and IOIS provides a solid theoretical background for explaining DMS adoption and usage factors. DeLone & McLean (2003) advocated a comprehensive six dimensional model of IS success for examining IS, its use and its consequences: IS quality measuring technical success (ease of use, functionality, reliability, flexibility, data quality, transportability, integration and importance, system response time); information quality (personalised, precise, complete, relevant, coherent, easy to understand and secure information); quality of the service provided (based on SERVQUAL); use (frequency, navigation time, number of accesses, mode of use and dependence); user satisfaction; individual (better task/decision-making performance, work environment), organizational (market impact, strategic, transactional, efficiency, control) and inter-organisational or societal impacts measure IS effectiveness success. Larsen's (2003) meta-analysis of variables found in IS, technical and organisational journals (83 focal constructs and 865 concepts) stresses the influence of organisational factors: 5 constructs categories were found to affect IS success: technology; IS expertise; organisational dimension (structure, environmental complexity & inter-organisational relationships); communication about tasks; individual- and job-related dimensions. Kumar & Crook's (1999) IOIS multidisciplinary success framework includes the following factors: *collaboration* combining economic, strategic and social elements (e.g. value sharing and trust) and conflict management; *organisational* factors related to the organisation (size and resources), the individual (involvement, perceived simplicity, task

importance and time) and leadership style; *technologies* including security, standardisation, system integration and level of IS competence. Collaboration factors stress the impact of aligning perceptions and values amongst IOIS stakeholders, while organisational factors stress the need to have organisational support like training, upper management involvement, implementation planning, estimation and impact evaluation (Bergeron & Raymond, 1992). Financial resources and technological skills are key success factors for a firm operating and participating in IOIS (Iacovu et al. 1995; Zhu et al. 2004; Wang, 2008). Concerning technological factors, studies revealed the significance of the firm's IT skills and readiness reflected in the intensity of its IT use (Zhu et al., 2004) and the integration degree of the new IOIS with other existing IS (Bergeron & Raymond, 1992; Iacovu et al. 1995; Zhu et al. 2004).

Other studies have also stressed the impact of the following factors on IOIS adoption: diversity of IS functionalities (Zhu et al. 2004); diversity and number of participating firms (Bergeron & Raymond, 1992; Iacovu et al. 1995; Teo et al. 2003); sector competitiveness (Bergeron & Raymond, 1992; Cavaye & Cragg, 1995; Chwelos et al. 2001; Zhu et al. 2004); dependence or interdependence, cooperation, partner's power and inter-organisational trust. Arguments showing the power and dependence factors in inter-organisational relationships draw from the socio-political perspective (Ramamurthy et al. 1999), institutional theory and resource dependence (Teo et al. 2003). The tourism product is complex and diversified and so, DMS participation from various firms can boost DMS adoption and use. Power and dependence factors were also found to affect IOIS adoption in tourism: e-procurement adoption (Sigala, 2006) was driven by pressures of SC players, e.g. suppliers, partners and B2B customers (Bergeron & Raymond, 1992; Iacovu et al. 1995). Apart from normative pressures, firms with high power in IOIS can influence IOIS adoption by offering a compensation system or using coercive or threatening measures (Chwelos et al. 2001; Iacovu et al. 1995). Mimicry of practices of other successful firms can also influence IOIS adoption for enhancing their professionalism or status (Sigala, 2006; Barringer & Harrison, 2000; Teo et al. 2003). Interdependence and collaboration in IOIS also stress the impact of trust, commitment, conflict management, shared values, aligned strategies and operations of IOIS stakeholders on IOIS use & performance (Lee & Lim, 2005; Sigala, 2006; Kumar & Crook, 1999; Zhu et al. 2004).

4 Research Aims and Methodology

A recent study of the E-Business Forum (www.ebusinessforum.gr) group on DMS found that the Greek tourism industry has been very late in developing DMSs at national, regional and local destination levels. To further examine this, the E-Business Forum Group undertook a nation-wide survey (12/2007 – 2/2008) targeting all tourism stakeholders with the aim to investigate their perceptions about the adoption, organisational structure and performance evaluation of DMS. For ensuring content validity, the research instrument was based on previous literature regarding DMS, IS and IOIS adoption and performance success factors, while the questionnaire was also pre-tested by conducting four focused groups with tourism stakeholders that were

organised along the proceedings of the E-Business Forum Group in DMS. The questions' categories referred to: perceptions about the DMS functionality, role and evaluation; (inter)-organisational and technological factors affecting DMS adoption; perceptions about the current and future use and organisational development of DMS; respondents' profile (size, type, management style and IT use of firm). Data were collected by an e-mail survey sent to 2,000 tourism firms and organisations listed in databases of the: E-Business Forum; tourism professional organisations; traveldailynews.com (e-tourism news portal); Institute of Local Administration (for targeting public DMOs). 427 usable questionnaires were received (response rate of 21,35%) mainly due to the participation of many respondents in the E-Business Forum's events and the latter's reputation in the Greek tourism industry.

5 Analysis and Discussion of the Findings

Respondents represent a variety of tourism stakeholders. Respondents represent: DMO (12.6%); accommodation providers (46.1%); travel agents and tour operators (20.6%); casino (0.4%); rent-a-car (1.8%); cultural organisation (11.2%); food-service & bar operators (4.9%); wineries (2.1%). The management governance of respondents refers to: 54.3% independent private firms; 3.5% part of a chain; 2.1% consortia members, 37.9% public organisations, 2.1% management contract/franchisees. Business size of respondents: 49.8% (1-9 employees), 43.7% (10-49 employees), 4.4% (50-99 employees), 1.8% (99+ employees). Respondents' IT usage was relatively low [internet presence (87%); e-commerce (44%); GDS (13%); Intranet (0.4%); e-procurement (0.8%); CRM (0.2%)], and intentions for future It investments were low [23% claimed that their IT investment will increase in the next 3 years, for 11% would decrease and for 66% would remain constant]. Respondents' perception about the development stage of their destination: 10% declining, 37% mature, 44% developing, 9% unknown. 64% of respondents claimed no existence of a DMS developed/operated in their destination, while the remaining (36%) claiming DMS existence reported the following satisfaction with DMS performance: 5.9% (totally satisfied), 22.8% (satisfied), 28.5% (neutral), 17.1% (dissatisfied), 25.7% (totally dissatisfied). Existing DMS were operated by: a public organisation (20%); a tourism firms' association (16%); a PPP (16%); a private firm (44%).

A factor analysis was undertaken for identifying the particular perceived factors affecting DMS adoption. Factors were extracted with a principal component analysis and the factor matrix was rotated using the varimax method. Four factors are found to explain the 69.22% of the variance (Table 1) with a high level of reliability ($\alpha>0.7$): 1) organisational & managerial inefficiency of publicly operated DMO; 2) lack of activities aiming for destination management; 3) firms' IT infrastructure, skills & attitude; 3) DMS features & characteristics. T-tests conducted for examining differences between respondents' perceptions representing private and public organisations revealed that generally there are not significant differences regarding the factors affecting DMS adoption and/or good operation. It is interesting that the inefficiency of publicly run DMO and the deficiencies of tourism firms are equally admitted and recognised as highly influential factors by both private and public firms.

Statistically significant differences were found on 3 only perception items. Relative to private firms, public organisations reported significant better perceptions about the efficiencies-appropriateness of DMS as an e-channel as well as their benefits comparative to their operating costs. In other words, public organisations still appreciate more than private firms the benefits that DMS can provide to SMEs and destination marketing (although they cannot deliver them). On the other hand, private firms (mainly due to their disappointment from the existing or not existing DMS and their knowledge/experience from the benefits they get by using other e-channels) were significantly more negative about the benefits-efficiencies of DMS that they also do not currently get. moreover, small private firms (with less than 9 employees) also reported hold more positive perceptions about DMS efficiencies and benefits than larger private firms (more than 9 employees $t=0.0032$, $\alpha=0.05$). This may be due to the fact that larger firms have the knowledge, skills and funds to use other e-channels relative to smaller firms that may rely solely on DMS. Public organisations also claimed statistically significant lower impact of the lack of a DMO on DMS adoption than private firms. So, although public organisations recognise their inefficiencies in designing and implementing destination management activities, they still consider their body as playing an important DMO role at their destination that can influence DMS adoption and use. Obviously, such an approach is myopic since before adopting and participating in a DMS, tourism firms would first expect that the DMS operator designs and implements efficient and effective DMO activities online and off line.

A principal component analysis and a varimax method for rotating the factor matrix identified four factors (explaining 67.66% of the variance, $\alpha>0.7$) perceived appropriate for evaluating DMS performance (Table 2): 1) firms' DMS costs and benefits; 2) performance metrics of DMS; 3) DMS destination impacts; and 4) DMS information performance. Mean values of factors' items show that respondents place higher significance to DMS performance metrics referring to the DMS value on firms and to metrics measuring the operational, short-term DMS-portal performance. Metrics related to DMS performance on the destination as whole received much lower significance, which illustrates respondents' focus on private DMS benefits and their myopia to the benefits of collaborative destination practices such DMS. This individualistic attitude was also evident in numerous firms participating in E-Business Forum workshops. This oversight to wider DMS benefits may also be due to firms' stress on making a ROI on costs for using DMS (relative to the costs provided to other e-channels). Respondents' low means values to the significance of metrics measuring the DMS performance on information issues may be related to the fact that such issues are taken for granted (as standards) that they need to be provided and so, not very important to use a crucial DMS performance metrics. T-tests also identified that relative to public organisations, private firms reported significant higher significance on the suitability of metrics related to firms' DMS benefits/costs and significant lower perceptions about the significance of metrics related to DMS performance impact on the destination as a whole.

Table 1. Perceptions about the factors affecting DMS adoption and/or good operation

(1 – 5 Likert scale, from strongly disagree to strongly agree) ** significant at α=0.05*	**N=427**		**t-test**	**F1**	**F2**	**F3**	**F4**
	M	SD	t	**α=84**	**α=83**	**α=83**	**α=80**
Inefficient public mechanism	4.21	0.74	1.836	0.902			
Efficient management of the public DMO	4.09	0.77	1.358	0.857			
Lack of a skilled/specialised labour force at the public DMO	4.27	0.82	0.892	0.802			
Lack of a strategy and/or tourism policy of the public DMO	4.31	0.87	0.285	0.812			
Bureaucracy of the public DMO	4.37	0.88	3.674	0.785			
Lack of trust and commitment to public DMO activities	4.03	0.91	0.032	0.845			
Bad cooperation & communication with public DMO	3.98	0.84	0.261	0.881			
Lack of tourism planning, policy & strategy at national level	4.39	0.92	1.712	0.756			
Lack or inefficient financial resources for the public DMO	3.91	0.97	0.682	0.782			
Philosophy of DMS development for getting public subsidies without a strategy for sustainable & long term development	3.96	0.85	0.022	0.734			
Lack of a central body and/or procedures to collect & analyse destination data	4.29	0.87	1.156		0.843		
Lack of a DMO at the destination	4.01	0.91	0.001*		0.803		
Lack of a leading firm to motivate and push DMS adoption	3.61	0.83	1.562		0.811		
Conflict of stakeholders' interests at local destination	3.56	0.94	0.936		0.776		
Lack of IT infrastructure in tourism firms	3.87	0.92	1.283			0.809	
Lack of IT skills and education in tourism firms	3.86	0.89	1.372			0.778	
Difficult to integrate DMS with existing IT applications	3.21	0.98	1.116			0.783	
Cost for joining or using a DMS is high	3.34	1.12	0.736			0.726	
Lack of organisational/managerial structures in tourism firms to support DMS use	3.27	1.01	1.428			0.733	
Competing tourism firms do not participate in DMS	3.01	1.13	1.294			0.703	
There are better & more efficient e-channels than DMS	3.68	1.04	0.001*				0.683
High operating costs of DMS relative to its benefits	3.92	1.14	0.003*				0.702
Low functionality and customer value offered by DMS	3.07	1.41	1.472				0.634
Lack of training to firms regarding DMS and its benefits	3.12	1.23	0.836				0.642
The DMS is difficult to use	3.04	1.16	1.036				0.601
It is not easy to learn to use the DMS	3.01	1.09	0.936				0.612
Low quality or comprehensiveness of the DMS information	2.89	1.26	0.912				0.604
Percentage of variance explained				39.01	11.13	10.02	9.06
Cumulative percentage of variance explained				39.01	50.14	60.16	69.22

Table 2. Perceptions about the evaluation metrics for measuring DMS performance

(1 – 5 Likert scale, from strongly disagree to strongly agree) * *significant at α=0.05*	N=427		t-test	F1	F2	F3	F4
	M	SD	t	α=81	α=80	α=78	α=78
Value of bookings from DMS	4.11	1.14	0.003*	0.902			
Number of bookings from DMS	4.04	1.13	0.852	0.883			
Cost per online DMS booking	4.01	1.09	0.023*	0.892			
Return on investment for online DMS bookings	4.01	0.82	0.046	0.842			
Subscription cost to the DMS	3.96	1.18	0.001*	0.857			
Promotion cost in the DMS	3.92	1.01	0.031*	0.827			
Number of visitors in the DMS portal	4.19	0.93	0.173		0.883		
Percentage of DMS users that make a booking	4.12	0.95	0.039*		0.892		
Navigation duration time of DMS users	4.08	1.01	1.941		0.863		
Number of users registered in the DMS	3.98	0.96	0.892		0.828		
Collection and analysis of DMS users' profile and behaviour	3.93	0.97	3.092		0.803		
Easiness of finding the DMS online portal	3.89	1.14	0.782		0.701		
Easy of use of the DMS online portal	3.89	0.94	0.918		0.815		
Reliability of the DMS online system	3.87	1.16	1.021		0.804		
Integration of DMS with other IS	3.82	1.12	1.182		0.805		
Impact on destination brand image and enhancement	4.01	1.12	0.001*			0.802	
Promotion and presence of destination on the internet	3.86	1.09	0.692			0.795	
Decrease of negative tourists' perceptions about the destination	3.81	1.15	0.041*			0.792	
Percentage of tourism firms being bookable on the DMS	3.77	1.09	1.723			0.790	
Purchasing power of tourists attracted by the DMS	3.77	0.93	1.038			0.762	
Number of tourists attracted to the destination by the DMS	3.70	0.89	3.924			0.807	
Tourists' satisfaction with destination information & services	3.68	1.14	0.021*			0.712	
Customer relationship development and maintenance	3.68	0.83	0.723			0.753	
Communication and interactions with tourists	3.67	1.18	0.020*			0.786	
Time and space diffusion of tourists in destination	3.67	0.94	1.024			0.742	
Provision on dynamic packaging tools	3.66	1.03	0.067			0.783	
Percentage of firms - organisations listed in DMS	3.64	1.26	0.001*			0.753	
Variety of firms - organisations listed in DMS	3.60	0.99	0.022*			0.711	
Quality and uniqueness of DMS information	4.12	0.92	1.832				0.702
Update frequency of DMS information	3.93	0.83	3.052				0.704
Multilingual DMS information	3.83	0.75	0.947				0.677
Provision/filtering of DMS content in a personalised way	3.52	0.92	1.276				0.652
Production/dissemination of content by using web 2.0 tools	3.22	1.02	0.939				0.627
DMS information integrated with that of other national DMS	3.18	1.11	0.893				0.602
Percentage of variance explained				38.41	10.20	10.02	9.03
Cumulative percentage of variance explained				38.41	48.61	58.63	67.66

Respondents' perceptions about the best DMS organisational structure (48.9% PPP, 42.8% association of firms, 4.2% private firm, and 3.9% public organisation) showed that firms appreciate more the operation of a DMS by a collective body rather than a private or public organisation, which is not surprising when considering the previous perceptions about the limitations and inefficiencies of both public and private firms; x^2 revealed no significant differences between private and public firms on this issue.

6 Conclusions and Implications for Future Research

The study contributed to the literature by providing and comparing the perceptions of several stakeholders about the factors inhibiting DMS adoption and the metrics for evaluating DMS performance. Inefficiency of public DMOs and their lack of plans aiming at (collaborative) destination management activities were perceived as the major inhibitors of DMS adoption by both private and public firms. Respondents focused on short-term/operational (vs strategic) and firms' specific (vs destination wide) DMS performance metrics; private relative to public firms placed statistically more significance to individualist rather than destination wide metrics. Size of firms and public status were also found to significantly affect respondents' perceptions about the value of DMS as an alternative e-channel. As, stakeholder characteristics was found to influence perceptions about DMS adoption and evaluation, further research should examine on how influential stakeholders can use different normative and coercive methods for boosting DMS adoption and performance evaluation. Power and conflict management issues within IOIS is also worthwhile to be examined from a multi-stakeholder approach in DMS operations. This is because findings showed that firms' experiences with DMO and DMS operations and their performances influence their attitude about DMS, their importance-role and consequently their DMS participation. Overall, future studies should focus on inter-firm DMS operational issues initially using qualitative methods to cater for stakeholders' different views.

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Do Emotional Mental Models Before and After an Effective Visitation of a Virtual World Differ?

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Abstract

The aim of the study is to find out the mental model of people concerning the virtual world Second Life. The present study bases the mental model on emotional feelings of people who think of service and product presentations in Second Life. In a first step the emotional mental model of test persons without prior knowledge of Second Life is uncovered. In a second step people effectively visited a hotel's appearance in the virtual world. After, they were asked again to tell their emotions concerning a service and product presentation in such an environment. Then, the gathered terms were allocated to the basic emotions proposed by Izard (1977) by 25 encoders. Results show, that there are differences between the emotional mental model before and after the visitation of the virtual world. Thus, indicating that expectations are not consistent with the actual experience in SL.

Keywords: Web 3.0, virtual worlds, mental model, emotions, Second Life (SL), Tourism

1 Introduction

Due to advances in technology it is possible to combine different activities in one single package which have been used separately before. Among those are voice communications, entertainment, information, and transaction. Virtual worlds are an ideal medium to offer such activities.

The Search Volume index of Google Trends shows that since 2006 people have increasingly been searching for the keyword "virtual worlds". The data is based on the average search traffic for the used term from 2004, January to present.

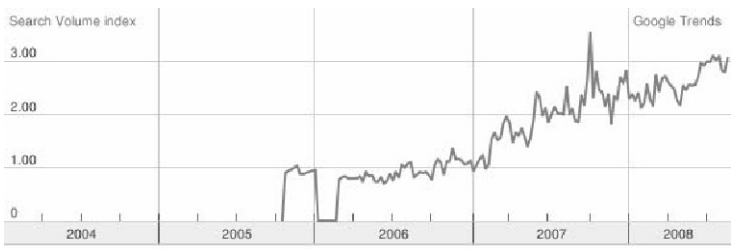

Fig. 1. Search Volume index for the keyword "virtual worlds"
Source: Google Trends (retrieved: 2008, September 03)

The ever increasing importance of virtual worlds motivates developers to make such online systems attractive and easy to use. These usability constructs, the fun factor as well as emotional perception of a system are important antecedents to build a critical mass of members (Rice, 1990; Markus 1987). A strong online community provides companies the chance to combine communication with other content. Moreover, data on user's behaviour can be gathered and a deeper understanding of customers' needs can be gained (Armstrong & Hagel, 1995).

This is true for the tourism industry too. However, there are still rather few organizations which have an appearance in a virtual world. In Second Life (SL) for example there are appearances of some tour operators (e.g. gratistours.com, Thomas Cook, TUI) but hotels are very rare. In the first half of 2007 a medium sized hotel established an appearance called "First Spa Hotel". This was right at a time were SL was very popular, see Fig. 2. The hotel received a lot of media coverage. Nevertheless, the hotels' manager decided to leave SL, i.e. to delete the appearance there - among other reasons, due to an insufficient amount of visitors. The hotels' appearance was not able to attract a critical mass of visitors.

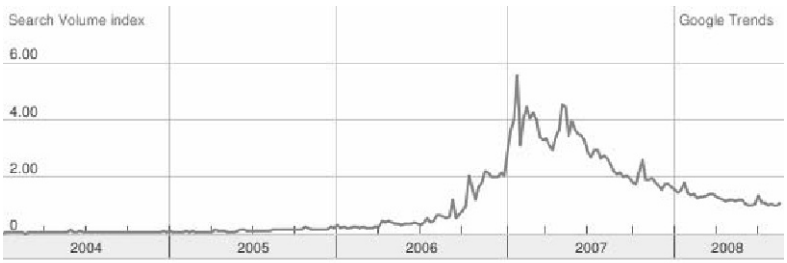

Fig. 2. Search Volume index for the keyword "Second Life"
Source: Google Trends (retrieved: 2008, September 03)

The figures published by Linden lab confirm this lack of a critical mass of residents, as the amount of premium accounts (for residents who are prepared to pay for the usage of SL) decreased for the first time in July 2007 (Second Life „Economic Statistics", retrieved: 24.09.2007). Moreover, a closer look at the density of population reveals that it does not increase as much as registrations itself (Schleser, 2007). Based on these facts the present study tries to find out if the reason for visiting SL just for a short period of time is a mismatch between users' emotional mental models before and after a visitation of SL.

The remainder of the paper is divided into the following sections: First an overview of relevant literature is given. Thus, the concept of the mental model is described and insight into relevant emotion theory is given. Then, the methodology used is presented, followed by the description of the samples and the results. Finally, important findings are discussed, limitations of the study are presented, and suggestions for further research are given.

2 Theoretical background

2.1 Mental model

With regard to the demand for usability of online-systems, human factors like cognition and perception play an important role for the development of such systems. The centre where all sensations are recorded is the human brain. How these sensations are perceived is depending on experiences, prior knowledge, the information processing style and the general intelligence. These antecedents of perception form the so called mental model (Van Der Veer & Felt 1988, Norman 2002).

"A mental model provides on immediate expectation about what you think is going to happen and the emotional system will evaluate that result, you will experience hope or anxiety (Norman in Parush, 2004)."

The mental model in the mind of the user is a framework for learning in new situations. New incoming information will be compared with already known structures in the brain then a new or adapted mental model is generated.

Beside the users' mental model also the designers' conceptual model is fundamental to develop a user friendly and successful online-system. Both of these models have to be incorporated in the systems' image. If the conceptual model is not consistent with the mental model users will link negative emotions with the system and thus will not use the system again (Norman 2002).

2.2 Emotions

Emotion theory tries to identify and describe certain emotions by special characteristics. Emotions can be similar in intensity and direction but may differ in subjective experience. Hence scientist identified different numbers of emotions based on different strategies, like e.g. dimension analysis (Wundt, 1992; Block, 1957; Mees, 1991) and basic emotions (James, 1884; Arnold, 1960; Frijda, 1986). Dimension analysis is heavily criticized due to the impact of the methodogical design used for an investigation. (Roseman, 2001; Scherer, 2003). Basic emotions are used to derive more specific ones. However, as Table 1 shows there is no consensus about which are the basic emotions and how many there are. The number of basic emotions analyzed range from two (Mowrer, 1960; Weiner et al, 1984) to eleven (Arnold, 1960) emotional concepts.

Several prior studies based their research on the classification by Izard (1977) or that by Plutchik (1980) (Brave & Nass, 2007, Gnoth et al, 2000).

The mental model stipulates, that people have certain expectations of how things should look like, how things should work and connect certain emotions with this. Therefore, people who never visited SL before have certain expectations based on e.g. media reports. However, these might change after they actually visited the virtual

reality. A change towards a more negative emotional mental model might be one reason why SL has not reached a critical mass yet. The critical mass is the required minimum number of users needed to sustain a diffusion process and to consider a new technology as successful (Rice, 1990; Markus, 1987). This paper tries to contribute to this question by investigating the following aspect:

Research question: Is there a mismatch between the emotional mental model before and after an effective visitation of Second Life (SL)?

Table 1. Basic emotions investigated in research from 1884 to 1987
Source: According to Ortony & Turner (1990)

Author	Year	Basic emotions investigated
James	1884	Fear, grief, love, rage
McDougall	1926	Anger, disgust, elation, fear, subjection, tender-emotion, wonder
Watson	1930	Fear, love, rage
Arnold	1960	Anger, aversion, courage, dejection, desire, despair, fear, hate, hope, love, sadness
Mowrer	1960	Pain, pleasure
Izard	1971	Anger, contempt, disgust, sadness, fear, guilt, interest, joy, shame, surprise
Plutchik	1980	Acceptance, anger, anticipation, disgust, fear, joy, sadness, surprise
Ekman et al.	1982	Anger, disgust, fear, joy, sadness, surprise
Gray	1982	Anxiety, joy, rage, terror
Panksepp	1982	Expectancy, fear, panic, rage
Tomkins	1984	Anger, contempt, disgust, distress, fear, interest, joy, shame, surprise
Weiner et al.	1984	Happiness, sadness
Frijda	1986	Desire, happiness, interest, sorrow, surprise, wonder
Oatley et al.	1987	Anger, anxiety, disgust, happiness, sadness

3 Method

Due to the lack of studies which investigate the consistency of emotional mental models of users before and after a visitation of virtual worlds an experiment was conducted in the field of hospitality industry in June 2007. The design included a convenience sample. The demographical, the internet usage and the gaming usage profile were surveyed. People without any experience with SL prior to this study (further on called: un-experienced) were invited to do the study in a laboratory at the Vienna University of Economics and Business Administration. Test persons were asked to name adjectives (one or two words only) by answering the following two questions:

“When I imagine a service presentation in Second Life (e.g. virtual massages) I feel:”
“When I imagine a product presentation in Second Life (e.g. shoes, cars) I feel:“

The differentiation between “product presentation” and “service presentation” was made because it was expected to gain even deeper insight. People were asked to answer the two questions mentioned above before and after their visitation in SL. At the hotel’s SL appearance all test persons had the chance to try the tasks offered, i.e. playing hangman, sitting at the bonfire, getting a massage, doing a round trip by chairlift, chatting with other visitors or employees of the spa, jumping into the pool, and dancing. The study participants were asked to do at least five of the offered eight tasks.

As the study was done in German language two experts discussed a possible translation of the gathered words (adjectives). Another two experts independently translated the words. During a further discussion all four experts agreed upon the most suitable translation. The two lists (words expressed before visiting SL and words expressed after visiting SL of all groups) were adjusted for double entries, words which did not express any emotion, and other useless words. Then, the basic emotions defined by Izard (1977) have been used and encoders were asked to allocate the list of words to the appropriate basic emotion based on their feeling. They did this online via a card-sorting tool. For the present study the classification by Izard (1977) was used because it has two more basic emotional concepts than the classification by Plutchik (1980) and therefore promised more detailed results.

Then, the authors aggregated the ten emotional concepts by Izard (1977) into two categories, i.e. positive (joy, interest, and surprise) and negative (anger, contempt, disgust, distress, fear, and shame). Thus, it is possible to find out if the allocated emotional direction of the terms is unambiguous. To be unambiguous at least two third of all allocations had to be either positive or negative otherwise the direction is seen as ambiguous. To find out if a term was allocated directly to one basic emotion a hard margin was defined which took into account how many basic emotional concepts have been served by the test persons. If e.g. six concepts were served, a uniform distribution between these six concepts would be 16.67 %. Then, the difference from the second most served concept and the concept with most allocations had to be equal/more than one third of the uniform distribution (i.e. 5.56 were added to the second most served concept). To confirm the allocation of the words to the basic emotional concepts (using the determined hard margin) a principle component analysis (PCA) with Varimax rotation was calculated using SPSS. Finally, the emotional mental model before the visitation of SL and the emotional mental model after the effective visit in SL were compared by using the non-parametric test McNemar. To do this calculation the emotional concept which was determined by using the “hard margin procedure” was used for the purpose of the present paper. Finally, results for service and product presentations are compared.

4 Results

4.1 Description of the samples

In the SL-study a convenience sample of 112 people passed through the whole procedure of the experiment. For the purpose of this study 47 people delivered appropriated data. The sample consists of 51.1 % female and 48.9 % male test persons. 83.0 % are less than 30 years old. 25.5 % graduated from university and 70.2 % of the test persons have the general qualification for university entrance. Concerning internet usage the sample of un-experienced test persons on average is 17.0 hours online, play 0.3 hours online games, and visit 1.3 hours per week all kinds of VRs (other than SL, e.g. Papermint, World of Warcraft). Nearly all test persons search for information online, before doing a hotel reservation. 78.7 % always search for information online prior a trip, 17.0 sometimes, and the rest of them use other sources.

25 encoders were asked to allocate the emotional words gathered during the SL-study. 12 men and 13 female participated. 4 persons are between 20 and 25 years old, 16 are between 26 and 30 and 6 are older than 31 years old.

4.2 Terms and emotional concepts

Table 2 presents all the terms which have been gathered during the SL-study and which have been allocated to the basic emotional concepts by Izard (1977). Moreover, the table gives an overview if the direction (positive (2), negative basic emotion (3), and no clear direction (1)) of the terms allocated is unambiguous. As Table 2 shows, only eight basic emotional concepts have been served, i.e. no terms were un-ambiguously allocated to “disgust (Ekel)” and “shame (Scham)”. Moreover, only the term neutral (neutral) was allocated to the basic emotion “guilt (Schuld)”, whereby the direction of this term was ambiguous.

As Table 2 shows the principle component analysis more or less confirms the hard margin used by the authors. Factor loadings of the rotated results of all allocated terms were between 0.95 and 0.80. The direction of the terms analyzed is rather clear. Only some words like: unfamiliar (ungewohnt), ambivalent (ambivalent), curious (eigenartig) had an ambiguous direction (3). Most of the ambiguous terms, i.e. weird (komisch), odd (merkwürdig), hard to imagine (schwer vorstellbar), and weird (seltsam/schräg) are allocated to the basic emotional concept surprise (Überraschung).

But there have also been some terms which belong to several basic emotions (based on the margin the authors stipulated). Table 3 gives an overview of these terms, the basic emotions they are allocated to, and the direction of the basic emotion (positive (2), negative (3), and no clear direction (1)).

Table 2. Terms gathered during the SL-study, allocated basic emotion, and allocated emotional direction of the terms

anger	intrusiv (aufdringlich)	3
	cumbersome (mühsam)	3
	annoying (nervig)	3
	meaningless (sinnlos)	3
	superfluous (überflüssig)	3
	unsatisfactory (unbefriedigend)	3
	useless (unbrauchbar)	3
	unqualified (ungeeignet)	3
	unnecessary (unnötig)	3
	inappropriate (unpassend)*	3
	unreal (unrealistisch/realitäts-fremd/unwirklich)	3
	pointless (unsinnig)	3
	insufficient (unzureichend)	3
	ambiguous (widersprüchlich)*	3
interest	ambivalent (ambivalent)*	1
	animating (animierend)	2
	illustrative (anschaulich)	2
	calling attention (aufmerksam machend)	2
	suitable (brauchbar)	2
	curious (eigenartig)*	1
	informative (informativ)	2
	innovative (innovativ)	2
	interactive (interaktiv)	2
	interesting (interessant)	2
	arousing interest (Interesse weckend)	2
	arousing curiosity (Neugierde erwecken)	2
	useful (nützlich)	2
	realistic (realistisch)	2
	generating desire (ruft Verlangen hervor)	2
	unusual (ungewöhnlich)*	2
surprise	weird (komisch)*	1
	odd (merkwürdig)*	1
	hard to imagine (schwer vorstellbar)*	1
contempt	absurd (absurd)*	3
	ordinary (gewöhnlich)	3
	useless (nutzlos)*	3
	superficial (oberflächlich)	3
	exaggerated (übertrieben)*	3
	phoney (unecht)	3
fear	strange (befremdlich)	3
	dispensable (entbehrlich)	3
	unfamiliar (ungewohnt)*	1
guilt	neutral (neutral)*	1
joy	pleasant (angenehm/ wohltuend)	2
	cool (cool)	2
	relaxing (entspannend)	2
	erotic (erotisch)	2
	good (gut)	2
	helpful (hilfreich)	2
	funny (lustig)	2
	nice (nett)	2
	okay (okay)	2
	adequate (passend)*	2
	handy (praktisch)	2
	beautiful (schön)	2
	fun (spass)	2
	super (super)	2
	entertaining (unterhaltend)	2
	witty (witzig)	2
sadness	boring (fad)*	3
	boring (langweilig)	3
	nothing new (nichts Neues)*	3
	weird (seltsam/schräg)	1
	surreal (surreal)	2
	crazy (verrückt)	2

Note: The figures indicate if the direction of the word is negative (1), positive (2) or has no clear direction (3).

* Term is not allocated to a concept by the principle component analyses.

Table 3. Terms not clearly allocated to one of the basic emotional concepts and their emotional directions

Term	Concepts	
thrilling (aufregend)	interest/joy/surprise	2
irrelevant (irrelevant)	contempt/interest	3
kitschy (kitsch)	contempt/disgust/surprise	1
artifical (künstlich)**	contempt/disgust	3
new (neu)	interest/surprise	2
not compelling (nicht aussagekräftig)	anger/contempt	3
not exciting (nicht spannend)	anger/contempt/interest/sadness	3
unconvincing (nicht überzeugend)	anger/contempt	3
clumsy (schwerfällig)	sadness/contempt	3
meaningful (sinnvoll)	interest/joy	2
exciting (spannend)	interest/surprise	2
uninteresting (uninteressant)	interest/sadness	3

Note: The figures next to each word indicate if the direction of the word is negative (1), positive (2) or has no clear direction (3).

** Term is allocated to the basic emotion "contempt" by the principle component analyses.

4.3 Comparison of the emotional mental models

The results presented in Table 4 show that there are significant differences between emotional mental models before and after the first visitation of SL.

For the presentation of services Table 4 shows that 90 SL-study participants neither felt "anger" before the visitation of SL nor after an effective visitation. 7 participants felt anger before and after the visitation of SL. Moreover, 2 participants perceived anger before their experience with SL but not anymore afterwards. Finally, 18 participants "got angry" due to their visitation in SL. Hence, more people felt "anger" after their visitation of SL which indicates an emotional shift in a negative direction (↓).

The basic emotional concepts of "anger" and "joy" feature significant differences for both the presentation of products and services (significant values are presented in bold). After the visit of SL more people indicate an adjective which was allocated to the basic emotion "anger", i.e. the emotional shift towards a more negative feeling (↓). At the same time there is a significant difference for "joy", whereby the emotional shift is towards a more positive feeling (↑). For "interest" there is a significant difference towards a more positive feeling (↑) for products only. For all the other emotional concepts there are no significant differences.

Table 4. Comparison of the emotional mental models

Basic emotion			**services** after		**product** after		**emotional shift***		**McNemar test**	
			0	1	0	1	S**	P**	S**	P**
anger (Ärger/Zorn)	before	0	90	18	101	12	↓	↓	**0,000**	**0,003**
		1	2	7	1	3				
contempt (Verachtung)	before	0	115	0	114	2	↑	↓	0,500	1,000
		1	2	0	1	0				
disgust (Ekel)	before	0	0	0	116	1	↔	↓	-	1,000
		1	0	0	0	0				
fear (Furcht)	before	0	114	2	0	0	↓	-	1,000	-
		1	1	0	0	0				
guilt (Schuld)	before	0	116	1	116	0	↓	↔	1,000	1,000
		1	0	0	0	1				
interest (Interesse)	before	0	87	18	72	25	↑	↑	0,078	**0,001**
		1	8	4	5	15				
joy (Freude)	before	0	85	24	85	24	↑	↑	**0,001**	**0,000**
		1	5	3	4	4				
sadness (Kummer)	before	0	111	5	115	1	↓	↔	0,063	1,000
		1	0	1	1	0				
shame (Scham)	before	0	0	0	0	0	-	-	-	-
		1	0	0	0	0				
surprise (Überraschung)	before	0	103	4	115	2	↓	↑	0,754	0,157
		1	6	1	0	0				
I do not add any emotion with this term	before	0	99	12	105	10	-	-	**0,035**	**0,039**
		1	3	3	2	0				

* ↑ indicates that the emotional mental model is more positive after the SL visit
↓ indicates that the emotional mental model is more negative after the SL visit
↔ indicates that the emotional mental model did not change
** S = Services, P = Product (physical)

Note:
1. Columns four and six (encoded by “after” and “0”) show the frequencies of how often a specific basic emotion was not felt after an effective visitation of SL.
2. Columns five and seven (encoded “after” and “1”) show the frequencies of how often a specific basic emotion was felt after an effective visitation of SL.
3. Rows encoded by “before” and “0” show the frequencies of how often a specific basic emotion was not felt before an effective visitation of SL.
4. Rows encoded by “before” and “1” show the frequencies of how often a specific basic emotion was felt before an effective visitation of SL.

5 Discussion and conclusion

5.1 Theoretical implications

The aim of the study was to contribute to the question if SL does not reach a critical mass due to a negative change of the user’s mental model after an effective visitation of the virtual world. Precisely, the study analysed one aspect, i.e. if there is a mismatch between the emotional mental model before and after an effective visitation of SL. Therefore, a two step approach was applied. First, a convenience sample was asked to indicate their emotional feeling (by stating one or two adjective/s) before and after a visitation of SL. Second, 25 encoders allocated the gathered terms to the basic emotional concepts by Izard (1977). Then, for a clear allocation of the terms to one basic emotional concept a “hard margin procedure” was introduced by the authors. This procedure was more or less confirmed by the principal component analyses (PCA), which was calculated afterwards. There are only a few differences between the allocation applying the “hard margin” or the PCA: First, if the authors would not have set the margin “equal/more” but “more” the following three terms would have been allocated to at least two emotional concepts: “boring (fad)”, “hard to imagine (schwer vorstellbar)”, and “unfamiliar (ungewohnt)”. This would be in conformity with the PCA calculations which did not allocate these terms. Second, it is unclear, why PCA allocates “artificial (künstlich)” to the emotional concept “contempt (Verachtung)” because the concepts “contempt (Verachtung)” and “disgust (Ekel)” were served by six encoders each. Interestingly there is no general pattern for the other terms which were allocated in a different way by the PCA, i.e. terms with unambiguous directions as well as terms with ambiguous directions where not unambiguously allocated by the PCA.

Generally, results revealed that the direction of the terms (positive, negative or no clear direction) was rather clear, however, the most ambiguous terms were allocated to the emotional concept “surprise (Überraschung)”. Maybe the reason for this is that the basic emotion “surprise (Überraschung)” itself is already ambiguous, as some people might see surprises to be positive while other people do not like surprises.

Concerning the research question if there is a difference between the mental model of un-experienced users before and after their visitation in SL the results revealed a significant negative and a significant positive emotional shift. The negative shift appeared for the basic emotion “anger (Ärger, Zorn)” for both, service and product presentations. A significant positive emotional shift was revealed for the basic emotional concepts “joy (Freude)” and “interest (Interesse)”. However, for “interest

(Interesse)" it is significant for product presentations only. Hence, there is a difference between the mental model of un-experienced users before and after their visitation in SL.

5.2 Managerial implications

The revealed emotional shift is somehow inconclusive, because there is an emotional shift in a positive (joy, interest) and a negative direction (anger). Nevertheless, the significant emotional differences point out the importance of emotional aspects of usability for appearances in virtual worlds. Thus, developers should take into account these aspects too. A system which is able to change the emotional mental model of users in a positive direction, might have a competitive advantage over competitors to reach a critical mass of users and to establish a strong online community.

Moreover, the uncovered shifts might be a hint that the emotional mental model of users is not consistent with the conceptual model of the designers of SL. Hence, Linden Lab (the provider of SL) may loose residents due to the fact that they do not fulfil expectations of certain visitors. Therefore, providers of virtual worlds need to precisely profile their target user groups and find out information about their mental model. Such information will help to offer a system where the designers' conceptual model is in accordance with the users' mental model.

Finally, the study revealed that suppliers in a virtual world have to be aware of a different perception/cognition of product and service presentations. Accordingly, appearances have to be designed differently depending on the suppliers' aim, i.e. if s/he wants to offer/sell services or products in a virtual world.

5.3 Limitations of the study and implications for further research

As for most of the existing studies, this project also suffers from some limitations. First, the sample size of the SL-study is only very small and based on a convenience sample. Moreover, the study was conducted in the environment of only one possible virtual world at the appearance of only one virtual hotel. Therefore, a generalization of the results is not possible. Second, some encoders who allocated the adjectives to the basic emotions by Izard (1977) communicated that they would have appreciated other concepts, e.g. more positive emotional concepts. Izard (1977) provides three basic emotions, namely joy, interest, and surprise, whereby surprise might be seen as negative by some test persons. Arnold (1960) suggests four positive basic emotions explicitly courage, desire, hope, and love. Therefore, another study should be conducted where test persons allocate the terms to the basic emotions by Arnold (1960) or to the basic emotions of other emotion theorists (Plutchik, 1980; Frijda, 1986). Moreover, study participants should be asked to determine whether they perceive a certain emotional concept to be positive or negative (e.g. surprise). Third, as the analysis of this paper was done with very simple methods and a "hard margin" stipulated by the authors, further analysis is needed using more sophisticated methods. An application of several methods would allow uncovering a set of terms which are allocated unambiguously by all methods applied. Fourth, future research should find

out factors responsible for an emotional shift of the users' mental model to be able to give recommendations concerning the requirements to achieve such a positive emotional shift. Ultimately, further research is needed to find out if the users' mental model is consistent with the designers' conceptual model.

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Adoption of a Destination-Wide CRM Approach: An Empirical Analysis of the Determinants in the Swiss Hospitality Industry

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Abstract

Cooperation between a destination's tourism organization and its service providers are judged to be vital to the competitiveness of the destination. Cooperation is also a key element in Customer Relationship Management (CRM), in order to create a long-term bond between customers and a destination. Technological innovations enable the cooperative use of CRM systems and the networking of locally implemented processes. The motivation of the independent tourism service providers plays a crucial role in the successful establishment of such cooperative arrangements. In this study, using a theory-driven approach, a model is designed which seeks to explain the service providers' intention to use an interorganizational CRM system. The system of hypotheses derived from this model is then tested for significant relationships, using PLS analysis. The results show that the decision is influenced both by rational drivers such as performance expectancy as well as institutional factors such as organizational conditions and perceived customer needs.

Keywords: Destination Management; CRM; Cooperation; Technology Adoption; Email Marketing Campaign, Interorganizational System (IOS)

1 Introduction

Cooperations between the stakeholders in the region's tourism sector are crucially important to a tourist destination's ability to compete. The creation of an interorganizational IT infrastructure in the form of destination management systems (DMS) and the associated electronic networking of the service providers open up new avenues of cooperation in marketing, sales and service. These core areas of Customer Relationship Management (CRM) are now increasingly supported by innovative DMS applications. Wang (2007) expresses the view that CRM functionalities are in fact "the most critical function of a DMS in developing long-lasting, meaningful relationships with its consumers".

The behavior of a destination's independent service providers has a key role to play in the success of the cooperative use of the system. Their willingness to cooperate determines how much customer-oriented data is present in the system and can be processed for CRM processes. The strategic role of the service providers is to supply the system with up-to-date booking and customer information and be committed to increased cooperation at the strategic and process level in the destination. When developing and implementing destination-wide CRM systems, it is therefore very important to know the interests and attitudes of the service providers (Ritchie & Ritchie, 2002). Appointing these main decision determinants is the key objective of this paper.

After describing the object of the study, this paper then goes on to derive, with the aid of theory, potential determinants in the service providers' decision-making process. The study model is then tested using Partial Least Square (PLS) analysis. Finally, the results are discussed and conclusions drawn for research and practice.

2 Cooperative CRM in tourism destinations

The next three sections describe a concept for a cooperative CRM approach in tourism destinations. The three key areas of CRM, namely strategy, processes and systems, are examined in greater detail. The described CRM system was developed by a software company in close cooperation with a national tourism organization. At the moment the system is in use at several tourism organizations and destination-wide implementation, including single service providers, is in process of planning.

2.1 Strategic objectives

One of the core aims of CRM is to address customer needs individually in marketing, sales and service processes. In marketing, efforts are directed at switching the focus from the product to the customer and moving away from traditional mass marketing to data-based marketing. By treating each customer as an individual, the aim is to emotionalize the relationship and enhance the destination's brand awareness and brand value. Building a stronger relationship with the customer will encourage return visits to the region and achieve increased sales (Li & Petrick, 2008).

The specific strategic aim of cooperative CRM is to promote cooperation between the tourism organization and service providers, on the one hand, and between the service providers themselves, on the other. The aim of cooperation between the tourism organization and service providers is to strengthen the customer's relationship with the destination as a whole, using customer-oriented processes to present a unified image of various tourist services offered by a particular destination. This holistic approach seeks to achieve the same objective as the call for integrated management of tourist destinations using a joint strategy (Go & Govers, 2000). Another aim of cooperation is to avoid duplications in process implementation and redundancies in the development of systems. These are currently the main problem areas as the respective roles and responsibilities of the cooperating enterprises are not sufficiently

clearly defined. Basically, the aim is to increase the professionalism of CRM processes by a competence-based assignment of roles and to reduce costs through economies of scale.

2.2 Process-oriented view

A central area of activity in cooperative CRM is the design and implementation of marketing campaigns across organizational boundaries; the workflow involved is described below.

A cooperative marketing campaign involves central planning by the tourism organization of objectives, content, target group and campaign timing. At the end of the planning phase, service providers participating in the cooperative CRM system are notified of opportunities for cooperation. If a service provider is interested in cooperating in a specific marketing campaign, the service provider makes its customer database available for the selection of customers and, if necessary, provides content to the tourism organization. When the campaign is then executed, the target group is selected from the customer dataset provided. Once the content of the marketing campaign has been compiled and the performance indicators for assessing its success have been established, the campaign is then launched. Customer response to marketing campaigns is systematically recorded and serves as a basis for success analysis. When the success of the campaign has been analyzed, the cooperating enterprises are notified of the results.

2.3 Enabling Systems

The operational components of the described CRM system are internet-based and support the planning of marketing activities, by enabling parameters such as target group, content or timing to be defined for individual campaigns. The system supports the creation of campaigns using predefined templates which are an efficient tool for collating new content. The campaign content is compiled in the form of blocks in a separate template and linked with appropriate key words. The system matches these key words with the available customer profiles and dynamically generates personalized content for each customer in the target group. This method allows certain elements of a marketing campaign to be communicated only to a specifically selected group of addressees. Marketing campaigns are conducted primarily by e-mail.

The analytical basis of the system is a multi-tenant database system in which customer-related data from the service providers and the tourism organization is stored. Profiling is done either manually by entering personal data, by importing data from existing databases or automatically using the click tracking method. With click tracking, the online responses of campaign recipients are automatically captured and recorded in the customer profile. The click tracking method is also the basis for detailed analysis of the success of marketing campaigns, as it can for instance identify how many e-mails were sent and opened and which content was of so much interest to recipients to prompt them to click on it to obtain further information.

The architecture of the database allows each client (i.e. service provider or tourism organization) to access only the data they themselves have entered. Although the tourism organization is responsible for operation and maintenance of the entire system, it cannot access the service providers' customer data without being expressly granted permission. Agreements can be made between the clients, however, allowing each other's customer data to be used for joint activities. Under the terms of such cooperative agreements, the tourism organization simply processes the data but is prevented from transferring data into its own database.

3 Construction of hypotheses

The literature does not offer a theoretical reference framework for the adoption of interorganizational IS (IOS) in tourist destinations which can be used to construct hypotheses. In order to investigate factors that influence the adoption of technologies at the organizational level, a framework that has been used for similar study subjects is the Technology-Organization-Environment-Framework (Kuan & Chau, 2001; Zhu et al., 2003). The reference framework developed by Tornatzky and Fleischer (1990) identifies three contextual areas which influence the process by which organizations adopt technological innovations, namely technology, organization and environment. For each of these three areas, we will now present factors that empirical studies have shown to have a significant influence on the adoption of technological innovations.

3.1 Technological context

Where technological context is concerned, an analysis of the literature showed that the dominant factors are relative advantage and complexity. In the much quoted meta-analysis of Tornatzky and Klein (1982) on the relationships between innovation characteristics and innovation adoption and implementation, these two factors were found to have a significant influence on adoption and diffusion, in all the studies analyzed. On the basis of the theoretical foundation (Venkatesh et al., 2003) and empirical evidence (Chau & Hui, 2001; Chwelos et al., 2001), drawing from the technology-related context and using UTAUT terminology, the factors 'performance expectancy' and 'effort expectancy' are considered to be direct determinants of the behavioral intention. Expected performance is the degree to which an individual believes that using a system or an innovation will help him or her attain gains in job performance (Venkatesh et al., 2003). Similarly, in a business environment, the construct describes the improvement in performance an enterprise expects from adoption and can thus be interpreted as the economic aspect of the innovation. The expected effort describes the degree of ease associated with use of the system or the innovation. The construct is thus an indicator for the cognitive effort involved in learning and using a new system, and this can be interpreted as the perceived complexity of an innovation (Rogers, 1995). This is not to be confused with the actual monetary investment in the system.

3.2 Organizational context

The construct 'facilitating conditions' from the UTAUT model and the constructs 'relationship climate' and 'attitude to cooperation within the destination' based on studies into adoption and diffusion of IOS, were integrated into the research model. Based on the UTAUT model, the construct 'facilitating conditions' is defined as the degree to which a decision-maker perceives that an organizational or technical infrastructure exists to support use of the system (Venkatesh et al., 2003). Relationship climate refers to the socio-political features of the relationship between the tourism organization and the service providers as interacting organizations. Against the background of the empirical findings of Chwelos et al. (2001) and Premkumar et al. (1997), the authors assume that in the case in question, a positive relationship climate – one characterized by a high level of trust and a high level of commitment – between the service providers and the tourism organization is important for adoption of the system, too. The construct 'attitude to cooperation within the destination' is specific to the context of this present study and has not been considered as a determinant in previous research work. This construct is comparable to some extent with the determinant 'partnership commitment' which according to the study by Lee and Lim (2003) has a significant impact on IOS adoption. In our case, attitude to cooperation refers to the general assessment of cooperation with the tourism organization by the decision-makers surveyed.

3.3 Environmental context

The theoretical background to the influences within the organizational environment is provided by the three mechanisms of isomorphism postulated in new institutional organization theory (DiMaggio & Powell, 1983). With reference to the mechanisms of isomorphism, the following influencing factors were selected: expected adoption by the competition is regarded as the driver of mimetic isomorphism; dependence on the tourism organization together with perceived customer needs are responsible for coercive isomorphism, while normative isomorphism occurs through the influence of reference individuals. The inclusion of the construct 'expected adoption by competition' means that competitive pressure is also taken into account as a reason for mimetic isomorphism (Premkumar et al., 1997). Just as dependencies exist in typical customer/supplier relationships, whose impact on ICT adoption has been demonstrated empirically (Chau & Hui, 2001; Chwelos et al., 2001), a similar scenario exists between tourism organizations and service providers, with the tourism organizations undertaking marketing activities on behalf of all the stakeholders in a tourist destination. Alongside dependence on suppliers or partners, a perceived customer need for a particular service can also produce coercive isomorphism. In their studies, Buhalis (1999) and Fuchs et al. (2008) found specifically for the tourism industry that the demand of customers is a relevant factor influencing decisions to deploy IT. The construct expresses the extent to which enterprises perceive that customers expect them to offer a particular service. To take account of normative isomorphism, the construct 'influence of reference individuals' was integrated into the study model. This external influence is discussed not only in new institutional organization theory (DiMaggio & Powell, 1983), it also features in the UTAUT

model as the construct 'social influence' (Venkatesh et al., 2003). This construct is defined in UTAUT as the degree to which a particular decision-maker perceives that important others believe that the system should be used. Empirical evidence for the relationship between normative pressure and IOS adoption can be found in the study by Teo et al. (2003).

3.4 Research Model

The theoretical assumptions and empirical findings described above produce a causal model which represents the postulated interdependencies. The specified dependency model contains nine exogenous constructs to explain usage intention as an endogenous variable. Intention to use the system is regarded as a dependent variable. The literature is unanimous that the intention to perform a particular behavior is an extremely strong predictor of the behavior actually observed (Ajzen, 1991).

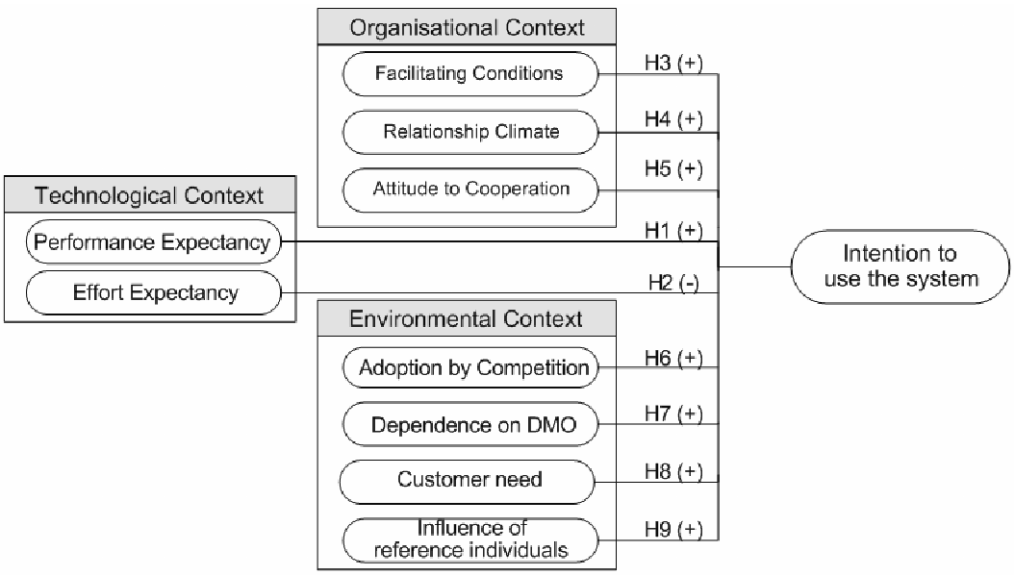

Fig. 1. Research Model

4 Methodology

Specification of the constructs using appropriate measurement models was done on the basis of a comprehensive literature search. With the exception of enterprise size, the measurement instruments are multi-attribute and were taken directly from or adapted from the literature. Reflective indicators were used for the constructs, with the exception of the 'performance expectancy' construct, which was operationalized with a formative scale. All multi-attribute construct specifications were rated on a five-point Likert scale ranging from one (strongly agree) to five (strongly disagree). Data collection was internet-based; respondents were shown an animation with multimedia elements to explain the system before answering questions.

The sample used for the study was the Swiss hotel industry. All German-speaking members of the Swiss Hotel Association (hoteleriesuisse) were contacted by e-mail and invited to take part in the survey. Of the 173 questionnaires returned, 27 were unusable because of missing values. This meant that 146 questionnaires were submitted for data analysis, equivalent to a response rate of 7.96%.

Table 1. Sample characteristics

Category	**Number (percent)**	**Category**	**Number (percent)**
Quality rating		*Region*	
5 & 4 star	47 (32.4%)	Alpine zone	96 (66.2%)
3 star	67 (45.9%)	City zone	24 (16.2%)
1 & 2 star	20 (13.5%)	Lake zones	15 (10.1%)
No rating	12 (8.1%)	Other zones	11 (7.4%)
Number of rooms		*Number of employees*	
1 – 10 rooms	9 (6.1%)	1 – 10	51 (34.5%)
11 – 20 rooms	35 (24.3%)	11 - 20	45 (30.4%)
21 – 50 rooms	63 (43.2%)	21 - 50	27 (19.6%)
51 – 100 rooms	32 (21.6%)	51 - 100	14 (9.5%)
> 100 rooms	7 (4.7%)	> 100 employees	9 (6.1%)

To enable the quality of the eight reflectively measured constructs to be assessed, indicator, convergence and predictive validity were checked. The elimination of indicators proved not to be necessary and the validity of the constructs was confirmed. The quality of the formative measurement model of the “performance expectancy” construct was assessed by checking multicollinearity using the variance inflation factor. In order to test the significance of the resulting path coefficients between the dependent and independent variables, a bootstrapping procedure was performed and corresponding t-values observed.

5 Results and Discussion

The analysis of the dependent variable demonstrates that over half of the hotels surveyed are interested in a cooperative CRM approach. Roughly 25% expressed that they would implement the system in the next 12 months.

R^2 is the key metric for evaluating the ‘goodness of fit’ of the regression function to the empirical data and quantifies the significance of the nine exogenous variables. For this present structural model, the explanatory power is 0.52, meaning that 52% of the model's variance can be explained. Based on the recommendations of Chin (1998), this R^2 value can be classified at the top end of the “moderate” range of explanatory power. The path coefficients are shown in Table 2, together with the t- and f^2-values.

Table 2. Results of PLS analysis

Independent variable	Hypo-thesis	Dependent variable	Path coefficient	t-value	f^2
Performance expectancy	H1 (+)	Intention to use	0.419	5.097	0.238
Effort expectancy	H2 (-)	Intention to use	0.08	1.378	0.010
Facilitating conditions	H3 (+)	Intention to use	0.226	3.294	0.081
Relationship climate	H4 (+)	Intention to use	-0.037	0.625	0.002
Attitude to cooperation	H5 (+)	Intention to use	0.124	1.825	0.025
Adoption by competition	H6 (+)	Intention to use	0.045	1.075	0.004
Dependence on DMO	H7 (+)	Intention to use	-0.035	0.764	0.002
Customer need	H8 (+)	Intention to use	0.237	3.186	0.075
Influence of reference individuals	H9 (+)	Intention to use	0.058	1.007	0.004

Based on the t-values, four of the nine proposed hypotheses (H1, H3, H5, H8) are significant, with an error probability of at least 5%. The remaining factors have only a non significant influence on behavioral intention. The f^2-values of the latent exogenous variables 'facilitating conditions', 'attitude to cooperation' and 'customer need' vary between 0.025 and 0.081, indicating a smaller influence, while the f^2-value of the independent variable 'performance expectancy' indicates a moderate influence.

An examination of the hypotheses from the technological context (H1 and H2) shows that the decision-makers must attribute a performance potential to the system, in order to develop a strong usage intention where it is concerned. However, there is no difference between respondents with a strong and a weak intention to use the system when it comes to expected effort. This result contradicts the relationship between expected effort and intention to use a technology hypothesized in the UTAUT model (Venkatesh et al., 2003).

For the 'organizational context', the expected degree of impact was demonstrated for the factors 'facilitating conditions' (H3) and 'attitude to cooperation within the destination' (H5). This illustrates that both specific organizational conditions such as available resources and technological competence are necessary, as well as a fundamental willingness to cooperate in the tourist destination. As for the lack of correlation between relationship climate and usage intention (H4), we can only speculate. One possible explanation is that a trustworthy relationship with the tourism organization does not automatically produce a positive attitude to using the system. The results indicate a rational decision by the respondents, which is based primarily on utility maximization rather than on organizational factors.

Of the four theory-driven hypotheses on the 'environmental context', perceived customer needs (H8) proved to be a relevant driver for adoption of the new system, while no meaningful paths were found for the effects of dependence on the DMO

(H7), the effects of competitor behavior (H6) and the influence of reference individuals (H9). It is possible that the significance of these last two determinants cannot be confirmed by the research results, as competitor behavior was still difficult to assess at the time of the study and the novel nature of the system meant that reference individuals had not yet been able to form an opinion and disseminate this.

6 Implications

As the survey was conducted before the implementation of the system, the managerial implications focus mainly on aspects facilitating implementation plans. Since the independent service providers can not be forced to use the system, the measures are mainly to positively influence the acceptance of the system.

A clear finding of our study is that primarily hotels with high performance expectancy are interested in using the system. Consequently, the performance potential of the system has to be emphasized in order to promote acceptance. After successful implementation and use of the system by the first enterprises, the potential benefits need to be quantified in order to offer other service providers in the destination real incentives to adopt the system. In order to make perceived customer needs an even stronger driver of usage intention for the service providers, customer expectations should be identified; the resulting findings can then be communicated, with the assumed effect of increasing acceptance indicated by the results of this study. In this context it would be valuable to compare the customer value of company specific and cooperative CRM activities. Of course, these positive effects have to be related with the incurring costs to determine the value added for the service providers.

If the system is to be used and the anticipated benefits achieved, our results suggest that it is important that facilitating conditions be fostered and barriers removed. A key factor here is to ensure that trained professionals are available internally and externally, to help overcome technical and organizational challenges. Because this may require considerable resources in the whole destination, the implementation of cooperative CRM might be advantaged in destinations with well-provided stakeholders. In particular the DMO, as the coordinating actor and service provider, has to be sufficiently equipped. To promote a positive attitude to cooperation within destinations and to counter potential resistance, the DMO should assume the role of a change agent and embody the vision of progressive destination management.

In terms of research, our approach has been based on the assumption that there is a need for simultaneous consideration of rational drivers of a target-oriented behavior together with internal and external institutional factors to explain the acceptance of a new technology deployed across organizational boundaries. The results justify our assumption in general, even though the assessment of performance potential and customer needs are the most important factors, indicating a quite utilitarian position of the decision-makers. Other factors in particular with respect to relationship aspects have been less clear or not supported at all. It is an open question whether these results have to be interpreted as low relevance of these factors or are due to a

measurement problem with relation to the very early and rather abstract problem situation for the questioned decision-makers. Nevertheless, the results of this study do not contradict our assumption that important factors are missing from classic models of individual technology adoption such as TAM (Davis, 1989), and these can be covered by new institutional organization theory.

7 Outlook

The results of the empirical study reveal that there is an interest in cooperative CRM. This willingness needs to be exploited in order to drive forward implementation of joint activities in CRM. Introducing a destination-wide CRM system remains, however, a major challenge for all the stakeholders in the destinations. System introduction is a complex, iterative process requiring flexibility and before it can begin, certain key conditions must first be created. Especially the integration of the system into the existing IT infrastructure might be a technical barrier. Although initiatives like the Open Travel Alliance developed industry communication specifications, most of the existing interfaces need further adaptation. This technical interoperability needs to be solved in order for efficient CRM collaboration with automated processes and minimal human interaction.

For future research projects, it is desirable that further studies should first work on the defects in this study model and second, consider the phenomenon from different perspectives. Further research work could usefully be done on those hypotheses that were not confirmed. There is also a strong case for reviewing the theoretical basis and the operationalization based on it. It would no doubt also be interesting to use variants of triangulation to strengthen the underpinning of the constructs and hypotheses and increase the robustness of the results. Longitudinal studies would provide evidence, how influencing factors evolve.

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