Rob Law
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Information and Communication Technologies in Tourism 2011

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Information and Communication Technologies in Tourism 2011

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Preface

With a history of 18 years, the annual ENTER conference has long been recognized as the world's largest event on Information and Communication Technologies (ICTs) and tourism. Following this tradition, ENTER2011 is to reflect the synergistic interaction between technology and tourism, which continuously transforms the structures of the tourism industry. With the theme of "eTourism: Present and Future Interactions", ENTER2011 emphasizes the role of Information and Communication Technologies on facilitating global and regional interactions between tourism players worldwide. In the past few months, nearly 90 research papers were submitted by researchers in the fields of tourism and technology around the world. The popularity and prominent functionality of social media and mobile technology in connecting travelers with tourism destinations or organizations have become two of the most researched areas at present. As such, these are two popular areas among all ENTER2011 submissions. Consistent with the papers submitted to ENTER Conferences in the past, most submitted papers are of good qualities that bring up innovative research ideas with insightful findings and implications.

After the rigorous double blind reviewing, the high quality full length papers are included in the proceedings. Prior to their final acceptance, authors of all accepted papers were required to revise their papers to address comments from reviewers. This is to maintain the high quality of the published articles in the proceedings. The papers included in the volume advances in recommender systems, website quality and analysis, user-generate content, eWOM, mobile tourism, hospitality applications, technology acceptance and impact, Web 2.0, destination management, technology solutions, social media, marketing, tourist behavior, and other important topics. Authors of these articles are affiliated with some of the world's prominent research institutes and organizations, located many countries in most major continents worldwide. In addition, these authors comprise regular ENTER contributors as well as new scholars. Such a diversity of authorship in geographical regions and topics bring a wealth of values of international experiences and methods to examine various issues that are pertinent to information technology and tourism. The paper co-authored by Liu, Zhong, Ip, and Leung is of particular interest as it analyzes the progress of research in the field based on the previous ENTER proceedings.

We would like to thank all authors for their contributions and willingness to share their new ideas and findings. Additionally, it not possible to have the proceedings without the professional and voluntarily efforts of the international research programme committee members to review submissions. Thanks are extended to Wilco Chan, Catherine Cheung, John Fotis, Basak Denizci Guillet, Cindy Heo, Alice Hon, Adele Ladkin, Andy Lee, Woojin Lee, Rosanna Leung, Huiying Li, Elaina Michopoulou, Cristian Morosan, Yongli Ren, Jia Rong, Huy Qyan Vu, Karin Weber, Edmond Wu, Honggen Xiao, and Lina Zhong for providing ad hoc review service. These reviewers' time and effort on carefully reviewing submissions and offering constructive comments for improvement are fundamental to raise the overall quality of the all accepted papers included in the proceedings. Lastly but certainly not the least, the editorial assistance from Crystal Ip and Daniel Leung throughout the entire process is greatly acknowledged.

The papers in the proceedings have investigated different issues on different topics. The papers have also provided answers to some major research questions, and, at the same time, raised additional questions that drive future research. We trust readers will find the papers in this proceedings informative, useful, and most importantly, offer new insights that match the theme of ENTER2011: eTourism: Present and Future Interactions.

We look forward to exchanging the latest ideas and findings to the worldwide audience at ENTER2011.

Rob Law, Matthias Fuchs, and Francesco Ricci

Innsbruck, January 2011

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Image-based Travel Recommender System for small tourist destinations

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Abstract

Most tour planning systems have similar three-step structures: definition of the tourist profile, evaluation of the Points of Interest (PoI), and route optimization. Having in mind that a picture paints a thousand words, this paper describes an approach that allows tourists specify their interests through a set of images, from which the system inferences their profile. Taken into account the choices made by the visitor, the system infers a dynamic profile. Furthermore, the system calculates a list of resources that match the profile with the destination tourist resources. Each resource is associated with a weight which indicates the utility of that resource to the profile of the visitor. Thus, visitors obtain personalized tourism recommendations based on their preferences as a result.

Keywords: image-based profiling; travel recommender system; route planning.

1 Introduction

Existing travel recommender systems have been developed to provide suitable recommendations for tourist destinations. However, in most of the cases, this information is not personalized to visitors so that they have to navigate through large amounts of information to plan their visit. Therefore, new ways to capture user preferences are required in order to determine more sophisticated user profiles for advanced personalization. Currently, the process of creating such profiles can be time-consuming and tedious. However, intelligent services such as Travel Recommender Systems (TRS) heavily rely on personal user profiles in addition to explicitly expressed needs and constraints. Some systems tackle this problem by requesting users to answer a predefined set of questions.

This paper presents a TRS that allows visitors configuring their own personalized experience. First, the system defines the user dynamic profile based on socio-demographical data, available means of transport, duration of the visit, way of visiting and preferences. Some of these preferences are derived from a set of photographs

related to the destination which represent a combination of several static user profiles defined by the Destination Management Organization (DMO). The system infers a dynamic profile taken into account the choices made by the visitor. Furthermore, the system calculates a list of resources that match the profile with tourist resources at the destination. Each resource is associated with a weight which indicates the utility of that resource to the visitor. Thus, personalized recommendations based on their preferences are provided to visitors.

The structure of this paper is as follows. Section 2 summarizes the state of the art of recommender systems and user profiling. Section 3 describes the algorithms implemented in the proposed approach to determine the resources that best fit the user profile. The validation scenario is described in Section 4. Finally, Section 5 discusses some conclusions and future work.

2 State of the Art

2.1 Recommender Systems

Recommender systems are powerful tools to help online users to filter information overload and provide personalized recommendations on various types of products and services (Resnick & Varian, 1997). The first recommender systems have been introduced during the last decade mainly by Amazon. Their goal was to limit the number of items offered to users to those the system thinks are more relevant for them. Since then, there has been an extensive research in the field of recommender systems (Adomavicius & Tuzhilin, 2005; Montaner, Lopez & de la Rosa, 2003; Schafer, Konstan & Riedl, 2000).

Providing personalized recommendations to users requires modelling their characteristics, preferences and needs. This information is referred in the literature as a User Model (UM) (Kobsa, 2001). The accuracy of the provided recommendations depends on the quality and accuracy of the user representation in the UM. However, the process of creating such models can be a rather annoying, time consuming and cumbersome task (Gretzel *et al.*, 2004). This may result in poorly defined user profiles reducing the quality of recommendations, and consequently, the acceptance and, thus, the success of recommender systems.

User data modelling can be performed in two ways: users can provide information explicitly or systems can apply various reasoning mechanisms to infer information based on the behaviour of the user (Hanani, Shapira & Shoval, 2001). It is clear that the more information obtained from the user, the more accurate the recommendation will be. Focusing on the tourism sector, Berger *et al.* (2007) have designed and implemented a Web-based tourist type profiling tool using a statistical model established by the logistic regression. An online survey revealing significant dependencies between tourism-related photographs and tourist types has been conducted. Eight sets of photographs were located in the top row and users may

switch from one set to the next by clicking the respective hyperlink. Users drag photographs they have identified with into the lower-left area.

Moreover, Späth and Conlan (2008) have implemented a visual approach to user modelling resulting in the VUMA (Visual User Modelling Approach) tool that can be used in a playful and dynamic manner repeatedly during a user's engagement with a personalization system. As a proof of concept, the VUMA tool has been adapted to a sightseeing itinerary planner to assist tourists in planning their own personalized sightseeing day.

Several recommendation techniques have been implemented, such as content-based filtering, collaborative filtering, knowledge-based recommendation and multiple hybrid approaches. This work focuses on a content-based recommender system. The tourist resources of a destination are represented by characteristic features, and the UM are typically represented by weights assigned to these features and representing the degree of preference of the user for these features (Pazzani, 1999; Billsus & Pazzani, 2000).

2. 2 Travel Recommender Systems

Recommender systems in tourism, also referred as Travel Recommender Systems (TRS) or Destination Recommendation Systems (DRS) (Staab *et al.*, 2002; Fesenmaier *et al*., 2003), are special recommendation systems used in the tourism industry. TRS have been developed to recommend different travel destinations to the user for a decade now. They focus on selecting destinations and offering product packages tailored to the needs of the tourist (Ricci & Werthner, 2002). A simple TRS asks different questions to provide one or more recommendations for travel itineraries that match the preferences of the tourist. Furthermore, the aim of a TRS is to reduce the time spent on the entire planning process. The TRS usually displays a range of products based on user queries. Each query and recommendation made can also be used to help the recommender system to learn and identify a better set of products for future recommendations.

Two of the most popular TRS currently available are the Triplehop's TripMatcher™ and VacationCoach Me-Print™. While the former uses brief user inputs, such as activity preferences, people going on vacation, travel dates, and even budget in combination with past user queries to calculate vacation recommendations matching the user criteria, the latter uses predefined personality traits or forms that can inquire the personality profile. The user is directly asked to classify himself so that the system can then match the user profile with the product catalog. However, neither of the two supports users in planning a user-defined trip package that includes a scheduled list of preferred locations along with sightseeing recommendations according to their preferences.

Furthermore, Trip@dvice is a travel recommendation methodology that supports selecting travel products and building a coherent travel plan from the user point of view (Ricci *et al.*, 2006). In this approach, the case base is composed of travel plans

built by a community of users, extending the concept of case-based reasoning with interactive query management. Moreover, SAMAP is a tool to make tourists plans for a user in an "intelligent" way, considering its preferences to propose a list of activities that better adjusts to its profile (Castillo *et al.*, 2008). The system has to access information about the city, personal data, interests and preferences of the user to inference the type of activities that the user likes to do, places that other similar profiles liked when visiting the same city and further information about basic services required for performing the activities. The main difference with the proposed approach is the use of images as a means to define the profile of the users.

Most of the previously mentioned TRS are based on textual input of both the user preferences and the recommendations. Sharda (2010) introduced the concept of a Visual Travel Recommender System (VTRS), which uses audiovisual information to present the choices as well as the recommendations. Two important aspects of any VTRS are: visual input and visual output (Ponnada, Jakkilinki & Sharda, 2007).

Kimber, Georgievski and Sharda (2006) have proposed the Tourism Recommendation using Image-based Planning (TRIP) system to incorporate the visualisation of the destination information into recommender systems. Generally, visitors have to browse through a large number of Websites to gather the required information and sort out the relevant details. The TRIP system aims to overcome this drawback by presenting customised details visually. Our approach is targeted to define the agenda while on the destination, not searching for information about a destination on the Website.

Our approach focuses on the visual input aspect with the further aim of presenting visual content to be used to determine the profile of the visitor. In such a way, the proposed approach can be compared to the system for visual input based recommendation proposed by Keen and Rawlings (as cited in Sharda *et al.*, 2008). Their system facilitates the decision making process by using a visual scrapbook providing a wide range of tourism products as images and videos. As the user browses through this information, the system tracks the browsing pattern, and constructs a statistical profile.

3 Image-based Travel Recommender System

3.1 Definition of tourist profiles

User profiling can be defined as the definition of the most relevant features of users (socio-demographics data, travel preferences, contextual information) which will be further used in their characterization in a tourist destination. Clustering groups of people with similar profiles leads to the definition of static user profiles. Profiles in this research approach can be classified into three main groups: main (type A) and derived static profiles (type B), a weighted composition of main static profiles, both of them defined by the DMO; and dynamic profiles (type C) which are dynamically created for each visitor on the basis of the static profiles (type A and B) inferred from the interaction with the system.

For each destination, a set of m derived static profiles defined in the Y vector can be obtained as a combination of n main static profiles (type A) defined in a vector X through the N matrix. This matrix is determined for each destination on the basis of the information available about visitors.

$$Y = NX \tag{1}$$

Where x_i represents a main static profile, y_j a derived static profile, and n_{ji} the relation (in %) between the x_i main profile and the y_j derived static profile.

3. 2 Image-based definition of the user profiles

Most of the current search engines are based either on words to formulate a query or on a selection from a list of items. Although this step is usually done on the basis of text-based questionnaires that query the visitor about his budget and preferences, our approach uses image-based interfaces to collect the requested information about visitors in order to recommend tourist resources.

A collection of p images M is defined as a combination of static profiles (both A and B types). Destinations must define manually the weights between the profiles and the images represented in the A and B matrices. Although these weights can be only defined for each main static profile (type A), our approach balances the influence of each static profile (type A and B) in the image, so that their influence is not biased.

$$M = AX + BY \tag{2}$$

Where m_k represents each image of the set, x_i a main static profile, y_j a derived static profile, a_{ki} the weight (in %) of the x_i main profile in the image and b_{kj} the weight (in %) of the y_j derived profile in the image.

Collecting the profile of the user is performed in two phases. A first set of images displays p images related to main static profiles (type A), from which users can select as many as desired up to a certain limit. This initial set of images presented is selected from the database in a fuzzy way. The system extracts the most representative main static profiles from the selection and selects a second set of p images related to type A and B profiles. The profile of the user is then composed taking into account the percentages of both types of static profiles in the selected set of images in the second phase.

$$\%x_i = \frac{\sum_{k=1}^{p} a_{ki}}{\sum_{k=1}^{p}\sum_{i=1}^{n} a_{ki} + \sum_{k=1}^{p}\sum_{j=1}^{m} b_{kj}} \qquad \%y_j = \frac{\sum_{k=1}^{p} b_{kj}}{\sum_{k=1}^{p}\sum_{i=1}^{n} a_{ki} + \sum_{k=1}^{p}\sum_{j=1}^{m} b_{kj}} \tag{3}$$

Where $\%x_i$ is the percentage of the main static profile x_i in the dynamic profile of the user, $\%y_j$ is the percentage of the derived static profile y_j in the dynamic profile of the user, a_{ki} the weight (in %) of the x_i main profile in the image and b_{kj} the weight (in %) of the y_j derived profile in the image.

3.3 Tourist resource recommendation

The final step analyses the user model in order to estimate the utility value of each tourist resource for each profile. The objective is to obtain a list of tourist resources and to generate a personalized route according to their preferences. For each destination, a set of n main static profiles (type A) of users defined in a vector X are related to a list of r tourist resources defined in the vector R through the Q matrix, which indicates the utility that visiting that resource might have for the user. This matrix is determined by the destination of the basis of their knowledge and experience.

$$R = QX \tag{4}$$

Where x_i represents a main static profile, r_j a resource of the destination and q_{ij} the utility that visiting the resource r_j may have for a main static profile x_i.

On the other hand, the dynamic profile of the user Z is composed by the percentages of the static profiles X and Y as calculated in (3). However, and in order to simplify the process of determining utilities of the resources of the destination, the system automatically transforms the static derived profiles Y into main static profiles X as in (1). Thus, the dynamic profile z_i can be calculated as follows:

$$z_i = \%x_i \cdot x_i \tag{5}$$

Then, the system selects the resources R which provide the highest satisfaction S for a dynamic profile Z.

$$S = QZ \tag{6}$$

Where z_i represents the dynamic profile of the user, s_j the satisfaction of a user who visits the r_j resource of the destination and q_{ij} the utility that visiting the resource r_j may have for a main static profile x_i and therefore, for a dynamic profile z_i.

Apart from recommending the resources z_j which have the highest values for the utilities q_{ij}, the system automatically generates and proposes a route maximizing the total collected utility. First, tourist resources are transformed into nodes with the following properties: position of each resource; the utility of the tourist resource for each visitor; estimated visit time to the resource; open and close times; and cost (fee or entrance). Then, intelligent routing algorithms are applied to generate the best possible route (Garcia *et al.*, 2009; Vansteenwegen *et al.*, 2009).

4 A Small Destination as a Validation Scenario

The system has been validated in the Bidasoa Activa destination, a small cross-border DMO in the north part of Spain close to the French border. Actually, the destination is composed of two Spanish towns (Irun and Fuenterrabia) and a third French city (Hendaia). 70 tourist resources between monuments and accommodation types (hotels, rural hostels) have been selected for the validation of the prototype.

4.1 Definition of tourist profiles

User profiling has been based on a complementary use of factorial and classification techniques in order to obtain multivariable profiling. The main objective of such techniques is the characterization of individuals on the basis of a finite number of variables. The DMO has compiled many data about the profiles of the visitors from the Web site (origin, hour, type of query) and also from several questionnaires at the tourist office. These data have been reformatted to apply the proposed methodology in this paper. Four main static profiles (type A) have been defined on the basis of the data available:

- Business tourism. It has been mainly detected in one of the towns of the destination. Tourists stay in the city or its surroundings and they visit some cultural and historical Points of Interest (PoI). If they are Spanish, they mainly look for the typical gastronomy.
- Cultural and urban tourism. Tourists come worldwide to spend the day. Their interest is focused on cultural experiences and good gastronomy.
- Leisure tourism. Usually spending only an afternoon or a day, tourists come to the beach and the shops.
- Elderly day visitors coming mainly from the South of France. They also come for the day, to shop and walk mainly with their couples.

Furthermore, 13 derived static profiles have been defined for this first prototype as a combination of the previously mentioned main static profiles. For instance, the urban tourist type B profile is composed of the cultural, leisure and elderly main static profiles (type A).

4.2 Technical description of the prototype

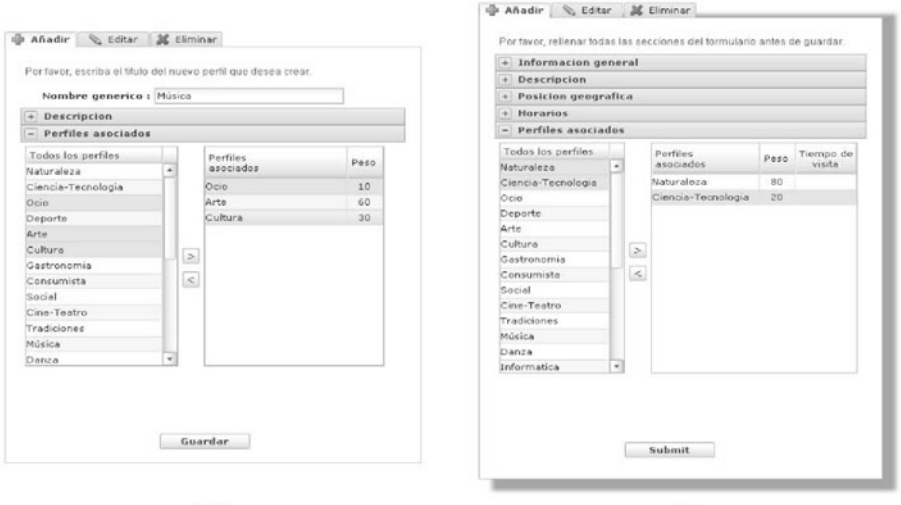
The prototype has been implemented as a client-server architecture. The client mainly creates and manages the interface, retrieving data from the server. On the other hand, the server handles the database and calculates the profiles of the users taking into account the data provided by the clients. Java Servlets have been used to implement the logic of the server. Data from the DMO has been stored in a MySQL database. In order to handle the communication between the database and the Servlets, Hibernate has been integrated in the architecture to manage relational objects and to use databases from an object oriented language like Java. Apache Tomcat has been used for the server applications.

The communication between the client and the server is based on AJAX calls. Applications are run on the browser of the clients, while maintaining the asynchronous communications on the background. In such a way, changes can be made over the websites without reloading them, increasing the interactivity, speed and usability of the applications.

The client has been implemented using the Java's GWT (Google Web Toolkit) library. GWT simplifies the implementation of AJAX based applications, so that developers can easily create and maintain JavaScript applications with complex interfaces in a simple way. The Java code can be easily created and the GWT compilator translates it to optimized HTML and JavaScript code. This code is valid straight for most of the current Web browsers. Although GWT library includes several graphical elements for the creation of Web interfaces (buttons, panels, lists), the SmartGwt library has been added, extending the catalogue of GWT graphical elements with new functionalities to achieve a more attractive interface.

4.3 Management tool for image-based definition of profiles

A tool for destination has been implemented so that DMO can manage and update their tourist profiles and the images required for the UM. The tool includes user-friendly questionnaires to add, edit or remove images from the system, always taking into account that the staff of the DMO may not have technological skills. Three main functionalities have been implemented. First, the tool allows the DMO to define the main static profiles (type A), the derived static profiles (type B) and the weights of the associated static profiles (matrix *N*). To create a new profile *Music* (Figure 1a), the DMO has to name it and provide the percentage of the static profiles for this new profile (*Leisure 10%, Art 60% and Culture 30%*).



(a) (b)

Fig. 1. (a) Definition of derived static profiles (type B); (b) Association of the static profiles to each of the images.

Secondly, the DMO can manage the images that are used to determine the profile of the visitor. Each image is characterized by several parameters, such as its name, description, URL and associated profiles (type A and B) (Figure 1b). Finally, the system needs updated information about the tourist resources in order to provide accurate recommendations (Figure 2). Each resource has an associated main photograph, an estimated visit time (for attractions and museums), a cost, contact data, booking and other features (accessibility, guided visits). Moreover, resources are geolocated on Google Maps in order to simplify the interaction with the DMO.

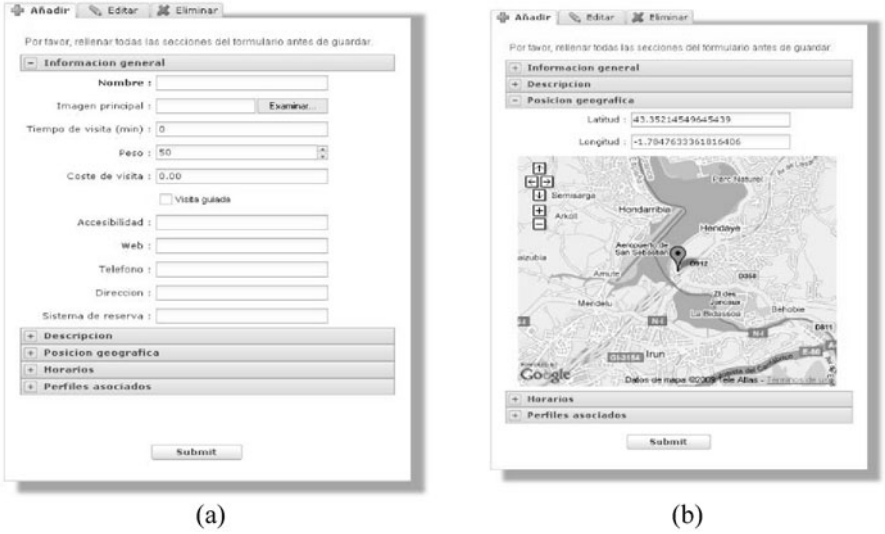


Fig. 2. Management of tourist resources.
(a) Definition of the main features of each tourist resource including utility;
(b) Geolocation of resources.

4.4 Determining the profile of the user

In order to determine the dynamic profile of each visitor, the system asks the user to provide some information about personal and travel characteristics (Figure 3). These features include group composition, means of transport, budget, travel period, knowledge of the destination area, and preferred activities. This information is gathered by using a kiosk at the destination.

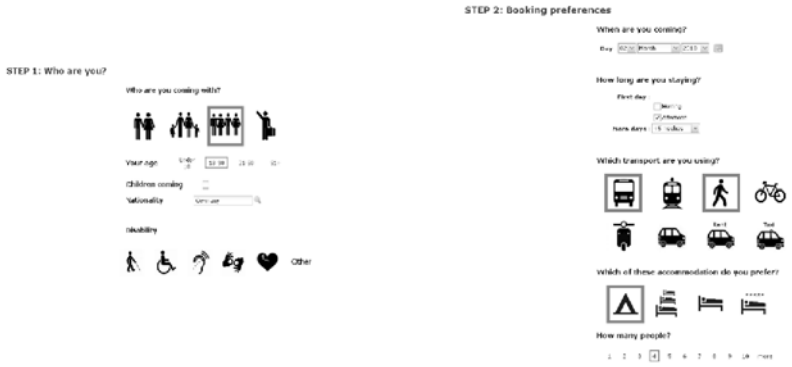


Fig. 3. Flow diagram for the definition of the preferences of the user.

Users can select a range of images based on main static profiles in order to inference their profile. For instance, during the first interaction (Figure 4(a)), the user selects the images highlighted in blue such as *Lake, Pintxos* and *Windsurf*. As these images are related to cultural and leisure tourism main static profiles, the system displays further images related to those profiles and other derived static profiles. The user selects the *Scuba-diving* and *Parapent*, related to the leisure tourism main static profiles and the derived profiles German tourist, young Basque day visitor and young Basque day visitor with friends (Figure 4(b)).

Fig. 4. (a) First interaction of visitor to determine the main static profile of the user. (b) Second interaction to determine the derived profiles.

Once the profile is calculated on the basis of the image-based algorithms, the system determines the most attractive tourist resources for the visitor based on their utility defined by the destination. It must be mentioned that this utility may change for the same tourist resource depending on the dynamic profile of the user. Finally, the

system proposes a personalized list of resources so that the user can select and configure the sightseeing day.

5 Conclusion

This paper presents an image-based travel recommender system that allows the generation of personalized tourist tours. The systems aims at creating activity packages and a personalized agenda taking into account the restrictions imposed by the user and his/her preferences. Therefore, it is necessary to define the profile and selection criteria of the user.

When the visitor starts using the system, he/she should define his/her profile (young, family, retired), restrictions (time, available budget) and preferences using an image-based system. This interface offers a new approach over the existing ones based mainly on dialogs and questions about the preferences of the user. Although filling in the questionnaires is a tough work and it is not fulfilled correctly in many cases, such information is crucial for the recommender system to work properly and select the most appropriate attractions for the user.

The recommender system creates a list with the tourist resources that fit best to the profile of the user taking into account his/her preferences and the available information about the DMO. From that list, the module in charge of the generation of personalized tours selects the attractions compatible with the schedule and budget restrictions defined by the user, proposing several tourist resources. Visitors will build their own plan from those resources using an image-based interface to select other options. The project is being validated in the Bidasoa area, which offers several attractions and enhancing activities in different fields, such as cultural heritage, nature or sports.

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Recommender systems for dynamic packaging of tourism services

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Abstract

Based on a case study in Valais (Switzerland), this paper discusses recommender system technologies used to help clients choose tourism service packages online. Different recommender systems are first presented and then analysed in relation to dynamic packaging. Five solutions are finally proposed.

1 Introduction

Tourism packaging offers an important potential for tourism destinations wanting to develop a reservation platform that includes the different services available in a region. Potential clients thus have access to a consolidated offer that may facilitate the planning of their trip.

The eComTour project, carried out by the Institute of Business Information Systems and the Institute of Tourism of the University of Applied Sciences Western Switzerland (HES-SO), analyses the technical requirements and potentials of such a platform with different tourism service providers in the Valais (Switzerland). Different functionalities and a design for the booking creation process were defined. The present document analyses how recommender system technologies can be used to improve personalised packages for clients.

The main proposal is to integrate a recommender system that suggests products to the clients. Several technologies are possible, and the problem must be thoroughly analysed in order to choose the right one. We will also discuss the integration of user profiles and their preferences.

For each of the above cited aspects, we will present the general technologies and discuss their value and applicability for a tourism packaging platform, i.e. their potentials and pitfalls.

The paper is structured as follows: Our case study is presented in section 2. Section 3 introduces recommender systems in general. Section 4 explains collaborative systems,

section 5 content-based systems and section 6 knowledge-based systems. In section 0, the use of recommender systems for dynamic packaging of tourism products is analysed. Section 0 is the conclusion.

2 Case Study

*Valais Tourisme*1 has commissioned us to evaluate the need for and the technical possibilities of an e-commerce platform that offers dynamic packaging of tourism services for the destination Valais in Switzerland, with a common entry platform for all tourist services offered in Valais (cf. Fig. 1).

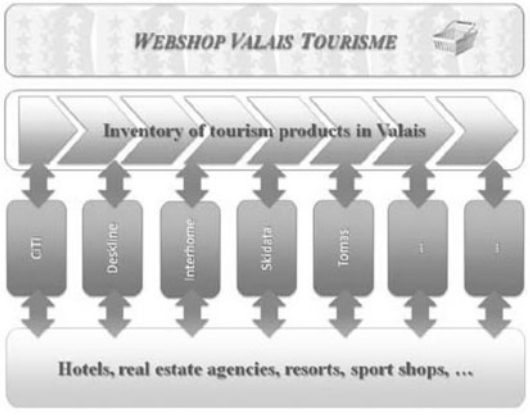

Fig. 1. Tourism e-commerce platform for Valais Tourisme

Dynamic packaging can be considered an electronic system that guides the consumer (or the travel agent) through the design, the booking and the payment of their holiday or trip, according to their needs or desires. The user can dynamically assemble the different components of their choices and then complete the transaction in real time.

Such a dynamic packaging solution requires the creation of an electronic window that combines the entire tourism offer in the Valais. The solution can be used by all service providers and is based on the services developed by them. These services will not be replaced, but integrated into a new or existing e-commerce solution.

Nowadays, it is relatively easy for IT providers to propose dynamic e-commerce solutions if they are based on their own software components2. If this is not the case, each integration of a new external partner requires a tailored development within an e-commerce solution, generally by means of web services.

1 http://www.valais.ch/

2 Examples in French-speaking Switzerland: eLiberty by Bemore (http://www.bemore.ch), Villars (http://www.villars.ch), etc.

The ultimate goal of a dynamic packaging portal is to give clients the opportunity to choose the service package they like, at a suitable price and with the best possible quality. There are a great number of possible package combinations. An intelligent system that recommends individual services for a package or even entire tourism service packages can therefore help the client choose among the many services offered. The aim of this paper is to determine which recommender systems can be used on a package creation platform.

3 Recommender Systems

The main objective of recommender systems (RS) (Adomavicius & Tuzhilin, 2005) (Zanker & Jannach, 2010) is to help users find the products that are best suited for them. These systems facilitate the presentation of the available information and assist the client during the purchase process by providing targeted advice. Many online shops such as Amazon.com use recommender systems.

A recommender system can have two main functions: it can improve the quality of choice and decrease the decision time, and, at the same time, increase product sales. It has the following advantages: i) reduction of the cost of research (extraction of data) by offering only suitable products; ii) serendipidity, i.e. the platform can suggest products the client did not know before.

Recommender systems mainly differ in the conditions of the system, which they have to implement: What product data is available and what are the data characteristics? Do users leave feedback, e.g. ratings? Does the website have regular subscribed users or do users only visit occasionally? All these aspects must be taken into account when choosing which RS technique to implement into a platform. Not every method is suitable for every problem. We will hereafter present the main recommender systems and then determine which of their features are essential for a packaging platform.

3.1 Formalisation.

In this section, we introduce a formalisation of the recommender systems problem such as presented in (Adomavicius & Tuzhilin, 2005):

- *C* represents all *users* (a potentially large group);
- *S* represents all *items* (or products) that can be recommended, i.e. hotel bookings, ski rentals (a potentially very large group).

u is a *utility function* that measures if an item *s* is useful for a user *c:*

$$u : C \times S \rightarrow R$$

R is an ordered set (e.g. real values). In many application cases, it is not necessary to define a score (utility) for all items, but only for the most important ones.
The aim is to choose for every user *c* of *C* the item *s'* of *S* that maximizes the utility for the user:

$$\forall c \in C, s'_c = \arg\max_{s \in S} u(c,s)$$

The utility of an item for a user can be defined using a function specified by the application or be represented by user ratings.

Every user c of C can be described by a *profile*, which includes information about their age, their gender, or a simple identifier. Similarly, every item s of S can be defined by a number of features. A hotel booking, for instance, can be described by the surface of the hotel room, etc.

The *main problem* of RS lies with the fact that the utility of all combinations of c and s cannot be predicted. It is therefore necessary to estimate this utility for all new cases. This extrapolation is defined by an estimated optimisation function of certain criteria or by an empirical law. Once this law is defined, i.e. once all user feedback has been extrapolated, the first item(s) that maximize their utility can be recommended to the user, such as described in the above function. The different RS methods differ in the way non-existing user ratings are extrapolated.

3.2 Main paradigms

Different RS paradigms exist. *Collaborative RS* recommend items that people with similar preferences have liked in the past. *Content-based RS* recommend similar products to the ones the users have liked in the past. *Knowledge-based RS* recommend items that correspond to user needs on the basis of existing items, user profiles (and possibly contextual parameters of these users) and knowledge models. *Hybrid RS* combine several technologies of the other paradigms.

These different paradigms represent multiple and very different technologies. Therefore, the problem (in our case dynamic packaging for the tourism industry) has to be thoroughly analysed in order to choose the technologies that are best suited for this problem. The relevance of the recommendations should also be measured by separating the model training data from the data resulting from their evaluation, and by analysing real recommendations. Quantitative measures of the relevance of these recommendations should then be analysed, i.e. the clients' satisfaction with a recommendation or "online reconversion" of a recommendation (did the user follow the recommendation, did the recommendation result in a purchase?). The following sections present the main paradigms in detail.

4 Collaborative Recommender Systems

Collaborative recommender systems predict the utility of an item on the basis of the opinion of *other users,* i.e. by using the *wisdom of the crowd.*

A collaborative RC estimates the utility $u(c,s)$ of an item s for a user c using all utilities $u(c_j,s)$ estimated by all users c_j of C that are "similar" to user c. For instance, to make recommendations to a user looking for a package including "wellness" and "snowshoes", packages of similar users can be chosen.

Collaborative filtering. *Collaborative filtering* CF (Goldberg, Nichols, Oki, & Terry, 1992) is used by most collaborative RS and by online shops such as amazon. CF puts

forward two basic *hypotheses:* i) users rate items/products; ii) users have similar behaviour that does not change significantly, i.e. they will like the same things in the future than they like now.

Many technologies have been developed that differ mainly in their definition of *similarity* and *prediction.* According to (Breese, Heckerman, Evans, Gladish, & Pazzani, 1998), two main methods can be distinguished. *Memory-based CF* directly uses the rating matrix to make recommendations, i.e. runtime analyses. These methods are not suitable for large data sources. *Model-based CF* is an offline-based method that learns a model using rating matrices. During runtime, this model is then used to make recommendations. These latter methods are much more run-time efficient, even though the development of the model, which needs regular updating, is expensive.

Memory-based CF: the example of item-based CF. *Item-based CF* is one of the most efficient memory-based methods. It uses the similarity between items (and not users) to make predictions.

To define the utility of an item *i* for a user *u*, this methods searches for all similar items and uses the ratings by *u* for this subset of items to predict the utility of *i.*

We have already mentioned the problem of the complexity of memory-based methods. Another well-known problem is the "cold start", i.e. how to recommend items that have only just been introduced or how to ma
ke recommendations to new users. This problem can be solved by obliging new users to rate certain products or by using other methods (demographic data).

Model-based CF: the example of association-based CF. A classical model-based method is the one that uses *association rules (affinity analysis).* This method defines "what goes with what" and is ideally used for online sales of products. Its aim is to define rules such as "if the client books a golfing holiday, he will book a 4- or 5-star hotel and a wellness package".

Various rules can be defined based on these transactions, for instance: {*golf, 4*hotel, wellness*} could mean "*If golf, then 4*hotel and wellness*", but also "*If golf and 4*hotel then wellness*", etc. The part before *if* is called *antecedent,* the part after *if* is called *consequence.* The first step consists in generating all possible association rules using the Apriori algorithm. This generation is exponential to the number of items. To decrease this complexity, Apriori counts up the frequencies, called the supports, of each member item separately. Once all possible rules have been generated, the rules that indicate a strong dependence between antecedent and consequence have to be chosen. The dependence of every rule can be defined by a confidence index, which is calculated as the number of transactions of items of the antecedent and the consequence divided by the number of transactions of items of the antecedents only. The rules that are finally kept are the ones with the largest confidence index.

Discussion. A large number of varieties of collaborative recommender systems exist, which all use different methods (e.g. clustering…). These methods have the advantage of being well-known and of not requiring specific knowledge of the subject area. However, a user group and a sufficiently large database are required.

5 Content-based Recommender Systems

Collaborative RS do not need any information on the recommended items. However, this information can prove very useful as, for instance, a golf course can be recommended to a person who has already used this service in the past. This is exactly what *content-based recommender systems do.* They use information about items (their *content*) and a user profile that describes what the user likes (*preferences)*.

Next, the user preferences have to be learned so that items can be recommended that are similar to the user's preferences. User profiles are either explicitly defined by interrogating the user or implicitly learned using, for instance, transactions. A content-based RS calculates the utility $u(c,s)$ of an item s for a user c using the utilities $u(c,s_i)$ that this same user c has attributed to the items s_i of S that are *similar* to s.

The description/content of an item s (that can be written as *content(s))*, can be described by the attributes of the item. These attributes are typically key words. According to the item description, three content-based RS types can be distinguished: *structured items* (data based on a precise model, typically organised in relational data bases), *non-structured items* (text data) and *semi-structured items* (a mixture of structured and non-structured items). In the first case, a *preference-based approach* can be used (cf. below). In the two other cases, structured data has to be extracted automatically, using *Information Retrieval (IR)* or *Machine Learning* methods, such as the Naive Bayes Classification (Pazzani & Billsus, 1997) or *Support Vector Machines* (Vapnik, 1995).

Similarity measure. For these algorithms, it is thus essential to measure the similarity between items. One of the most common (IR) methods is *TF-IDF*, which encodes a document into a multi-dimensional Euclidean space. TF *(Term Frequency*) measures the frequency of a term in a document (according to the length of the document, this measure is often standardised). IDF *(Inverse Document Frequency)* measures the importance of a term by dividing the total number of documents by the number of documents containing the term and then by taking the logarithm of this division. The resulting matrix is generally very large, with a lot of "holes". It can be improved by omitting terms such as articles (the, a, etc.).

Profiles and recommendations. Based on this representation of items, content-based RS will create *a content-based profile(c)* for every user, which is derived from their preferences. One method to create these profiles consists in extracting the key words of all items the user has liked. For a total number of k set key words, this profile can be described as a weight vector $(w_{c1},\ldots,w_{ck})$, where the weight w_{ci} describes the

importance of the item k_i for the user c. This vector can be calculated differently, using the ratings (appreciated/not appreciated) of all items.

The recommendation problem for a user can thus be described as follows (using the *k-nearest neighbour algorithm*). For every item i of the catalogue, it must be decided if it can be recommended to a user c. From the ratings of a group of items D *made* by c, the system finds the items out of D that are most similar to i (using similarity measure). The result, a subset of similar items, is then used to predict the rating of i (e.g. by majority).

Preference-based approach. This method directly uses the structured data, i.e. data from different databases from different tourism service providers (dynamic packaging). With the preference-based approach, the creation of recommendations is considered a *constraint satisfaction problem or CSP* (Tsang, 1993). Multi-variable problems are described as constraints between these variables. An optimal solution must be found among all possibilities based on the preferences of a user. We have the following data tuple *(X, D, C, I):*

- X represents the attributes $\{x_1, ,x_p\}$ that describe all items; e.g. *X={type, numberOfRooms, surface, ratePerWeek};*
- D represents the authorised domain values $\{D_1, ,D_p\}$, where every D_i represents the set of possible values for x_i; e.g. D_{Type} = *{chalet, apartment}*, $D_{NumberOfRooms}$ = *[1,8]*, $D_{Surface}$ = *[10,300]*m^2, $D_{RatePerWeek}$ = *[0,10'000]CHF;*
- C represents the constraints $\{c_1, ,c_p\}$, where every c_i is a constraint function that describes the values that a subset of X can have; e.g. $C_{Type,Size}$: if *type = chalet* then *surface > 70*m^2*;*
- I is the set of items that will be recommended to the user; it is part of the Cartesian product $D = D_1 \times D_2 \times \ldots \times D_p$. e.g. {chalet, 7, 220 m^2, 2'500}.

With the preference-based approach, the user preferences must first be defined (expressed as strong and weak constraints). Based on the *declarative* description of a problem, a CSP[3] solver will find a set of values for the attributes (variables) that fulfil the preferences (constraints).

Discussion. There are different limitations to content-based RS. In order for these methods to work, training data is needed, which is not always possible. These methods also tend to be too specialised and suggest items that are really too similar. The main limitation however is the need for keywords that have no semantic representation (knowledge). We will see in the next section which solutions are proposed to solve this problem.

The preference-based approach has the advantage of being applicable to structured items. Its main problem though is the time-consuming and complex interaction with the users to collect their preferences.

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[3] Many different solvers are available, also as open source (e.g. http://jacop.osolpro.com/).

6 Knowledge-based Recommender Systems

Knowledge-based recommender systems use technologies based on the representation of knowledge of items and users. Three types can be distinguished: conversational RS, taxonomy-based RS and ontological filtering.

Conversational RS. These recommender systems use *case-based reasoning* (Leak, 1994). Like the FindMe system (Burke, 1997), this method constructs a two-step conversation with the user. First, the system asks the user about their preferences. New preferences are then implicitly construed through *critiques* of the recommendations (e.g. too expensive). The system allows the user to navigate through suggestions without having to know all of the items' criteria. The aim of the system is to resemble a conversation with a salesperson.
It is also possible to add constraints to user preferences, e.g. "if the user books the tourism service A, they must have booked the tourism service B". These constraints can be strong or weak and must be used by the RS.

Taxonomy-based RS. It can be disadvantageous to use only key words to describe the items, as it is very probable that the key words defined by a user cannot be found in the items/documents. A *taxonomy* describing the concepts can therefore be very useful to complete the search. Middleton, for instance, uses a taxonomy to complete user interest profiles (Middleton, Shadbolt, & Roure, 2004). *Collaborative filtering* is then applied to these complements to create recommendations.

Ontological filtering. Even though using a taxonomy proves to be very relevant, Middleton and also (Ziegler, Lausen, & Schmidt-Thieme, 2004) assume that the taxonomy preexists, i.e. that it is static and cannot dynamically react to the addition of new items to the electronic catalogue. This limitation is to be overcome with *ontological filtering*[4] (Schickel-Zuber, 2007). This RS uses an ontology to enrich the catalogue and to deduct the missing preferences. This deduction makes the collection of user preferences unnecessary. To generate recommendations, the knowledge of items and user preferences are used instead of collaborative filtering. If an ontology describing a catalogue is missing, it is automatically learned. In addition, an ontology can be customised for specific users.

Discussion. Knowledge-based RS are used very little, probably because collaborative filtering produces rather good results. One of its disadvantages is the requirement to manually model the subject area into a representation of the knowledge. This disadvantage was overcome by ontological filtering, which automatically constructs the needed ontologies.

[4] Ontological filtering is protected by patents and led to the creation of the Swiss company Prediggo, which deploys its software in a large number of online catalogues.

7 Recommender Systems for Dynamic Packaging of Tourism Services: Synthesis

Considering the potential of RS, online tourism services and especially dynamic packaging of tourism services, have very distinctive characteristics. Two features need to be pointed out. A user who books a tourism service (a package or part of a package) is, in general, not a regular visitor of the website. That is, his profile is not known in advance, he has no purchase history and he has probably never rated any other items.

Recommendations can be made for accommodation types or for packages. In the first case, the integration site will have different RS for every type of service. In the second case, a recommendation will be made for a service package. These two types of recommendations correspond to two types of architectures that will be discussed hereafter.

Solutions for individual services. If recommendations are made for *individual services*, a system is created where, step by step, recommendations are made for every single service. If, during a booking, the client first wants to book accommodation, an accommodation recommendation will be made. In a second step, a recommendation for winter sports will be made, and so forth. For these individual recommendations, the following RS could be used:

- **Solution 1**: If ratings of individual services can be obtained, a *memory-based CF* can be used. However, this method is necessarily based on a user profile, so that similar user profiles can be found (cf. item-based CF). The user must thus be asked to rate certain offers or to create a basic profile.
- **Solution 2:** With ontological filtering, more precise recommendations can be made, without having to collect user preferences, because this RS uses an ontology to deduce missing preferences.

The implementation of these solutions presents an additional complexity: several RS have to be integrated into a single information system (i.e. the packaging platform). Recommendations for individual services also present the following fundamental problem: they do not take into account the entire booking process with its constraints. If, for instance, a family with four children wants to book a package, the presence of the children will have an influence on the services (type of accommodation, activities, etc.) and on the constraints on these services (e.g. budget constraints). A user should be able to determine an upper price limit for the package. For this reason, recommendations for service packages seem to be the more interesting option (from the client's point of view).

Solutions for service packages. The second possibility is to make recommendations for tourism service packages (Ricci, 2002). There are mainly three different solutions, the last two being the solutions generally found in the literature:

- **Solution 3**: This relatively simple approach consists in making association rules. This method requires an extensive history of purchased packages in order to find

out which services have been bought together. The advantage of this method is that the rules can be calculated offline (e.g. every night), so that recommendations can be made very efficiently when the client is online.

- **Solution 4:** Most research suggests the use of conversational RS using case-based reasoning. As with the example presented by (Ricci, Mirzadeh, & Venturini, 2006), a conversation system finds out user preferences or suggests examples that the user rates. The system then suggests products to the user and uses their feedback to improve the recommendations. One of the advantages of this system is the fact that it does not require much user feedback. That is, it can immediately be used (no cold start issues).
- **Solution 5:** The preference-based approach uses structured data, i.e. the kind of data integrated into packaging platforms. This method presents the disadvantage of requiring user profile information. In a second step, a solution is applied to a constraint satisfaction problem. The VIBE system by ConfigWorks[5] is an example of such an application that uses a conversational RS such as CSP to recommend packages in the tourist destination of Warmbad-Villach[6] (Jannach, Zanker, & Fuchs, 2009).

8 Conclusions

In this paper, we have analysed the different recommender systems that could be used for a dynamic packaging application for the tourism industry. After presenting the different methods, we have suggested five solutions for the application of RS methods. Solutions 3, 4 and 5 are, in our opinion, the best options. For an optimal choice, the components of the package and their number would have to be defined more precisely. It could be useful to work in two steps. First, the packaging platform could be developed, web services integrated and all transactions recorded. Then, a thorough analysis of this data could be made and a feasibility study with different RS methods could be carried out in order to develop a functional prototype. This study would imperatively have to measure the calculation time of a recommendation, the precision and the utility of the recommendation, and the cost for the implementation and the maintenance of the system.

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[5] www.configworks.com

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CT-Planner2: More Flexible and Interactive Assistance for Day Tour Planning

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Abstract

Tourists often have a hard time making their tour plans, especially when they are visiting a large city on a tight schedule. To relieve tourists from such difficulty, a computer-aided interactive tour planning system, called *CT-Planner2*, was developed. This system models a tourist advisor who makes tour plans customized for individual tourists. Guided by an interactive agent, each user of this system can request when and where he starts/ends his tour, which tour criteria he wants to emphasize, and which attractions he especially wants to visit/avoid, as well as compare several plans that the system automatically generates. By repeating the revision of tour plans in an interactive manner, the user can eventually build a custom-made tour plan that fits his requests and preference. In our user test, the usability and potential of the system is evaluated positively by the participants.

Keywords: computer-aided tour planning; candidate/critique model; selective travelling salesman problem; user's preference; custom-made tour plan.

1 Introduction

Imagine that you are visiting Tokyo for a conference, after which you have a day off. Probably you want to visit several places for sightseeing. If so, which places do you visit? You may browse a guidebook or web site, or ask somebody, to find out what places in Tokyo will be interesting for you. However, even if you have found several interesting places, it is difficult to determine how many of them you can visit only in a day, since you do not know the time necessary for visiting each place, as well as the time necessary for travelling from one place to another. Your guidebook may kindly show some model plans, but it is not guaranteed that these plans include one that fits your interest and schedule. Alternatively, you can consult an expert, such as a staff in a tourist information office or a concierge in your hotel. However, in a foreign country you may experience difficulty in communicating with such experts.

To relieve tourists from such difficulty in tour planning, several researchers have developed the systems that support the user's tour planning. Some systems recommend attractive points-of-interest (*POIs*) in the target area, taking the user's tour preference into account (e.g., Ricci *et al*., 2002; Schmidt-Belz *et al*., 2002; Ardissono *et al*., 2003). Some systems optimize the tour schedule complying with the user's request (Maruyama *et al*., 2004; Seifert, 2008). Some systems score the POIs based on the user's preference and then generate a customized tour plan for each user

(Kishimoto & Mizuno, 1997; Kurata *et al.*, 2000; Goy & Magro, 2004; Lee *et al.*, 2007). Typically, these systems are aimed at rather fully-automated generation of tour plans. *CT-Planner* (Kurata, 2010), on the other hand, emphasizes the concept of *interactive assistance*—it models the interaction between a tourist and a tour advisor, where the advisor shows several sample plans to the tourist, learns the tourist's preference and requests from the tourist's feedback, customizes the plans accordingly, and asks for the tourist's feedback again to refine the plans. Kurata (2010) asserted the potential of such interactive assistance, because the user can see the actual plans from the beginning, without thinking about his own tour interests which he is often not well aware of. However, he did not conduct an official user test to substantiate his claim. In addition, CT-Planner still had room for improvement of user-friendliness and interactivity. Thus, in this work, the revised version of CT-Planner, namely *CT-Planner2*, was developed and evaluated through a user test. This paper introduces CT-Planner2 and its mechanism, as well as reports the result of the user test. Note that CT-Planner stands for *Collaborative Tour Planner*, and also *City Tour Planner* as it mainly targets city-scale day tours. Currently, CT-Planner2 works on a Windows PC as a stand-alone application.

The major contribution of this work is, in an academic perspective, to introduce an alternative approach to computer-aided tour planning that emphasizes collaborative design of tour plans by the system and the user, and in an industry perspective, to demonstrate that this approach is highly potential as the users get high satisfaction through their active involvement in revising their tour plans.

The remainder of this paper is structured as follows: Section 2 reviews some key ideas of computer-aided tour planning. Section 3 describes the design concepts of CT-Planner2, while Section 4 explains its mechanism. Section 5 reports the result of our user test and identifies remaining problems. Finally, Section 6 concludes with a discussion of future work.

2 Computer-Aided Tour Planning

People have a large variety of tour interests. In addition, there are a large variety of tourist attractions, especially in huge cities which attract many tourists. Hence, user-adaptation techniques for filtering, sorting, and refabricating tourist information for individual tourists have been long discussed and implemented in many tourist information systems. Such techniques are especially important for tourist information services on mobile devices, because the users have to process the tourist information in a short time during their tour on a tiny screen.

A key question in such user-adaptation techniques is how to estimate the value of each POI for each user. In early systems, a user was asked to set several preference parameters manually, for instance, by sliders (e.g., Kishimoto & Mizuno, 1997; Maruyama *et al.*, 2004; Hochmair & Rinner, 2005). Then, the value of each POI in the target area is estimated, considering the matching between the POI's character and the user's preference. To achieve more natural interactions, the system by Kurata *et al.*

(2000) adopted an on-lime questionnaire, in which the user is asked to compare several pairs of tour purposes. Then, from the user's answers the system calculates the user's preference parameters. Alternatively, CT-Planner (Kurata, 2010) asks the user to compare tour plans; the system provides several plans of different characters, calculates the user's preference from the selection of his favourite plan, and again the system shows a set of adapted tour plans to the user to ask his feedback. With this interface, the user no longer has to specify his tour interests explicitly before seeing actual plans. This technique, called *candidate/critique model*, was proposed by Linden *et al*. (1997) who applied it to online airplane ticket sales.

The controversial issue of such preference-based approaches is the validity of measurement of users' tour preference. To skip this problem, some systems adopted *collaborative filtering* (Rensnick *et al*., 1994), which is now used practically in many recommender systems (Bachrach *et al*., 2009). In this approach, the evaluation of each POI by previous visitors is used for the estimation of its value for each user, assuming that tourists with similar profiles (gender, age, travel history, etc.) give similar evaluations to the same POI (Ricci *et al*., 2002; Lee *et al*., 2007). Even though this approach imposes fewer burdens on the users, the validity of the above assumption needs to be carefully examined. In addition, this approach requires a large amount of evaluation data by tourists.

Seifert (2008) pointed out that the main disadvantage of computer-aided tour planning systems is that they exclude the user's participation in the process of planning. Indeed, according to the user test by Kurata *et al*. (2000), users complained about the inability to customize the recommended tour plans by adding or removing POIs that they want to visit/avoid. The same problem is also seen in other tour planning systems. Exceptionally, P-Tour (Maruyama *et al*., 2004) allows the user to indicate where he wants to visit/avoid, although indirectly, by assigning high/low scores to the POIs. However, P-Tour forces the user to evaluate all POIs in the target area, which requires a lot of time and effort. From this lesson, CT-Planner (Kurata, 2010) allows the users both to specify their requests on some POIs and to leave the evaluation of the remaining POIs to the system.

3 System Design

Following the former version, CT-Planner2 models a tour advisor who makes tour plans customized for individual tourists. It emulates the following roles of the tour advisor:

- To propose sample tour plans to the tourist, based on the advisor's knowledge about the tourist's profile
- To handle the tourist's request about the overall character of his tour plan, as well as his special request to include certain POIs in the plan or to remove them from the plan
- To judge the tourist's preference from his feedback

The idea of modelling a tour advisor's role to realize user-friendly interactions is also seen in Garcia *et al*. (2010), but they do not adopt a repetitive process like ours where the tour plans are refined gradually as the user's preference and requests become clearer.

Currently CT-Planner2 targets Yokohama, a portside city near Tokyo, which attracts more than forty million tourists in a year. The number of POIs we consider is 28, which looks relatively fewer than the studies that target European cities where historic attractions are distributed densely (for instance, the system by Garcia *et al*. (2010) targets 50 POIs in San Sebastian, Spain).

Fig. 1 shows the main screen of CT-Planner2. A tour plan, recommended by the system, is shown on the map of central Yokohama. This plan visits eight POIs in five hours (from 10:00 to 15:00). On the right side the itinerary of this plan is shown, together with a photo, a short description, and a rating (one to three stars) of each POI visited during the tour. The user can see more detailed information about each POI by clicking it in the map or itinerary (Figs. 2a-b).

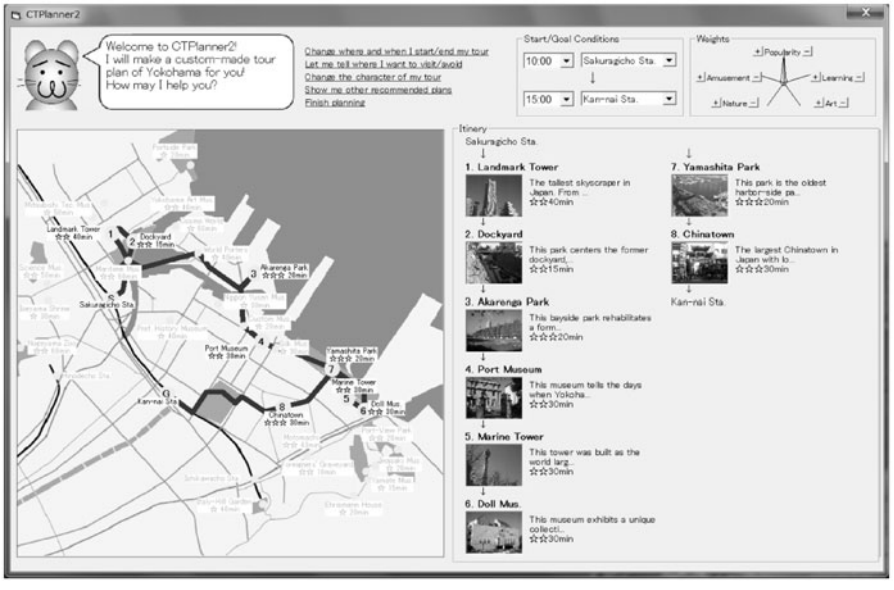

Fig. 1. The main window of CT-Planner2

(a) (b)

Fig. 2. Two small windows that show the property of (a) a POI and (b) a transportation facility, respectively

In the upper right of the main screen, there are two frames: the left one, namely *Start/Goal Conditions* frame, shows when and where the tour starts/ends, and the right one, named *Weights* frame, shows a radar chart that visualizes the weights on five tour criteria—*popularity*, *learning*, *art*, *nature*, and *amusement*—under which the POIs are evaluated and the recommended plan is generated. The radar chart essentially represents the user's preference.

In the upper left of the main screen is a cartoon character who guides the user. The user can interact with this character simply by selecting one of the options shown to the right of the character's message. Basically, the user has five options:

1. To change where and when the tour starts/ends;
2. To specify which POIs the user wants to visit/avoid;
3. To change the character of the tour;
4. To see other plans for comparison; and
5. To finish tour planning

If option 1 is selected, the user is guided to manipulate the four components in the *Start/Goal Conditions* frame (Fig. 1). The start/goal locations can be changed also by clicking a node in the map and then clicking the *Start*/*Goal* buttons in its property window (Figs. 2a-b). Similarly, if option 2 is selected, the user is guided to click a POI in the map or itinerary and then to click the *Visit*/*Avoid* button in its property window (Fig. 2a), and if option 3 is selected, the user is led to manipulate the radar chart in the *Weights* frame. As soon as the user manipulates any element, the tour plan shown on the screen is revised accordingly. For instance, when the user clicks the + button to the left of *Learning* in the *Weights* frame repeatedly, the tour plan is revised to visit more and more museums.

If the user selects option 4, the system shows two tour plans side-by-side, so that the user can compare the plans (Fig. 3). Both plans follow the same tour conditions (i.e., when and where to the tour should start/end and which POIs the tour should

visit/avoid). The difference is that the left one follows the current weights shown on the screen, while the right one puts more weight on either learning, art, nature, or amusement more than now. If the user adopts the alternative plan, the window switches to the previous state (Fig. 1) but the plan is now replaced with the adopted one, and the weights are updated accordingly.

By repeating the above four types of operations, the user can make his own tour plan supported by the system. When the user is satisfied with the plan, he is supposed to select option 5. Then, the map and itinerary of the current plan are printed out for the user, while the system is restarted for the next user.

CT-Planner2 implemented several new ideas that are not in the former version. First, CT-Planner2 adopted a cartoon character as a navigator, in order to enrich the sense of user-friendliness and interactivity. Second, CT-Planner2 shows the tour plan not only in a map, but also in an itinerary enriched with photos and short texts. Finally, CT-Planner2 shows the weights on the five tour criteria and allows its manual adjustment. The old version hides such weights and determines the weights from the user's repeated selection of alternative plans. However, some users complained that they could not directly decide the character of the tour plan. Hence, CT-Planner2 is designed to allow the user's direct manipulation on the weights on the five tour criteria. The evaluation of these new ideas is reported in Section 5.

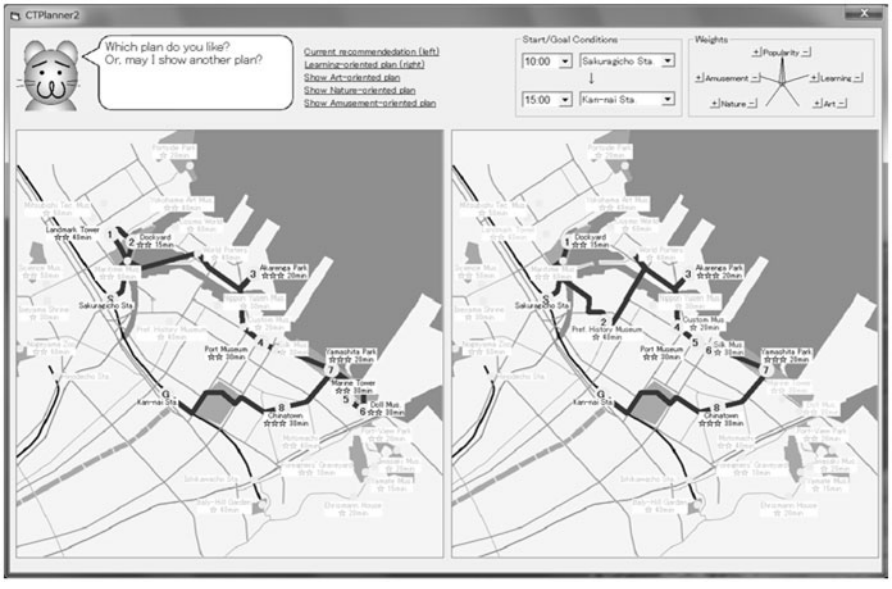

Fig. 3. CT-Planner2 shows two plans of different characters to seek the user's preference from his feedback

4 Underlying Mechanism

This section explains how CT-Planner2 generates custom-made tour plans for individual users. The underlying mechanism is almost the same as the former CT-Planner, although we redesigned the user interface.

CT-Planner2 targets a city-size tourist area which contains multiple POIs. The tourist area is modelled as a graph. Each node represents either POI or transportation facility (TF), while each link represents a route between two POI/TFs. The routes are computed beforehand using Dijkstra's shortest path algorithm (Dijkstra, 1959). POI-nodes are assigned two parameters: *visitation time* that a tourist normally spends at the POI and *expected utility* (i.e., the amount of satisfaction) that the user will obtain by visiting it. TF-nodes are assigned zero visitation time and zero utility in order to deal with both POI-nodes and TF-nodes simultaneously in computation. Links are assigned a single parameter *travel time* that a tourist normally spends to travel the corresponding route.

4.1 Plan Generation

The system recommends the *best* tour plan that visits highly-evaluated POIs as much as possible under a given time constraint and current evaluations of POIs. The problem to find out the best plan is formalized as follows (Kurata, 2009):

Given a complete graph (V,E), *the expected utility of each node* u_i, *the visitation time* $t^{visit}{}_i$, *the travel time* $t^{travel}{}_{ij}$, *origin node* $v_{ori} \in V$, *goal node* $v_{goal} \in V$, *and time constraint* T, *find a series of nodes to be visited* $v_{a_1},\cdots,v_{a_k}$ $(v_{a_i} \in V)$ *that maximizes the sum of utilities* $\sum_{i=1}^{k} u_{a_i}$ *under the following three constraints*:

$$\sum_{i=1}^{k} t^{visit}{}_{a_i} + \sum_{i=0}^{k+1} t^{travel}{}_{a_i a_j} \le T$$

$$v_{a_0} = v_{ori}$$

$$v_{a_{k+1}} = v_{des}$$

Currently, the maximum tour time is restricted to no more than 7 hours (i.e., $T \le 420\,\mathrm{min}$), since we target day-tour planning. Another reason of this restriction is that the above problem setting presumes that all POIs are always open and accessible (usually 10am to 5pm).

The above problem is essentially the *Selective Travelling Salesman Problem* (*STSP*), which is known to be an NP-hard combinatory optimization problem (Laporte & Martello, 1990). CT-Planner2 uses a heuristic high-speed algorithm for deriving semi-optimal solution, which was proposed by Kurata *et al*. (2000). This algorithm works

in $O(nt^2)$, where n is the number of POIs in the target area and t is the length of tour time. Alternatively, a genetic algorithm (GA) used in STAR (Goy & Magro, 2004) or P-Tour (Maruyama *et al*., 2004) may also be applied to generate more optimal solutions. We, however, did not adopt a GA-based approach, because it may take a bit time to find a solution (Garcia *et al*. 2010) while quick feedback from the system is vital in our system to achieve smooth interactions.

4.2 Evaluation of POIs

To conduct the plan generation as explained in Section 4.1, we have to estimate the expected utilities of POIs in the target area beforehand. Each POI is given five-grade scores in five criteria—*popularity*, *satisfaction level of learning*, *satisfaction level of art*, *satisfaction level of nature*, and *satisfaction level of amusement*—determined by experts in advance. On the other hand, the weights on the corresponding five tour criteria—*popularity*, *learning*, *art*, *nature*, and *amusement*—are determined by every user (Section 4.4). The expected utility of each POI is calculated from the weighted total of its five scores.

We adopted the above four criteria for representing the user's tour preference, because people often express their preference by the categories of tourist attractions they like. We considered that *education*, *art*, *nature*, and *amusement* are four representative categories of tourist attractions. Of course there are other possible categorizations, but we should avoid detailed ones in order not to overwhelm the user. Note that we further added one item, *popularity*, because people typically prefer to visit popular POIs when they do not have any specific request.

The expected utility is transformed into star-based rating (one to three stars) and displayed on the screen (Figs. 1 and 2a), such that the user can easily judge whether the POI will be interesting to him or not.

4.3 Processing Visit/Avoid Requests

If the user requests the system to visit certain POIs, the system tentatively assigns very high utility to these POIs. Accordingly, the generated plans contain the requested POIs as many as possible under the given time constraint. This function is useful, for instance, if the user assigns a high weight on *learning* as she likes museum, but she also wants to visit an amusement park as it is famous.

Similarly, if the user requests the system to avoid certain POIs, the system tentatively assigns zero utility to these POIs, such that the generated tour plans no longer contain these POIs. Again, this function is useful, for instance, if the user has been to the target area before and she does not want to visit the same POIs again.

4.4 Changing Weights

To estimate the utility of POIs for each user (Section 4.2), the user has to specify the weights on the five tour criteria. Initially, the weight is assigned only to *popularity*.

Accordingly, the initial recommended plan emphasizes the POIs that are popular to everyone. The user can adjust the weights on the five tour criteria by clicking the respective + and buttons in the *Weights* frame (Fig. 1). Let the current weights on *popularity*, *learning*, *art*, *nature*, and *amusement* be $(w_p, w_l, w_a, w_n, w_e)$ and suppose that the user clicks the + button to the left of *Amusement*. Then, the weights are modified to $(aw_p, aw_l, aw_a, aw_n, w_e + \alpha)$, where $a = (1 - w_e - \alpha)/(1 - w_e)$ in order to keep the sum of weights 1. In the current version, the parameter α is assigned 0.1, or $(1 - w_e)$ if it is smaller than 0.1, such that the weight on each criterion is kept no more than one. Note that the + button to the left of *Amusement* is enabled only when $w_e < 1$.

The weights can be modified also by the user's selection of alternative plans (Fig. 3). The alternative plans are generated using tentatively modified weights. For instance, when the current weights are $(w_p, w_l, w_a, w_n, w_e)$, the *nature-oriented plan* is generated under the weight $(bw_p, bw_l, bw_a, w_n + \beta, bw_e)$ where $b = (1 - w_n - \beta)/(1 - w_n)$. β is $\min(0.1, 1 - w_n)$. If the user adopts this plan, the weights are modified to $(bw_p, bw_l, bw_a, w_n + \beta, bw_e)$.

Once the weights on the five tour criteria are changed, the system promptly revises the expected utility of each POI, as well as the tour plan shown on the screen. Accordingly, the user can see the result of weight adjustment dynamically.

5 Evaluation

In order to evaluate CT-Planner2, a user test was conducted from August to September 2010. Twenty people participated in the test as volunteers. The participants were 17 students and three faculty members in the department of Tourism Science, Tokyo Metropolitan University. Sixteen were males and four were females. Their average age was 25.4. All subjects had been to Yokohama before, as it is a very popular tourist destination near Tokyo.

In this test, the participants were asked to play with the system freely for about five to ten minutes and then to make their favourite day-trip plan eventually. They were not given any instruction about how to operate the system, so that we can examine the intuitiveness of the system for naïve users. The participants were left alone and given no advice during their trial, but their actions were recorded by the system. After the trial, the participants were asked to fill in a questionnaire.

On average, the participants spent 9.7 minutes (σ=3.4) for the trial. Three major types of users were found from the user log:

- Goal-oriented users, who made their final plan in fewer steps without trying various tour conditions;

- Experimenting users, who tried various tour conditions and eventually found the best plan; and
- DIY-type users, who specified their requests as many as possible and did not leave the system to propose which POIs to visit.

Naturally, the first group finished tour planning relatively quickly, while the latter two groups spent longer time.

In the first part of the questionnaire, the participants were asked six questions about their satisfaction with and impression of the system. The results, as summarized in Table 1, show that the system is evaluated positively by the users. Especially, most users evaluated the system as easy to understand (Q2). However, some participants did not feel that they had successfully made their favourite plan (Q4). Two complaints were heard from them: one is that CT-Planner2 does not allow them to specify *when* they visit a POI and *how long* they spend there, and another is that the current sample data misses the information about restaurants and shops. Many participants answered that they would like to use the system on the Web (Q5), while some participants were not willing to use it in a tourist information office (Q6). This indicates that the sales point of CT-Planner2 is that it enables the users to consult the system about their plans at any time at any place.

Table 1. User evaluation of CT-Planner2 (Five-grade scale where yes=5 and no=1)

	Question	Average Rating	Standard Deviation
Q1	Are you satisfied with your tour planning experience supported by CT-Planner2?	3.95	0.51
Q2	Was CT-Planner2 easy to understand?	4.40	0.68
Q3	Was CT-Planner2 user-friendly?	3.95	0.76
Q4	Did you successfully make your favourite plan with CT-Planner2?	3.65	0.99
Q5	Will you use CT-Planner2 if you can access it on the Web?	4.20	0.83
Q6	Will you use CT-Planner2 if you can access it at a tourist information office in your destination?	3.80	1.20

In the second part of the questionnaire, the participants were asked to evaluate five features of CT-Planner2. The results, as summarized in Table 2, show that visualization of a tour plan and support of user's visit/avoid requests were highly evaluated, while presence of a guiding character was not well. Some participants commented that the character was not lively, as their image was fixed and their messages were very limited. Display of multiple plans for comparison, which was the key feature of the former CT-Planner, did not attract many participants. According to

the user log, the participants rather preferred to adjust the weights on the five tour criteria by themselves, in order to see the tour plans of different characters.

Table 2. User evaluation of CT-Planner2's five features (Five-grade scale where good=5 and bad=1)

Function	Average Score	Standard Deviation
Visualization of a tour plan by the combination of a map and an itinerary	4.55	0.60
Presence of a guiding character	3.65	1.09
Display of multiple plans of different characters for user's comparison	3.68	0.95
Support of user's request about where to visit/avoid	4.45	0.69
Support of user's manual setting of weights on tour criteria	3.9	1.04

The last part of the questionnaire asked the participants to write their comments and ideas freely. Some participants mentioned the system's restriction on tour time (10:00 to 17:00). This restriction arises from the problem of the current algorithm which presumes that all POIs are open and accessible. This problem can be avoided by the use of an approximate algorithm by Matsuda *et al*. (2004) for *FORPS* (Fuzzy Optimal Routing Problem for Sightseeing), which supports temporal fluctuation of POI values—we should simply assign zero utility to POIs when they are in closed hours.

Some participants wanted the system to support not only point-like tourist attractions, but also attractive paths. If the value of paths is taken into account, the problem becomes *EPTP* (*Enhanced Profitable Tour Problem*). A heuristic algorithm for deriving semi-optimal solutions of this problem is already available (Joset & Stille, 2002). Thus, the remaining question is how we should evaluate the attractiveness of paths in a reasonable way. Further possible extensions of the tour planning problem are reviewed in Souriau and Vansteenwegen (2010).

Some participants wished if they could edit multiple plans simultaneously, such that they could keep candidates and compare them afterwards. Some participants requested an *undo* function as well. The implementation of these ideas is left for future work.

6 Conclusions and Future Work

Tourist information is essential for tourists who visit unfamiliar places, but their decision making becomes rather difficult if they are given an overwhelming amount of information. Thus, the question of how to refine and customize the information for individual tourists is important for intelligent tourist information systems. This paper introduced CT-Planner2, with which people can create custom-made tour plans

interactively, as if they are assisted by a human advisor. Compared with the former version, CT-Planner2 increased the user-friendliness and interactivity thanks to the employment of the guiding character, the visually-enriched itinerary, and the radar chart that shows the weights on different tour criteria and allows their adjustment. The system was evaluated positively by the participants of our user test. At the same time, the user test revealed several remaining issues, such as limitation of tour hours and inability to request the time and duration for visiting POIs. How to overcome these issues is left for future work.

A great advantage of computer-aided tour planning systems is that a user can consult a system at any time, as much as he wants, using his own language even in foreign countries. To make the most of this advantage, an online multi-language version of our system for serving tourists visiting Japanese cities is now under preparation. Of course, the system itself is applicable to non-Japanese cities if their data are provided.

In addition, the development of a mobile version of our system is also on our road map. A key question is how to provide a service tailored to mobile devices. Real-time monitoring of the user's location and schedule (Shiraishi *et al*., 2005) and subsequent real-time rescheduling are potential services of mobile-oriented tour planning systems.

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SigTur/E-Destination: A System for the Management of Complex Tourist Regions

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Abstract

The development of digital and web technologies opened new horizons regarding the generation of personalized contents and the management of visitor services. The objective of SIGtur/E-Destination is to provide to the tourist and travel sector electronic tools for the sustainable management of destinations, also possibly leading to an increase in the effectiveness of visitor service firms. The SIGtur/E-Destination system includes a warehouse of geo-referenced information that updates the available information on the tourism activities in the Costa Daurada and Terres de l'Ebre in the south of Catalonia (Spain). This catalogue of information on resources, attractions, products, establishments and packages has to make possible the improvement of the interaction of between public and private agents and visitors. A recommender system uses this catalogue to offer personalized information to the tourists.

Keywords: Travel recommender systems; geographic information systems; Artificial Intelligence

1 Background

The spatial behaviour of visitors into a destination, and specifically their selection of visits once in a destination; the routing between them and the selection of means of transport; the time and attention dedicated to each of them; purchases; the choice of "gateways" and nodal points where to rest or stay overnight is strongly influenced by time budgets (Shoval & Isaacson, 2009; Oppermann, 1995; McKercher & Lau 2008). These factors, among others, come to determine the pace of development of a destination (Shoval, 2000), the satisfaction of visitors (Verbeke & Lievois, 2004), and the structure of the market (Russo, 2002).

Innovative solutions to this problem rely in planning and management initiatives that minimise the information deficiencies and asymmetries influencing the spatial behaviours of visitors. When tourists have full information about the location, access,

and quality of the attractions and complementary services in a destination region, they are more likely to organise their stay in a way that matches their preference schemes. On the other hand, the clever design, organisation and communication of opportunities in the region may bring to a more balanced tourism activity, spatially, thematically and financially, with important returns in terms of sustainable development.

However, once accrued this knowledge, it is then necessary that destination management organisations provide the necessary infrastructure to facilitate the spatial activity of visitors. For this reason, *recommender systems* are emerging as important elements in the development and management strategies of destination regions and cities, with increasing degrees of sophistication. The widespread usage of web environments in travel planning, as well as the consolidation of web 2.0 technologies, is opening the way to a new generation of tourism recommender systems with the potential to enrich tourism experiences to a substantial degree. This paper provides an illustration of the design and potential effects of one such recommender system of the "new generation", to be applied in the management of a very complex destination region: Costa Daurada, in the south of Catalonia, one of the most developed coastal destinations in Spain (Anton-Clavé, 2010). In this region mostly focusing on "3S" tourism; tourism activity is concentrated in a narrow stretch of coastal resorts (as is shown by various studies on tourists' spatial behaviour in this area). Diversification and differentiation for a renewed sustainable development clearly passes through an "activation" of natural, cultural and eno-gastronomic resources found in inland areas and cities.

In a partnership with the major tourism operators and DMOs of the area, and using European Regional Development co-funding, the Science and Technology Park of Tourism and Leisure of Vila-seca, Tarragona, has designed a recommender system, SIGTUR/E-Destination, that makes the whole range of products and itineraries accessible to visitors that plan their visits in this area, as well as to those that being already there want to enjoy richer experiences. It is based on the interaction of geospatial technologies and Artificial Intelligence algorithms, adding higher-level functionalities to currently available recommender systems and providing users with a greater range of possibilities to identify leisure activities according to their profile and, beyond that, facilitate the planning of the trip and the decision-making process before and during the stay. In the remainder of this paper we proceed as follows: in the next section the main functionalities of the system are described. Next, the architecture and design of the system are detailed, emphasizing the geospatial and recommender features. We conclude with final considerations and guidelines for future research.

2 Functionalities of the System

Tourism recommender systems allow users to optimise their travel planning time, receiving personalized assistance. In order to achieve such personalization, semantic web technologies may be used (Berners-Lee et al., 2001). Semantic web techniques

using ontologies of the tourism domain are useful in the development of new intelligent systems. In addition, recommendations can be enhanced with algorithms that learn user profiles (Sieg et al., 2007), as well as with the traditional content and collaborative filters. However, most recommender systems have some important limitations: they are focused on accommodation facilities, or feed on recommendations from the users themselves, or do not take into account spatial parameters, such as the location of the tourist resources and where tourists stay.

On one hand, the usage of geospatial technologies allows the recommender system to display geo-referred resources on a web map-based application, filtering results on real time according to spatial parameters, such as position or distance. On the other hand, Artificial Intelligence provides the system with the capability to learn automatically from the users' behaviour, meaning that the application is able to refine the recommendations on-the-fly and improve them for future visitors, without requiring explicit collaboration from users.

Fig. 1. Fill-in form to initialize the user profile

This system provides a particularly powerful tool for the spatial management of tourism activity in a complex tourist region counting on a wide range of tourist products and territorial features dispersed in space. In such a context, the ultimate objective of tourism policy would be that of diversifying tourist activity by presenting alternatives that are not so easy to visualize and access as the core product.

The users are first presented with a brief questionnaire that is used to know the general preferences of the visitor, his/her demographic characteristics and the localization. This information is processed by the recommender system (as will be explained in the next section), which matches these values with the descriptions of the available activities in the area of interest. The system performs a selection of the most appropriate activities and displays a list ordered by the probability to satisfy the user's

preferences. In order to introduce a diversification mechanism, the system computes the similarity of recommended activities, rejecting those that are too similar. In addition, this procedure provides also a “surprise” factor in the recommendation. Although this decision reduces the accuracy of the process, it is estimated to improve user satisfaction (Ziegler et al., 2005).

Fig. 2. Map-based recommendations of cultural activities

Since activities in the application are geo-referenced, recommendations can be spatially dependent. That is, the user is able to specify his/her preferences regarding the location of an overnight stay in Costa Daurada and Terres de l’Ebre region, and the radius of distance that he/she is willing to move around during his/her stay. Then the distance term will also affect the final result of the recommendation. In addition, when the user’s decision of destination is still unknown, the system is able to recommend those destinations that fit better with the user’s preferences, taking into account the location of the activities. Figure 2 gives a representation of recommended activities in the proximity of Tarragona.

After the recommendation of the activities, the user is able to interact with the displayed items. He/she can request detailed information of a certain activity, as well as add it to a travel planner or express if the activity is liked or disliked. Moreover, the user can request other activities that are similar to the selected one. The implicit knowledge provided by these feedback actions of the user is taken into account in the following recommendations made to that user, so that new activities will be considered in the proximity of the specified destination matching the current map view.

3 Architecture and Design of the System

The system needs to manage information efficiently in order to achieve multiple user objectives simultaneously. Thus an adequate architecture must be defined. Figure 3 illustrates the general architecture of the system. All modules are based on Open Source technologies. The core of the architecture is the recommender system, developed in Java, which provides the interaction between modules. The web server application has been built in Java Server Faces (https://javaserverfaces.dev.java.net) with ICEfaces extension which is an Ajax framework that allows the development of rich Internet applications in Java. Since the application does not need to work with push technologies by now, the asynchronous mode is deactivated due to its additional resource requirements. Thus, the client presentation update is done synchronously by the request/response cycle. Concurrency of the system is addressed by the framework using a thread pool which provides bounded thread usage in large-scale applications. The web map server interacts with the client cartographic API, to display dynamic maps in a web.

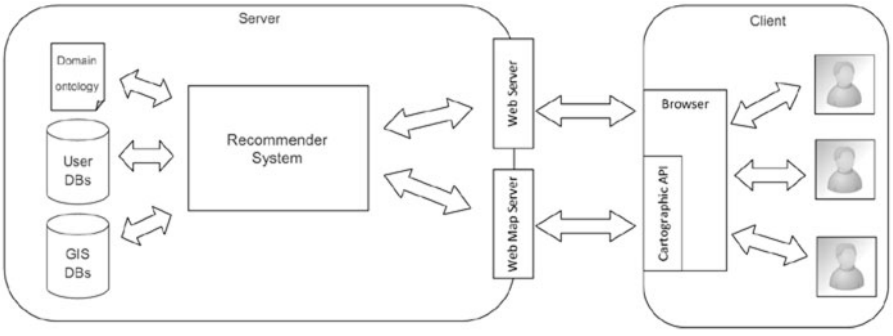

Fig. 3. General architecture of the SIGtur/E-Destination system

Data storage is divided in two databases, one that contains the tourist resources and another that stores the user profiles. User data are managed by PostgreSQL (http://www.postgresql.org/) and tourist resources are stored in the PostGIS (http://postgis.refractions.net/) extension. Database connections are handled by the Hibernate framework (http://www.hibernate.org) with a spatial extension that handles geographic data. Some modifications have been applied to Hibernate that improve the pool of database connections. In order to process spatial functions over tourist resources, such as computing the distance between two destinations, the JTS Topology Suite API (http://www.vividsolutions.com/jts/) is used.

3.1 Geospatial features and GIS database

As seen in Figure 3, there are different geospatial elements that take part on the SIGTUR/E-Destination system. This section details the role of each geospatial feature within the system.

Geoserver (http://geoserver.org/) is an open-source server written in Java for publishing spatial data from any source using the Open Geospatial Consortium standards (http://www.opengeospatial.org/) and building web map-based applications. In the case of the SIGTUR/E-Destination system, Geoserver has been configured to be connected to the GIS database in order to publish the spatial data from tourist resources as separate layers on the map. This server has a user friendly interface to define the publishing parameters for each layer before being displayed on the map. OpenLayers (http://openlayers.org/) is an open-source Javascript library that provides an API to obtain base maps from external sources, such as Google, Yahoo or Bing Maps. This API can reproject maps on-the-fly, enabling an easy overlay of spatial data from different sources and projections. In the initial stages of the project we considered the options of using topographic base maps, served by the Catalan spatial data infrastructure (http://www.geoportal-idec.cat/geoportal/eng/) or using the most recent and popular web-mapping platforms, such as Google Maps. Although this second alternative is much less accurate and subject to cartographic errors, the final decision was to use it, since the potential user is a tourist without a strong technical profile, who is more familiar with Google Maps mash-up applications. PostGIS is a spatial database extension for PostgreSQL that enables PostgreSQL to be used as a backend spatial database for Geographical Information Systems (GIS).

A GIS is defined as an information system used to input, store, retrieve, manipulate, analyze, and output geographically referenced data or geospatial data in order to support decision making for planning and management (Goossen et al., 2009). In this sense, the GIS database of the SIGTUR/E-Destination system stores the tourist resources (activities and services) from the region of Costa Daurada and Terres de l'Ebre to be used by the recommender system. It has been designed following the same structure and categories of the domain ontology, in order to enhance the system consistency. Consequently, each table - that represents a map layer - of the GIS database corresponds to a node at the highest level of the hierarchy stored in the domain ontology. Currently, the GIS database contains the main tourist resources of the region (over six hundred so far). Nevertheless, there is still a considerable work on adding new resources and updating the existing ones. Anyway, the GIS database has been designed in order to support easily these future tasks related to additions and updates. Besides, the structure of the tables is as similar as possible, containing most of the same fields, which facilitates the management of the database and massive operations. Just in the cases in which tourist resources require specific information additional fields have been added. In order to permit the interaction between the GIS database and the domain ontology each table in the GIS database includes a field that stores the tags with the visitor activity specifications, enabling the system to yield recommendations properly. In addition, the database contains a table that defines the relationships between all tourist activities, as a result of geo-processing operations between layers, so that the system can recommend tourist activities based on similarity.

Regarding the spatial data, they have been pooled from a wide variety of sources, what means that an effort has been required to convert different formats (Spreadsheets, CAD, shapefiles, etc) and in some cases geo-coding them. In the cases

in which spatial data on tourist resources were not available, they have been generated by the authors. Once the data have been homogenized and categorized according to the different activities, they have been uploaded to the GIS database, making them ready to use by the recommender system. It must be said that the use of a GIS software platform has facilitated all these operations.

3.2 Recommender system

In the development of recommender systems it is usual to employ hybrid methods that combine content-based and collaborative techniques, in order to overcome the main drawbacks of the individual methods and thus improve the accuracy and user satisfaction of the recommendation. Therefore, a hybrid recommender system is proposed, which uses two types of techniques: content filters and collaborative recommendations. One of the main features of this system is that the proposed methods are based on semantic domain knowledge represented in an *ontology*. Ontologies define areas of common understanding between multiple actors, easing their interoperability and permitting a high-level communication (Berners-Lee et al., 2001). Ontologies include concepts and relationships between them. Incorporating semantic information to the recommender systems (Gawinecki et. al, 2005; Lee et al., 2009) normally overcomes the main problems of traditional methods. Such information provides to the system reasoning capabilities and the possibility of improving the results of Machine Learning algorithms (Mobasher, 2007). The ontology has been constructed by a team of tourism experts to model the knowledge about visitor activities in a sufficiently general way as to permit repetitions of its use. It is also quite easily extendable to add new activities if required.

3.3 Tourism domain ontology

A large ontology in the tourism domain has been built in order to describe the tourist activities in a hierarchy. The ontology represents up to 184 connected concepts and five hierarchy levels in the tourism domain with multiple ancestors. Figure 4 illustrates a portion of the ontology. The ontology is used to explicitly classify the activities to recommend within a core set of predefined concepts, providing an explicit meaning that is used by the intelligent system. The main objective of the ontology is to model the degree of interest of the user for each concept. This degree is evaluated by explicit and implicit information, as well as through the collaboration with other users. Once the user's interest of each node is well defined, the degree of interest of each activity is computed, given that these activities are associated via at least one concept in the hierarchy. As it will be seen, this approach overcomes the main drawbacks suffered by the non-semantic methods.

The domain ontology has been developed with the Protégé editor (http://protege.stanford.edu) using the OWL language (http://www.w3.org/TR/owl-features). Jena (http://jena.sourceforge.net) is the semantic web framework used in the system that provides a management and a rule-based inference engine for ontologies. For each user, the ontology is loaded from the file as memory model, since it is not required to model persistent ontologies and it is the most efficient way to compute inference rules. However, the semantic information related to each user needs to be

stored in a database. Therefore, the ontology concepts are previously migrated from the ontology to the user database without requiring their hierarchy level and node connections, thus reducing memory resources.

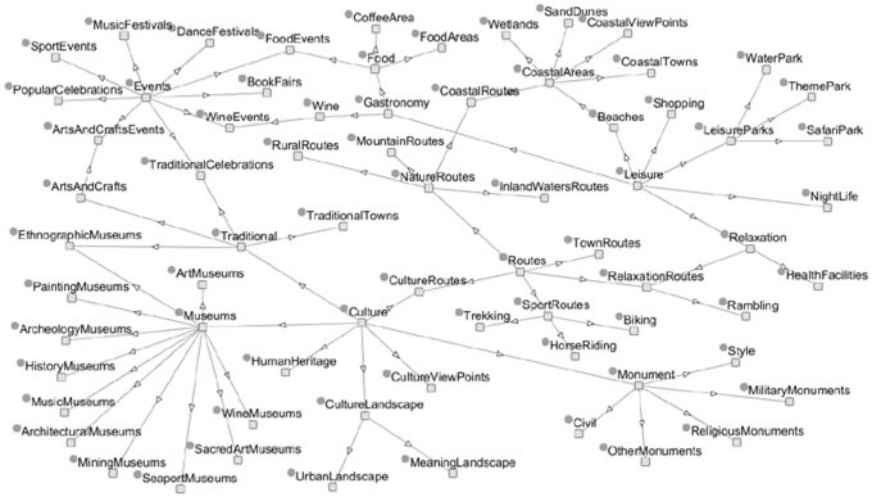

Fig. 4. Portion of the tourism domain ontology

3.4 Content filters

Content filters (Pazzani & Bilnius, 2007) are a kind of systems based on a direct matching between the characteristics of the activities to be recommended and the interests of the user in each of those features. To perform this kind of recommendation, it is required to build a user profile that stores the degree of interest (i.e. a score) on each of the different criteria that describe an activity. Such information can be extracted by fill-in forms but, as the set of characteristics can be quite large, it is known that this process is not adequate because long questionnaires result in inconveniences for participants in a survey.

Our goal was to develop a system that may consider many different types of activities with a large set of distinct features. The domain ontology presented above (Figure 4) allows the system to know the taxonomic and semantic relations between the different elements: in this case, the activities and their semantic descriptions. The content acquired from the user is the degree of interest in different tourism motivations. This degree of interest is mapped into the developed ontology, which can be navigated to find more general or more specific types of activities that can be of interest for a particular user. With this approach, user preferences can be generic terms, such as culture, leisure, or sports, avoiding the need of requiring too many details from the tourist that is using the system. Figure 1 depicted the fill-in form of the initial user profile acquisition. Activity categorization is given by more detailed concepts, such as

historical museum, cathedrals, theme parks, and so forth. Therefore, the ontology hierarchy permits to compute similarities between users' preferences and activity descriptions. Such similarity is computed by the aggregation of activity concepts that are related to the users' preferences using the parent-child relationship of the ontology.

Once the user receives activity recommendations on the map, he/she is able to interact with the recommendation list. The explicit data are the specified user's liking on recommended activities and the implicit data are given by the user's behaviour, such as adding activities to a travel planner, seeking detailed activity information or requiring other activities similar to a recently recommended one. Since activities are mapped to concepts in the domain ontology, the user's actions are also applied to those concepts. This method allows the application to acquire a more detailed concept of interest. In addition, a spreading activation algorithm (Sieg et al., 2007) has been developed using the domain ontology, that sends for each node the weight obtained by explicit and implicit actions over activities to their neighbour nodes.

3.5 Collaborative filters

The idea of collaborative filtering (Kruszyk et. al., 2007) is to make recommendations based on what similar users have visited and their level of satisfaction. Similarity between users is normally computed by matching user ratings. This method requires that each user rates a set of items to predict accurate recommendations. However, the probability of users rating the same items in large data bases is relatively small. To overcome this drawback, ontologies can be applied in order to have a hierarchical and semantic structure of the activities, which permits to make inferences at different levels of generality (Fink & Kobsa, 2002). For example, the appreciation of one user for Tarragona National Archaeological Museum gives evidence that he/she probably likes both the rated museum and other "archaeological museums". This gives the ability to calculate the similarity between users that have rated either the same activities or similar activities. In this system, in addition to the preferred interests of the users, demographic data are considered. The knowledge of travel accommodation, group composition and country of origin can be used to classify the users in common tourist typologies. Thus, the categorization of the visitors is based on motivational and demographic data as well as the users' ratings of activities.

The categorization is performed with an automatic clustering process that generates a set of common tourist types, according to both tourist motivations and demographic characteristics. Machine Learning techniques have been used to build automatically a classification of the users. In particular, the *c-means* clustering algorithm has been used (Brouwer, 2007). Clustering processes are based on the measurement of the similarity between two users. To calculate this similarity a novel method combining different aggregation operators has been used. In particular, the information regarding the user preferences on different types of activities is aggregated using the OWA operator (Torra & Narukawa, 2007). Then, the global evaluation of the similarity with respect to the interests is combined with the comparison of the demographic features using the LSP operator (Dujmovic, 2005). Those operators are particularly

interesting because they permit to specify different policies during the integration of the information. So, one can decide which features are mandatory, which ones are optional, and the degree of simultaneity required to make the global similarity evaluation.

In the initial stages of application of the system, when no rating information of the current user is available, general knowledge based on the characteristics of visitors of Costa Daurada and Terres de l'Ebre is used. The system has been initially enriched with common tourist activity preferences obtained from a survey of 30,000 questionnaires conducted in Costa Daurada and Terres de l'Ebre between 2001 and 2009. Up to 100 different tourist type classes were extracted using the most common combinations of tourist categorization. When the system is in the exploitation stage, the categorization based on the users' ratings obtained with our system will acquire more relevance, giving a more accurate recommendation to the user. In addition, not only the users' rating - which some users avoid - is acquired, but also the observed user behaviour that can be used to derive knowledge about the appreciation of specific activities. In order to reduce the computation time required to calculate the similarity between users, a pre-computing clustering process is performed during times of low activity in the server.

3.6 Integration of content-based and collaborative methods

The combination of content-based and collaborative methodologies is achieved through the aggregation of their weight values for each concept of the domain ontology. The aggregation values change over time giving a different level of relevance. The relevance of collaborative methods depends on the level of similarity between the current user and the most similar class. In addition, the distance between the activities location and the specified destination is also considered in the final recommendation.

Clustering methodologies are applied on the survey data to extract generalization of tourists' interests while our user application database remains poor in information. More relevance is given to collaborative filters as the number of users of the application increases, thus yielding more accurate recommendations with respect to the surveys. During the user life cycle, the collaborative filters based on ratings and inference domain methods will augment in relevance as user actions increase, giving less importance to initial motivations and demographic data that are used in the initial stages.

A basic aspect of the system is the collection of explicit and implicit feedback in order to propagate the weight of user preferences in upward and sideward directions. Imagine for example a tourist that expresses high interest in museums and monuments rather than in theme parks and shopping. Then, the inference system will deduce that the tourist is more interested in culture than in leisure. Since the last statement is not always true, the final recommendation is given by the combination of all the methods previously commented, giving rise to a hybrid recommender system that provides the main advantages of each methodology.

4 Final Considerations and Future Research

By increasing the familiarity and accessibility of a complex destination region to at least a part of the visitors, the SigTur/E-Destination system described in this paper allows a sustainable management of tourist flows. In addition, it is bound to bring about an improvement in visitor satisfaction and, as a consequence, the profitability of attractions. On the other hand, the services and digital contents are considered important resources to achieve a diversification and differentiation of the product. SiGTur/E-destination configures, then, a *laboratory* that helps companies and local institutions to implement advanced systems of contents and proposals for the current and potential visitors based on their profiles. Moreover, it is possible to use SIGTur/E-Destination to simulate the result of determinate decision-making processes, predictions, and scenarios for tourism and territorial development.

The possibility to easily update the information on assets and products (for instance about opening times, prices and eventually reservations) in a collaborative way at the "back-office" level is a key feature of this system that will be developed in further stages, taking full advantage of the role of our Science and Technology Park of Tourism and Leisure as a knowledge hub and service provider for the professional tourist networks of this region. This is especially important when considering the ephemeral and volatile nature of tourist information that is normally found in destination websites, however frequently updated, and the high actualization costs faced by Destination Management Organizations. Another development that is foreseen for this system is its adaptation for mobile devices, which will provide travel guide recommendations in real time. Moreover, it will include context-awareness, based on GPS, weather or traffic information among others, to provide more accurate recommendations. Next, the semantic side of the system could be enhanced using not only ontologies, but *folksonomies* created collaboratively by users annotating contents. This can provide a more detailed and dynamic categorization of the catalogue activities; however, intrusive information could also damage item categorization and finally the quality of the obtained recommendations. For this reason its treatment deserves further research.

Finally, an immediate development would be to define new methods to evaluate the recommender system. Normally, the accuracy of the recommendation is evaluated. Nevertheless, it does not assure user satisfaction on the recommendations. In this sense, next January it is planned to present the application in the International Tourism Trade Fair FITUR in order to be tested by potential visitors and obtain their feedback regarding the user experience.

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Smart City: A Rule-based Tourist Recommendation System

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Abstract

We are presenting the architecture of a personalised recommendation system using probabilistic reasoning. The system creates plans for visiting interesting objects and events on the trip, based on the personal preference profile. We will provide a short description of the system architecture, its main components and the probabilistic reasoner along with a small ruleset example with score calculations. The described architecture and components comprise the first iteration of the Smart City system.

Keywords: Recommendation engine; tourism; semantic web; rule-based reasoning

1 Introduction

People planning a trip often start investigations by looking for materials on the Internet. The user can find a large amount of information about the city and its popular tourism objects, but it takes a long time to select the most interesting objects and create a good plan for a visit. For example, consider a tourist planning a two-day visit to Paris. If she wants to put together an organized plan for those days, she will first have to find all the potentially interesting objects in Paris. Then she will have to decide which ones she would like to visit. After that she will have to organize the selected objects into a schedule. It may turn out that some of the objects do not fit into the time schedule, in which case she will have to select different objects. All this takes a lot of effort.

Our project focuses on automating the object selection and visit schedule creation. Smart City (SC) is a semantic recommender and route composer system for tourists. A tourist can specify her location, time of the visit and her preferences about different types of objects and events. Based on the created profile, the suggestion engine finds interesting objects for the given user. For each found object a score of "interestingness" is found. The objects that the user probably likes have a higher score and vice versa. The objects and events are organized into a timetable based on their location and time. Finally the schedule and the trip route will be presented to the user. The tourist has an option to modify the suggested objects and to create a more suitable timetable.

The system is currently undergoing the public test phase (see http://gn61.zone.eu/gui/) and will be properly deployed at the beginning of 2011 with the initial launch in Tallinn, Estonia, to be followed by several cities outside Estonia. The adequate business analysis of the first deployment phase can be given after the system has been fully exploited for at least several months/half a year. However, we would like to point out our initial business assumptions and foreseeable business implications.

First of all, the system is not targeting the functionality of traditional tourism sites, hence it would obviously make sense to deploy the system as a search/planning component of a larger tourism site. This is exactly the plan for the initial deployment in Tallinn, where the system should be a new component of the existing site http://www.tourism.tallinn.ee/. This gives us an obvious way to direct visitors to our site and an additional benefit of having better organisational means for both (a) competing for advertiser funding and (b) accessing existing databases, hence somewhat diminishing the need to do complex html scraping for data.

The direct benefit to consumers is obvious: easier planning of the trip and better search possibilities, hopefully leading to a better practical experience and satisfaction on location. However, we believe that the indirect benefits are even more important. First of all, the tourist will have far better means for finding specific objects of interest, even if they are not so "mainstream" or hugely popular. Concerts and performances would be a perfect example: most tourist sites do not directly integrate the concert/performance listings and if they do, it is hard to find the personally interesting genre and even harder to fit the performance into the trip plan, for example, by selecting a restaurant based on the combination of a performer, performance time, restaurant type and suitable location and match in the trip schedule.

The wider adoption of the system would likely benefit the wider spectrum of service providers in the city: there would be more tourists at less "mainstream" locations and consequentially somewhat fewer tourists at the main tourism sites. We believe this would also give a better experience to the tourist, who would get a better "blend-in" feeling, diminishing the often negative experience of seeing only highly "touristic" places.

The Smart City project uses experience from the Smartmuseum project (Liiv, Tammet, Ruotsalo, & Kuusik, 2009) and applies some of the ideas deployed in the Smartmuseum project to the outside tourist scenario.

2 Related Work

In the recent decade a significant amount of research has been conducted in the field of recommendation systems. There are several overviews of different techniques and methodologies (Adomavicius & Tuzhilin, 2005). The most widely known technique used in recommendation systems is Collaborative Filtering (CF) (Pitsilis & Marshall, 2008; Goldberg, Nichols, Oki, & Terry, 1992). For example, Amazon.com and Jester (joke recommendation system) both use CF (Adomavicius & Tuzhilin, 2005).

Collaborative filtering systems can produce personal recommendations by computing the similarity between the user preference and the one of the other user. Typically, a subgroup of users of the similar interests to the user is selected. The given subgroup preferences are then used to recommend options which do not have a personal opinion.

As there are several problems concerning CF ("cold start" problem - a new user or a new item is added without connections etc.) (Adomavicius & Tuzhilin, 2005), hybrid or other techniques are used (Sebastia, Garcia, Onaindia, & Guzman, 2008). A content-based (contextual) recommendation system is described in (Gonzalo-Alonso, Juan, Garcí-A-Hortelano & Iglesias, 2009). Contextual recommendation is based on finding similarities in the user profile and candidate items. Obviously, the quality of the recommendations depends on the amount of relevant information about items and the profiles.

Recommendation system authors often point out the necessity to use ontologies or relatively simple taxonomies, see (Sebastia, Garcia, Onaindia & Guzman, 2008). A common ontology gives an opportunity to group the necessary terms and define the relationships between the related terms. A brief overview on ontologies and the Semantic Web in E-Tourism is presented in (Siricharoen, 2008). Chiu, Yueh, Fung Leung and Hung (2009) present a specific application-oriented ontology.

Several systems use probabilities or a fuzzy criteria to recommend the items. In article by young Kang, Kim and Cho (2006) a similarity coefficient is offered to find the best suitable point of interests for the given user. The similarity is calculated by the profile and the item vectors. The similarity is larger if the angle between the vectors is smaller. Ciaramella, Cimino, Lazzerini and Marcelloni (2009) have presented an uncertainty of situations based on the contextual conditions.

Golovin and Rahm (2005) are creating rules by the recommendation process. Given rules are stored in the recommendation database. Another paper (Fuhr, 1999) describes probabilistic Datalog. The system is able to cope with independent events. Calculating the probabilities of the independent events is far less complex than calculating probabilities of dependent events. In case the degree of dependency is not known, intervals are required to present the probabilistic range of the event. Fuhr (1999) also describes an implementation of a working system based on the presented algorithms and principles of probabilistic Datalog.

As we have already mentioned, the work originating from the Smartmuseum (SM) (Liiv, Tammet, Ruotsalo & Kuusik, 2009) project is used in the SC project. SM is a recommendation system for museums. The tourist creates a profile about her interests. Similarly to the SC project, different objects inside a museum are recommended. However, the architecture and the recommendation methods are different from the methods employed in the current SC project.

3 Overview of the Recommendation System

The browser-based user interface has only two main views. Figure 1 shows the start page of the system. The user defines her visit time and degree of interest in five different main topics. Four predefined interest combinations are available. In the figure the "Walk in the city" is selected. After submitting the form a suggested trip plan is calculated and shown (Figure 2). The itinerary contains all the suggested objects and walking time between them. Each object in the list can be removed or the visit duration can be changed. All the objects are also presented on the map below the listing.

The tourist has an option to get more objects into the plan: the system will try to fit new objects into the existing timetable.

A more detailed description of recommendation process and schedule creation is provided in a separate section *Score calculation.*

The Smart City system itself is divided into several different components. We will present an overview of the components and their role in the system. A more technical and detailed description of critical modules can be found in the next section.

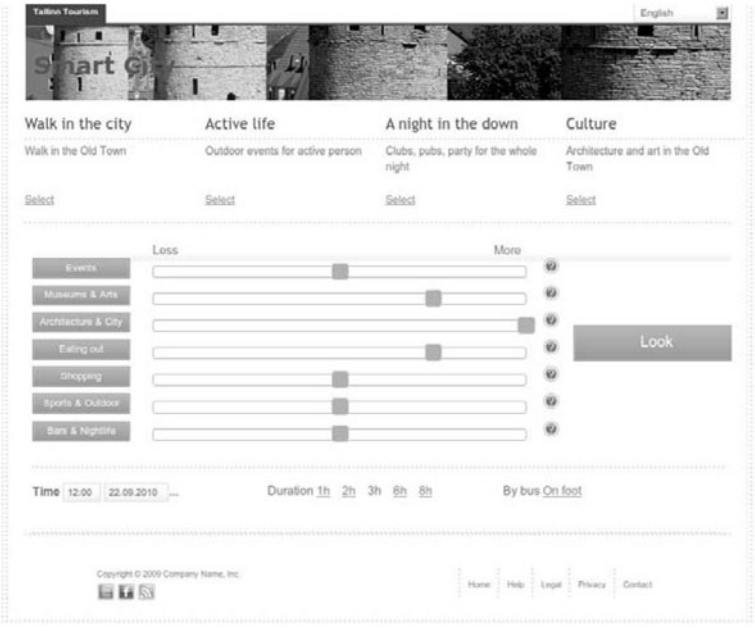

Fig. 1. The start page of the recommender system

Fig. 2. Suggested schedule view

The central component in our architecture is the Control Centre (CC). The CC is responsible for communicating with the different components and generating the User Interface (UI). The CC is connected directly to the persistent database which holds all the information about the tourism objects. The data is gathered automatically from the different content providers. Some publish web services; some provide access to their database or data files. For each source provider we use importer script designed specifically for the needs. As the sources are different, the problem of data interoperability has to be solved. We have adopted our own structure for the storage and convert the original data formats to this structure. We also have created our own ontology for the terms and objects.

The CC is connected to the suggestion engine (SE), which is responsible for creating a trip plan. The CC sends all the information about the user preferences to the SE. JSON (JavaScript Object Notation) is used to transport information between those two components. The SE returns a list of the suggested objects along with times. The CC presents the list to the user. If changes are made into the plan (user has removed some objects or altered the visit time for the objects) the CC sends the modified plan to the SE. Thus SE knows about the changes and can leave the user modifications unaffected.

The suggestion engine uses a rule-based reasoner with an integrated shared memory database to find all the scores for the objects. The reasoner employs the user preferences and rules to add scores to the objects. The objects with scores for the given user are returned to the SE. The reasoner uses the memory database as its knowledge base. The memory database should always have the latest information about the objects, therefore all the necessary data is synchronized from the persistent

database. A more detailed preview of the reasoner and the score calculation is presented in the next sections.

4 Technical Overview of Components

The Smart City recommendation system uses an ontology to classify both the places of interest and event (POI) types and user interests. Every term used in the rules is presented in the ontology. We have used different online vocabularies to assist our work: (Wordnet Princeton University, 2010) and Getty (The J. Paul Getty Trust, 2010).

Table 1. The main table structure in PostgreSQL

Field	**Description**
id	Unique row id.
object	Object URI of N3.
property	Property URI of N3.
value	Value URI of N3.
connection_score	Score/strength of the fact in range [0..1].
source	Source of the given fact.
timestamp	Date and time when the fact was created.
validity_start	The fact is valid starting from this date and time.
validity_end	The fact is valid until this date and time.
privacy	Whether the fact is private (not visible).

Data providers use different formats to present their information. A separate import module is created for each source. For example, a custom structured XML is converted into our ontology. We have imported data from the Visit Estonia system, presented to us as XML files. We are also using web pages as data sources (Tallinn Tourism web page and local events database mistoimub.ee). A web scraper configuration is created for different sources. Since some sources do not use the structured data presentation, we are planning to use content-based classification in the future. For example, a concert might not have an annotation about the genre. However, the description of the given event can be parsed to find certain words describing genres. The performing bands can also be used. If the bands are annotated in the system and each has a set of genres provided, this information will be used to classify the event.

All the information is stored in the persistent database. Smart City uses PostgreSQL with an essentially schemaless structure, extending a triple storage structure RDF used often in the Semantic Web context. Each fact is a tuple containing an object, property, value and additional information. The main table structure is shown in the table 1.

5 The Reasoner with the Shared Memory Database

The reasoning engine employed by the system has to handle a large amount of data - all properties of all POI-s - plus a relatively large ontology. The same holds for the suggestion engine, which has to quickly access all the original and all the derived data about POI-s and user preferences.

Fetching all this data from the conventional relational database takes too much time. In particular, it is hopeless to run the reasoning engine by querying all the potential premises of rules from the conventional database for each rule application during derivation. The reasoning engines are typically built on specialised efficient main-memory data stores.

Hence we employ a principle that all - or relevant for this day - data from the relational database is loaded into the fast in-memory database handled by the prover. Changes in the relational database are synchronised into the in-memory database using scripts. All the derivations conducted by the reasoner use only the in-memory database, which serves as a native data store of the reasoner.

Additionally, the reasoner should be able to serve a number of queries simultaneously, each one conducting a complex derivation. Hence the common set of facts and rules should be kept in the same memory store for all the queries, capable of running in parallel.

We have built a new reasoner-equipped fast in-memory database to serve our needs. The in-memory database is implemented in shared memory as a library, without any continuously running processes. Each update or query to the database is performed as a call to the corresponding function. In order to enable parallel queries, we have implemented a fast global read/write lock using spinlocks. Those prohibit simultaneous data addition and reading from the global data area. Each query process has an additional local non-shared data area for query input and temporary results. Thus it is possible to conduct several derivation queries in parallel, avoiding the need to copy common data to all the separate simultaneous derivation processes.

As the shared memory must be able to accept all kinds of data and all kinds of schemas we may use in our relational database, it is "schemaless" in the sense of not having the classical schema of relational databases.

The shared memory database must be also suited for keeping RDF data in the efficient manner: therefore we have implemented native support for RDF datatypes

like URI-s, XML literals, strings with the language attribute etc. However, the database - and the reasoner - is not limited to RDF. It is capable of holding arbitrarily long tuples of arbitrary data. Hence our data kept in the relational database can be imported into the shared memory database in a straightforward manner, without the need to reify, i.e. each database record is converted to a single shared memory database record with exactly the same number of fields.

Our reasoner is built on the first order resolution-based theorem prover Gandalf (Tammet, 1997), employing and extending selected algorithms from this prover.

The system employs the reasoner in two different ways. First, it regularly completes the database by deriving all the new facts from the rules and input facts. We use a specialised version of a forward-chaining hyper-resolution for this goal. Second, it may perform specific queries, where we employ a version of a binary backward-chaining set-of-support strategy. See Robinson and Voronkov (2001) for the common algorithms employed in first-order automated reasoners.

We employ both conventional in-memory database indexing algorithms (T-trees and hashes on fields and field vectors) combined with the indexing algorithms conventionally used in provers, like the widely used discrimination tree index for unit subsumption and unit deletion. The temporary, local area uses the discrimination tree index while the shared memory database area uses T-trees and hashes.

6 Score Calculation

The Control Centre sends the user profile properties with a *property preference score* to the suggestion engine. The latter will send this information to the reasoner. On the first page of the system's graphical user interface the user can use sliders to indicate her interests in different topics. Each slider will provide a certain *property preference score* for the user profile. We will provide a short example:

user1 profile:
music 70
architecture 40
museums 40
sports 40
food 50

In this example we have five preferences along with the scores. The score indicates the user interest in the given preference within the range [0, 100]. Let us consider two following objects:

object1:
music 50
architecture 30

museums 20
food 10

object2:
music 90
sports 60

Objects have properties with *property confidence scores*. The score indicates the confidence that the given object has this property.

The reasoner uses rules to deduct new facts about the objects. We are using RIF (Rule Interchange Format, 2010) style rules with an additional confidence score. The given score is presented as a number in the range [0,1] and is included to each rule. We will provide a simple example:

fact(?X type architecture 0.9?N) :- fact(?X type church ?N)*

The above rule indicates that if an object has a type *church* with *confidence score N*, it is also an *architecture* with the confidence score *0.9 * N*.

Each object in the database is compared to the given user profile. Based on the *profile property preference score* and the *object property confidence score* the *object preference score* is found.

Object properties do not depend on the user profile. Our reasoner generates all the properties with confidence scores for each object based on the rules. As the rules and the data do not change often, the property generation process is run once every night. This saves time for the suggestion requests, which use pre-calculated facts.

Once the user runs a suggestion query, the profile is passed to the suggestion engine. The reasoner generates the profile with the properties and their *preference scores* based on the rules. After the profile generation, the reasoner calculates the scores for each property available both in the profile and the object. We use a simple product of the two scores as the result. Our two objects will have the following property confidence scores:

object1 for user1
*music 0.7 * 0.5 = 0.35*
*architecture 0.4 * 0.3 = 0.12*
*museums 0.4 * 0.2 = 0.08*
*food 0.5 * 0.1 = 0.05*

object2 for user1
*music 0.7 * 0.9 = 0.63*
*sports 0.4 * 0.6 = 0.24*

All the objects with the *property confidence scores* for the given user are found and SE will calculate the *object preference score*. Our current logic for the calculation is to sum all the *property confidence scores*. So, the *object preference score* for *object1* would be 0.35 + 0.12 + 0.08 + 0.05 = 0.6. *object2* will have a score 0.87.

The suggestion engine computes the *preference scores* for each object. All the objects are passed to the schedule creating process, which consists of the following steps: 1. sort the array of objects by *preference score*, 2. run multiple schedule calculation algorithms on the resulting array of objects, and 3. collect the results and find the result which has the highest overall score.

To maintain a reasonable response time for the suggestion engine service, the schedule calculation step has a limited running time (100ms in SmartCity, currently). Schedule calculation algorithms may use one of two techniques: either process the entire array of objects once or process the array iteratively, increasing the number of objects examined on each iteration. The iterative technique is based on the rationale that the algorithm is guaranteed to return some result, even suboptimal, in early iterations with a low number of objects and then progressively improve the calculated schedule by examining more objects, until the timer expires. Since the array of objects is pre-sorted, early iterations examine the higher-scoring objects.

Three scheduling algorithms have been implemented. *Dummy* is an extremely fast and inaccurate algorithm that returns the top-scoring objects from the array, only ensuring that they are actually open during the time of the visit. *Bruteforce* is an accurate but slow algorithm which attempts to examine all possible combinations of objects, therefore obtaining optimal results on small data sets. *A** is an adaptation of the widely-known path finding algorithm. The cost in conventional *A** is replaced by cost/benefit value, which is calculated as time/score. The "goal" in *A** is to use up the entire time allocated for the schedule - as the algorithm tries to keep the cost as minimum, the score (inverse of cost) will be maximised. This algorithm is between the other two in terms of speed and accuracy. By combining the different algorithms, the scheduler can exploit their individual strengths depending on the situation (number of objects; server load; different profiles etc.).

Preliminary testing on a database of 261 real tourism objects shows that the *Bruteforce* algorithm obtains better-scoring schedules in approximately 80% of the tests when the visit time is shorter, while for longer schedules the *A** algorithm obtains higher scores in approximately 50% of the cases and has a higher average score. The *dummy* algorithm is out-performed by the other two in vast majority of the tests. These results are consistent with the expected properties of the individual algorithms.

The results returned by the schedule algorithms are checked for quality. Penalties are assigned to a schedule score based on the interaction of the objects. Following criteria apply: similar objects should not be repeated several times; as many different categories of objects as possible should be represented; eating out and workout-related objects should be limited in number (the tourist has limited capacity for eating

and generally does not wish to exert herself excessively). The highest-scoring schedule, post-quality check, is selected as the recommendation by the scheduler component.

7 Conclusions and Future Work

In this paper we have provided a quick overview of the architecture of the Smart City system. Our project uses ontologies and rules to reason and calculate the interest scores for tourism objects and events. A simple and intuitive user interface makes it easy to find the needed information quickly. We have described the logic of rules and reasoning. We are continuing our research with the goal of improving the suggestion process. New data providers will be connected to import more facts. Along with the new knowledge we will improve our ontology to support the obtained data.

The described system is only a small part of the whole project. We have already planned several additions which would improve the system. One of the planned improvements is saving the user preferences into a persistent profile. This profile will store all the user's history and feedback. The recommendation system can then make suggestions based on user's earlier choices. Also, the engine will not suggest objects which the user has already visited.

While the user is on the trip, she can make changes into the plan and obtain an updated suggestion. For example, the user wants to skip one object or spend more time in one museum. The system will automatically modify the rest of the plan according to the situation. For example, it can find an alternative object to visit instead of the skipped one. The system could also just skip one object so that the user has more time to spend on the previous object or to relax.

Additional data from the social networks can be gathered to complement the profile. The user may have watched videos of classical music in Youtube or has become a fan of a pizza place in Facebook. All this information could be used to improve the user profile. The user does not have to add her interests manually in the cases where this information is available on connected sites.

Our current approach is certainly not final and continuous research on the different topics will proceed. We are actively working on the subject of negative facts (*like* vs *dislike*). Dependent properties could be handled differently from independent properties. In our examples we had an object and a profile with only independent properties, but we already have started working on dependent properties. An ongoing research on how to improve the object score calculation and how to get more balanced schedules will continue.

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Exploiting Feedback from Users of innsbruck.mobile for Personalization

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Abstract

innsbruck.mobile is a mobile tourist guide for visitors of the city of Innsbruck. The system allows the retrieval of detailed information about sights, accommodation, events, dining out and weather forecasts as well as pushes recommendations from these categories to registered visitors via a short-messaging service. Personalising the information access and filtering of content according to the assumed relevance to its users was a key requirement for the system - especially in the context of mobile services with limited display capabilities. However, most real users conduct few and very short interactions with the system and therefore provide only sparse relevance feedback. As a consequence collaborative recommendation methods need to utilise multiple sources of user feedback to increase the accuracy on sparse rating data. We give a description of our system and conduct an evaluation based on this sparse usage data that includes more than 800 distinct user sessions.

Keywords: conversational recommender systems, collaborative filtering, mobile applications

1 Introduction

Mobile tourist guides can play an important role in enabling the public to access sites of cultural heritage or to guide tourists during their stay. Old historic towns with an original medieval city center like Innsbruck attract hundreds of thousands of visitors each year. innsbruck.mobile is therefore developed to provide an ubiquitous information service to this large population of users. First, the functionalities of this mobile service were determined conducting a large survey of tourists (Beer et al., 2007). Since autumn 2006 an initial version of the system offering browsing and parametric search as well as knowledge-based recommendations has been available to the public (Höpken et al., 2006). This paper explores how collaborative recommendation methods can now be applied in such a mobile domain with short user interactions by examining actual usage data of this system. Recommender

systems (RS) support users by retrieving the items from a large object catalog that will most probably match their interests and/or needs and are therefore particularly popular in the tourism domain (Ricci, 2002). Collaborative filtering (CF) relies on human judgements, i.e. ratings of items to determine proximity of users' tastes (Resnick et al., 1994). Recommendations are computed based on positively rated items from the most similar neighbors of a given user. In many situations these user judgments are collected automatically, requiring no explicit user input. Buying transactions or pageviews for instance can be interpreted as implicit ratings and exploited by collaborative filtering systems. Amazon.com is the most prominent example of this type of system, where users receive advice when browsing the online shop such as 'Users who viewed item A also had a look on items B and C'. Similarly, in our application domain we use only implicit rating information. This is in contrast to mobile recommendation systems that provide a critiquing based user interaction such as for instance (Ricci & Nguyen, 2007).

One of the biggest challenges for collaborative filtering applications is sparse rating matrices, where from each user only few ratings are known. In domains where the number of target users is relatively small the sparsity problem is even aggravated. This leads to 'coldstart' problems for new users: first-time or anonymous users cannot receive any personalised recommendations until their browsing behavior has been observed for some time, allowing their user model to be evaluated to determine similar users. For mobile information services the cold-start problem for new users becomes even more crucial: small devices typically have far more restricted display capabilities compared to a desktop computer. Personalised interaction is therefore on the one hand nearly mandatory, but on the other hand users will tend to provide less feedback in the form of ratings or system interaction due to the restricted form of usage. This paper therefore presents the case for a mobile tourist guide that provides visitor information such as details on accommodation, restaurants, events or sights to its users. Given the very short sequences of user interaction with this system that could be observed during its field trial, we will therefore compare the traditional CF approach with an extended CF framework that exploits multiple types of user feedback. The system collects implicit ratings in the form of clickthroughs on detailed item descriptions, i.e. the user accessed a page with detailed content about a tourism service. Furthermore, explicitly formulated requirements (e.g. search parameters), contextual parameters (e.g. location) and accessed navigation pages are recorded and exploited as additional sources of user feedback. While the algorithm working on a single category of user feedback is only able to compute personalised recommendations for a small share of users due to the low number of average ratings per user, an extended CF algorithm exploiting multiple sources of evidence can achieve considerably better results in terms of User coverage and accuracy (Zanker & Jessenitschnig, 2009a). Our contribution lies therefore in the presentation and evaluation of a dataset that derived from a mobile tourist guide for visitors in the city of Innsbruck. The paper is structured as follows: Section 2 provides a short discussion on related work and Section 3 presents the mobile application scenario. Furthermore, we provide details on our evaluation methodology and give results on our dataset from the innsbruck.mobile field trial in Section 4.

2 Related Work

In this paper a dataset of usage data from a mobile tourist information system based on CF is evaluated. A considerable amount of work addresses making recommendations for anonymous Web users or 'cold start' recommendation problems of CF in general, such as: exploiting Web usage data for personalised pageview recommendations (Mobasher et al., 2001). They employ a clustering approach to increase system performance. This paper also focuses on binary Web usage data; however it differentiates between the different types of user feedback such as implicit ratings or parametric search terms and exploits them by a feature combination CF hybrid presented in (Zanker & Jessenitschnig, 2009a). Schein et al. (2002) propose a single probabilistic framework that combines content and collaborative data to address cold-start recommendations. However, they clearly focus on the 'new item' problem, while collaborative filtering with different types of user feedback addresses the 'new user' problem in order to derive personalised recommendations to anonymous Web users. Interestingly, recent work of Berkovsky et al. (2007a, b) is related to our approach, although their starting point is a different one. They mediate between CF recommenders in a distributed context. Each recommender is specialized on a specific product domain and manages a local rating partition on its own. If users can be unambiguously identified in this distributed scenario, recommenders can share their rating data among each other and thus reduce data sparsity and improve recommendation accuracy. Berkovsky et al. (2007b) note that the non-existence of public datasets with multiple types of ratings hampers research in this direction. Hence, they interpreted each genre of rated movies in each movie as a separate ratings partition and compared a centralized prediction mechanism to a local (only rating information from a single partition used) and a distributed (partitions communicate with each other) mechanism. In this paper a more general approach is taken because a rating partition can be associated to a product domain and a specific type of feedback category. Thus, some rating types are solely used for neighborhood formation and not for deriving predictions, e.g. navigation actions. Furthermore, the dataset employed for evaluation originates from an actual mobile application and therefore gives a view on a real-world problem setting.

3 Mobile Tourist Guide

innsbruck.mobile is an information service for visitors 'on the go' with a focus on wide-spread use. Therefore, the service is intended to be accessible by all mobile devices with web browsing capabilities and it does not impose specific hardware requirements such as a GPS (global positioning system) module or additional clientside software. innsbruck.mobile supports two communication paradigms. First, an information pull service that offers mobile information access to tourism services such as dining places, historic and cultural attractions or festivals and events. This service is available to anonymous users and does not require a registration procedure. Second, a context-aware information push service (Beer et al., 2007) is provided that delivers personalised short messages to its subscribers utilising a knowledge-based recommendation mechanism (Jannach et al., 2009). This paper focuses solely on the

information pull aspect of the system as it suffers most from sparsity of usage data. The following section sketches an example.

3.1 Motivating example

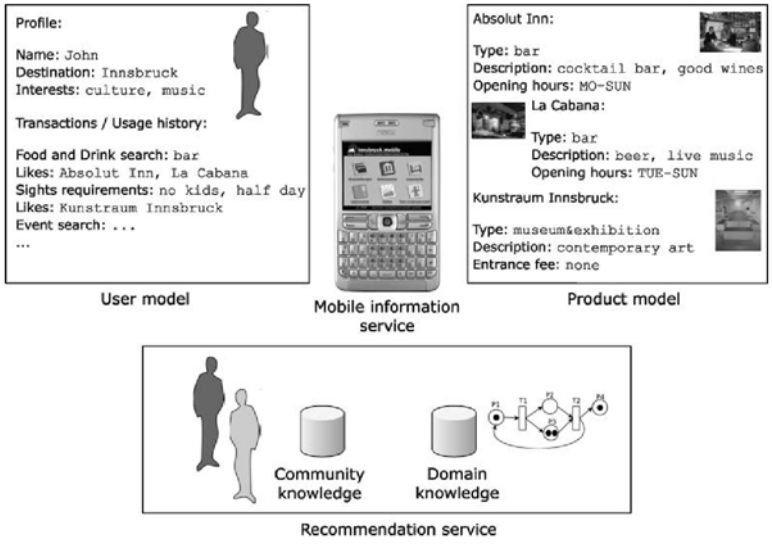

Fig. 1. Motivating example

Figure 1 illustrates a usage scenario: the fictitious user John provides the system with some optional profile information about his interests for personalisation of system interaction. Furthermore, he browses through the catalog looking for a place to have a drink. He seems to especially like two of them, the *Absolut Inn* and the *La Cabana*, and accesses the details pages for both. In addition, he utilises the search mask for sights by selecting 'half day' as a time restriction and 'no kids' for family status. The *Kunstraum Innsbruck* seemed to catch his attention as he again followed the further details link. All these system interactions (i.e. profile information, search parameters or clicks on items) are recorded and stored in his user model. Structured product information (i.e. a product model) is available, too. Based on the product model, items are dynamically retrieved as results for search requests or catalog navigation. Figure 2 gives a simplified example. It illustrates how traditional collaborative filtering as well as our extended CF framework using multiple types of user feedback (Zanker & Jessenitschnig, 2009a) would derive an additional recommendation of an attraction for John. John has expressed interest in two bars as well as in one museum of contemporary art.

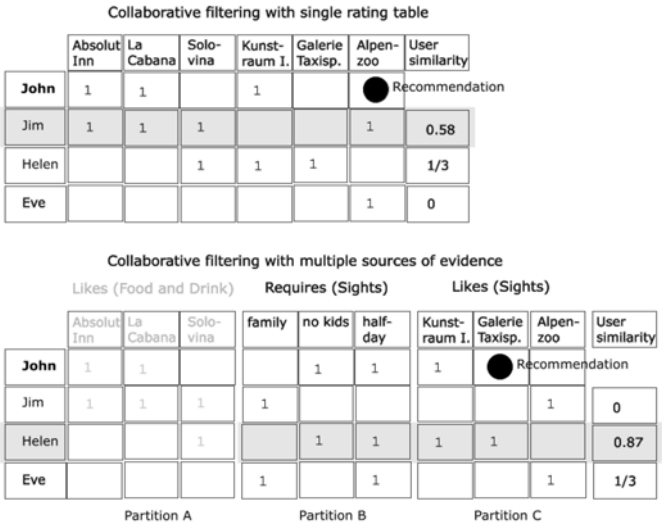

Fig. 2. Identification of nearest neighbors based on different feedback types

Traditional collaborative filtering does not distinguish between different rating categories and computes user similarities on a single rating table. Jim is the user that behaved most similar to John in the past and the Alpenzoo, an attraction Jim liked, will therefore be recommended to John. Note, that in this example similarities are calculated as the cosine between rating vectors. In Figure 2, ratings on items the users liked are separated according to the item category, e.g. food and drink (Partition A) or sights (Partition C). Furthermore, additional evidence for user interest is integrated by interpreting explicitly formulated search parameters and requirements as ratings (Partition B). This added rating partition consists of the parameters that users have entered when searching for sights. For instance, the user Eve queried for sights that are appropriate for families and that can be visited within half a day. When the system is required to recommend a sight to John, it will apply a decreasing priority algorithm based on multiple sources of user feedback as discussed in Zanker & Jessenitschnig (2009a). For this example, the system will first try to find similar users exploiting solely the *Likes* and *Requires* rating partitions for sights. In the case that no recommendations can be derived from these partitions, additional evidence such as ratings on food and drink locations will be considered. More details on the algorithm are given in Zanker & Jessenitschnig (2009a). Here, Helen is identified to be most similar to John and thus the gallery *Taxispalais* will be recommended. This example illustrates the rationale of the system to include additional evidence such as search parameters or navigation actions and to differentiate between rating partitions based on their relevance to similarity determination. Prior to the system's development, a survey using qualitative interviews was conducted to determine the informational needs of tourists. Accordingly, promising mobile information services and their corresponding functionalities (i.e. search & browse, recommendation, context-aware push, m-Commerce and feedback functionalities) were expressively described to survey participants using typical usage scenarios for six mobile information services (Beer et al., 2007; Rasinger et al., 2007). In accordance with the assessments

delivered by potential end-users, mobile information services were implemented in a mobile tourist guide called innsbruck.mobile. Figure 3 depicts the entry-page of the service and its functionalities. More precisely, mobile services providing information on events, sights, accommodation, gastronomy & nightlife and weather have been incorporated specifically for an urban setting.

Fig. 3. Entry-page and functionality of innsbruck.mobile

For the sight recommendation dialog (as depicted in Figure 4), the first question to the customer was how much time was available. In case, that more than 60 minutes were available, the user would be asked if she wanted a guided tour. If there was insufficient time or the user was not interested in a guided tour, she would be asked if she was traveling with children, had a handicap, or had preference for any specific type of sight. After that the results best fitting the user's profile would be provided. Consequently, the adoption of a knowledge-based recommendation strategy for deriving results required the integration of content from different information providers and its annotation with additional characteristics such as, for instance, adequacy for families with small children or opening hours. This proved to be an effort intense task. In this paper we are therefore experimenting with a collaborative recommendation mechanism that does not require detailed item descriptions, but exploits different types of user feedback such as implicit ratings, navigation actions and explicit user requirements for different item domains. Nevertheless, the services have been online since November 2006 and in the status of a field trial. innsbruck.mobile was made public via information leaflets at hotels and tourist information centers and, aside from communication costs, comes at no additional charge for its users.

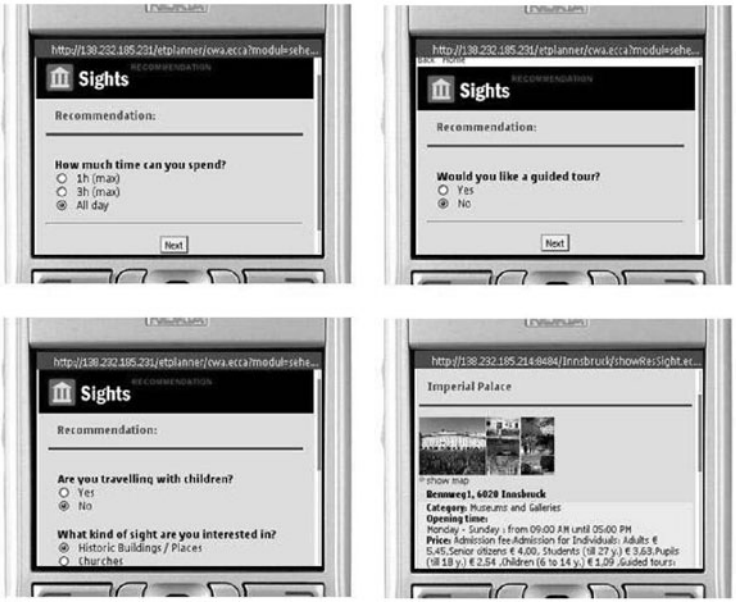

Fig. 4. Sight recommendation dialog

4 Evaluation

We base our algorithm evaluation on the dataset described in the following section 4.1 and instrument a comparative offline analysis with three different algorithms and pose the following research questions:

- What improvement in terms of accuracy and User coverage derives from collaborative filtering using multiple sources of evidence compared to standard CF?
- Can weighting and decreasing priorities of different rating partitions further improve accuracy?

4.1 innsbruck.mobile dataset

Interaction logs from the search and browse histories of innsbruck.mobile were collected for a period of four months, enabling the extraction of anonymous Web sessions comparable to Mobasher et al. (2001). The key characteristics of this dataset are depicted in Table 1.

Table 1 Characteristics of innsbruck.mobile dataset

	Likes	**Requirements & Navigation**	**Total**
Total users	754	884	884
Nbr. of users with at least			
2 ratings	220	884	
3 ratings	100	260	
4 ratings	58	203	
5 ratings	39	168	
Total items	3133	169	
Total ratings	1271	2923	4195
Ratings per user	1.69	3.31	4.75

All interaction data from the Weblog that was either generated by an ip-address originating from one of our departments or by a Web robot was discarded. Then entries in the Weblog belonging to the same usage session and generated interaction paths for different users were identified. Note, that the information pull service does not employ a user identification mechanism such as a required login. The term user therefore denotes a single online session with the system. See Mobasher et al. (2001) for a thorough discussion on Web usage mining and identification of usage profiles. Implicit ratings were collected for each user by interpreting a clickthrough on an item as relevance feedback. On catalog pages containing several items, each item is displayed as a thumbnail photo, a short description and a link for further details. Clickthroughs on these links are recorded as positive unary ratings ('Likes'). Additional evidence of user requirements is collected by storing search parameters and clicked navigation categories during a session. A total of 754 users followed a further details link at least once and 884 users utilised the search and browsing functions to navigate through the search space of more than 3000 items. 'Observation' denotes evidence about user's interest such as an implicitly rated item ('Likes') as well as a single search parameter or navigated category ('Requirements & Navigation'). On average only around 1.7 item ratings were observed per user. This leads to an extremely sparse rating matrix. The sparsity of the dataset was computed with the following formula, where |R| denotes the number of ratings, |U| the number of users and |I| the number of items and sparsity is computed by 1 - |R| / (|U| x |I|) = 0.99946. Frequencies for both types of user evidence are also given in Table 1. The data can be also downloaded from http://isl.ifit.uni-klu.ac.at/imobile.rar. The next section explains the evaluation method applied.

4.2 Method

The All but 1 method on clickthrough observations ('Likes' ratings) was used to evaluate the three different algorithm configurations. This means exactly one rating from each user u is withheld for testing. All other remaining ratings will be used for the learning set. Each evaluation experiment is performed with a hundred fold cross-validation i.e. for each of the 100 experiment runs for each user u one item for testing is randomly selected and all other ratings are used for neighbourhood formation. Reported results are the average values of all experiment runs. A value of k = 30 was

used as an upper limit for the k nearest neighbour approach. At most three recommendations are computed due to the limited display capabilities of mobile devices, i.e. recommendation set size is 3. A recommendation that is contained in the withheld testset is assumed to be a successful hit. Note, that due to the All but 1 method, the number of hits in one experiment run can be at most 1. Furthermore, for the traditional collaborative filtering algorithm, the amount of users that can receive recommendations (User coverage) strongly depends on the number of ratings for each user. As at least two additional ratings for determining the user neighborhood are required, only users with at least three clickthroughs can receive recommendations (compare Table 1 for figures on the frequency of ratings in the dataset). The accuracy of recommendations is computed using the Precision (P), Recall (R) and F1 metrics (Herlocker et al., 2004; Jannach et al., 2010). The Precision metric gives the share of successful recommendations from the total number of computed recommendations, but as only one rating is withheld for testing Precision can be at most 33%. In contrast, Recall metric computes the ratio of hits and the theoretical maximum amount of hits due to testing set size. Consequently, if the testing set could be predicted for all users, Recall would be 100%. The F1 measure combines both Precision and Recall by computing their harmonic mean. Another important metric in our evaluation is User coverage (Ucov). It is defined as the share of users from the overall dataset that received a non-empty set of recommendations during the trial (Herlocker et al., 2004).

4.3 Results and discussion

The goal of the evaluation is to find out what improvements in terms of accuracy and User coverage derive from a feature combination collaborative filtering method as presented in (Zanker & Jessenitschnig, 2009a) compared to standard CF?

Table 2 Results CF on single rating domain and feature combination (FCCF)

Experiment	User coverage	Recall	Precision	F1
CF, All but 1	11.31%	14.64%	5.02%	7.46%
FCCF, All but 1	85.29%	41.30%	13.77%	20.65%
FCCF*, All but 1	85.29%	44.32%	14.77%	22.16%

The standard CF experiment can only use the undifferentiated ‘Likes’ ratings. As the experiment design requests at least 2 rating values for learning and one for testing at most 100 users will receive CF recommendations (compare ‘at least 3 ratings’ in column ‘Likes’ in Table 1). Not astoundingly, it can be seen from Table 2 that the results for the traditional collaborative filtering approach are not satisfactory. Only one tenth of all users from the dataset received a recommendation and, due to the small learning set size, these propositions are not very accurate. Furthermore, recommending only to those users that already found something interesting neglects an important effect of personalisation: making attractive proposals to new users from

the very beginning in order to keep them using the system. Therefore, the FCCF method utilises additional evidence from the 'Requirements & Navigation' partition and weights them uniformly. In a first setup all user ratings from the 'Likes' and 'Requirements & Navigation' partitions are used for neighbourhood formation and both partitions are uniformly weighted. However, only withheld 'Likes' ratings are predicted. This way, significantly better results in terms of User coverage and accuracy are achieved, showing that the utilisation of additional evidence from parametric search functions or explicit requirements elicitation dialogues pays-off for determining user neighborhoods. The feature combination results are further improved (FCCF*) by separating all ratings into 8 different partitions, namely by splitting the 'Likes' and 'Requires' ratings each into four partitions: 'Sights/Likes' (1;1.0), 'Sights/Requ.& Nav.' (1;1.0), 'Accommodation/Likes' (2;1.0), 'Acommodation/ Requ.&Nav.' (2;0.5), 'Events/Likes' (2;0.7), 'Events/Requ.&Nav.' (2;0.3), 'Gastronomy/Likes' (3;0.3) and 'Gastronomy/Requ.&Nav.' (3;0.3). The assignment of priority values and weights was done based on domain expertise and experimentation (priority; weight). For instance, recorded search parameters for sight retrieval will be more important for predicting sights than search parameters for accommodations. However, no optimization of this parameter setting was done until now. Still, this algorithm configuration (FCCF*) achieves an even higher improvement as can be seen from the last line in Table 2. Although, it must be conceded that the improvement due to the decreasing priority algorithm is not fully realized with the usage data collected so far. The reason lies in the fact that most users accessed the system to perform a single task only, such as searching for a sight or a restaurant and only few of them showed a richer interaction history.

Nevertheless, the evaluation clearly shows that integrating additional evidence, i.e. using different types of user feedback, in collaborative recommendation applications yields better results in terms of User coverage and accuracy. Not unexpectedly, when using different types of user feedback the User coverage could be increased. However, the over 7-fold increase of User coverage cannot be generalized to traditional web interaction but is due to the extremely short interaction sequences with very few implicit ratings in each user session. Zanker & Jessenitschnig (2009) evaluated the extended CF framework on tradition Web commerce data and reported an increase in User coverage of over 20%. Another interesting result of using cross-domain user feedback is the improvement of accuracy metrics that replicates the findings on e-commerce data in (Zanker & Jessenitschnig, 2009a). The fact that nearest-neighbour algorithms are capable of recalling over 40% of the withheld items on a sparse dataset, makes them a strong choice for combining their predictive power with traditional knowledge-based search functionality as done for instance in (Zanker & Jessenitschnig, 2009b).

5 Conclusions

This paper presented the innsbruck.mobile information service for visitors 'on the go', focusing on the topic of collaborative recommendations and contributed an evaluation including the dataset of a collaborative filtering approach that utilises multiple types of user feedback. This allowed recommendations to be inferred even from the

extremely sparse dataset collected during the field trial of the mobile tourist guide. Such usage characteristics are common in domains with relatively few users and restricted input and display capabilities. Results indicate that both User coverage and accuracy can be considerably improved. The representative size of the user group indicates that the inclusion of multiple types of user feedback in comparable mobile applications should help to achieve similar improvements.

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Silver Surfers & eTourism: Web Usability and Testing Methods for the Generation 50plus

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Abstract

Silver Surfers show constant growth rates in the usage of the Internet and touristic Internet services. Our motivation is to enlarge the possibilities of investigation into the needs of the Generation 50plus in order to foster innovation in this field. This paper reviews specific user behaviour of senior people while being tested in a Usability Lab. The methodology of "Thinking Aloud" and "Retrospective Review" are compared with each other in terms of acceptance, utility and specific outcomes. In order to optimize web based booking platforms, Silver Surfers – who show constant growth rates in the usage of the Internet and touristic Internet services – should be tested in an adequate way. To be able to optimize web based booking platforms in the future, recommendations for Usability Test Settings are formulated.

Keywords: eTourism; Generation 50plus; Silver Surfers; Usability Methods; Web Usability.

1 Introduction

As the Internet more and more becomes a critical factor for the competitiveness of tourism organizations and destinations in attracting their customers (Carter & Beadard, 2001), tourism institutions are able to target prospective travellers more consistently via the web. This development has changed consumer behaviour, giving a potential tourist direct access to information provided by tourist institutions and increasingly by other travellers respectively customers (Mills & Law, 2005). Consistent use of Information and Communication Technology (ICT) in tourism can therefore be conducive to improving service quality and overall customer satisfaction (Buhalis & Law, 2008).

According to ongoing socio-demographic developments, the Generation 50plus with their increased amount of leisure time and disposable income for enjoyment purposes should be given more attention. This user group tends to be very loyal to websites they perceive as reliable and useful, especially in the context of eTourism (Pompe, 2007; Graeupl, 2006). Also this group's special needs in terms of information design and usability should be considered while developing touristic platforms.

By recognizing Silver Surfers as a target group of growing importance and also realizing the importance of Usability and therefore Usability Testing for eTourism platforms the perspective research question is:

To what extent are Standard Usability Testing Methods appropriate when it comes to testing Silver Surfers?

2 Theoretical Background

During the last years a stable growth of users searching for travel-related information prior to their trip, booking flight tickets online and purchasing services and products themselves instead of relying on travel agency´s competencies could be observed (Morrison *et al*., 2001). This development can be traced back to either wanting to reduce additional costs resulting from the agencies services or, as the Mintel International Group (2000) states, to the circumstance that the Internet offers a broad variety of new options that are not being covered through agencies. This might be an explanation for the fact that the popularity of packaged holidays constantly drops.

Focusing on the special user group of Silver Surfers, Graeupl (2006) was able to support this assumption. This emphasizes the trend of flight information and accommodations already ranging among the most searched topics by this user group (Vuori & Holmlund-Rytkönen, 2005; Gervey & Lin, 2000).

2.1 Silver Surfers

Although exact definitions by age vary from source to source (Bailey *et al*., 2005; Graeupl, 2006; Pompe, 2007), in the present paper Silver Surfers are defined as people being 50 years or older, having the possibility of easy Internet access and using the Internet at least occasionally (Wicks, 2003).

Taking a closer look at especially the Austrian and German society, already 40% of the inhabitants are older than 50 years and therefore represent a significant economic factor in many areas including for example health, tourism and clothing (Pompe, 2007).

Wealthy consumers, with an above-average amount of spare time, who love entertainment and luxury can be found among this target group. During the next years the upward trend in this demographic is more likely to continue. Economy does indeed realize this demographic change, but the respective market mostly focuses on health care solutions. The potential of competent and young at heart seniors is scarcely seen. For example, in Germany alone, this target group's purchasing power ranks at approximately 120 billion Euros (Pompe, 2007).

Focus Internet
Summarized, the Generation 50plus can be described as a very sophisticated and wealthy target group with high expectations. These expectations also apply in the use of Internet services. A survey conducted in 2008 showed that 64.3% of the German population use the Internet at least occasionally. Again taking a closer look at Silver

Surfers, the survey showed that 26.4% of all Internet users are 50 years and older (van Eimeren & Frees, 2008), which makes them a quite important target group.

According to a study by the European Interactive Advertising Association (2007) among a wide array of websites and topics, travel websites are particularly popular with this group, although these websites rank less popular with the average European Internet user. This can also be seen as an indicator of Silver Surfers' increased leisure time and disposable income for enjoyment purposes.

These results conform to a survey by Vuori and Holmlund-Rytkönen (2005), stating that the services most frequently used online by Silver Surfers are hotel reservations, followed by buying tickets. The average European Internet user's surfing behaviour contains considerably more use of music-platforms and Internet-auctions (European Interactive Advertising Association, 2007).

Focus Purchasing and Information Behaviour
In terms of eCommerce the most remarkable difference of Silver Surfers in opposition to other users lies within purchasing and information behaviour. Silver Surfers can be portrayed as very loyal to brands they perceive as reliable. Whereas younger customers tend to base their decision process on factors such as price or supply conditions, Silver Surfers tend to remain with brands or respective websites they once used and had a good experience with (Pompe, 2007). This makes Silver Surfers a very loyal and important user group. Given the fact they are attracted to a tourism institution's website, are able to finish the booking process and feel positive towards the institution, they are very likely to process further bookings on this website, leaving aside the factor of price (Pompe, 2007).

Another important characteristic of Silver Surfers on the web is that they tend to not perceive the Internet as a major source of information. They rather fall back on family and friends' recommendations or traditional travel-catalogues to gather all the information needed. However, after this information process many Silver Surfers indeed utilize the Internet for the actual booking (Pompe, 2007; Graeupl, 2006; Szmigin & Carrigan, 2000). This leads to the assumption that in terms of Silver Surfers, information design is not as important as the Usability of the booking process.

Focus Usability
Defining Usability as: "[…] *how well and how easily a user, without formal training, can interact with an information system or a website*" (Jordan, 1996), finishing a booking process should be accomplished with the least time and cognitive efforts possible (Krug & Dubau, 2006). According to international studies, the user-friendly implementation of web-based offers like for example eShops or eCommerce solutions, positively influences customer satisfaction as well as sales (Nielsen, 2008).
Making an online purchase is problematic and difficult for Silver Surfers, as they lack experience of computers and the Internet (Cleaver, 1999). They prefer functionalities that make online-navigation easier and more convenient and prefer websites that make it easy for them to use them and be successful (Coyne & Nielsen, 2005).

Older people are inclined to be portrayed as hesitant to adopt new technologies and as feeling uncomfortable using them (Vuori & Holmlund-Rytkönen, 2005).

Age in itself is clearly not a barrier for being active on the Internet. Many older people can be regarded not only as users of digital technologies, but also as fully "digitally engaged" (Olphert *et al*., 2005). Silver Surfers can be described as wanting to remain active and independent, trying to keep mentally alert, challenged, useful and feeling "young" (Loges & Joo-Young, 2002; Trocchia & Janda, 2000).

On the contrary, lack of experience and support are relatively more likely to produce negative experiences within this user group, posing a significant factor in computer anxiety (Todman & Drysdale, 2004). Anxieties range from simply feeling "too old" for new technologies (Selwyn, 2004), perceiving the Internet as a threat, or as being insecure and dangerous (Olphert *et al*., 2005) to constant worries "about what to press". As a result many users prefer to ask for help rather than solve the problem themselves (Bailey *et al*., 2005).

Considering Silver Surfers as an important target group for tourism institutions, Usability research rarely reflects demographic reality. In the process of designing eBooking platforms and eTourism initiatives, mainly student participants are tested, deducting Usability guidelines and implications for all age groups who access a website (Dickinson *et al*., 2007). Given all the facts discussed in this paragraph, this approach might be reconsidered.

2.2 Usability Methods

Coyne and Nielsen (2005) and Dickinson *et al*. (2007) outlined obstacles concerning Usability Inspections with seniors, though not in the context of eTourism. Nevertheless, beyond doubt abilities like visual and auditory perception and fine motor control decrease with age. Furthermore this specific user group also shows a significant decline of concentration, perception, interpretation, and memory retention (Schulte, 2005). Whereas Coyne and Nielsen (2005) solely focus on designing Usability for seniors, Dickinson *et al*. (2007) indeed question the methods used for testing Usability with seniors considering above mentioned obstacles. However, the perspective study does not include an entire Usability Test Setting – as described in the following - for seniors. They were merely asked to do a Retrospective Review after looking at a website for 20 seconds.

Usability Inspection

Usability Inspection comprises methodologies for measuring Usability aspects and identifying specific problems. In general two different approaches can be distinguished: (1) Expert Based Inspection, and (2) User Based Testing Methods (Jaspers *et al*., 2004). Table 1 shows a quick overview of the most widely adopted methods.

Table 1. Usability Method Overview

Method Type	Description
Expert Based Inspection Methods	
Guideline Review	Expert checks guideline conformance.
Heuristic Evaluation	Expert inspects heuristics.
Consistency Inspection	Expert checks consistency across products.
Cognitive Walkthrough	Expert simulates being a user.
User Based Testing Methods	
Performance Measurement	Usage data is recorded during test.
Log File Analysis	Usage data is analyzed.
Interviews	User participates in a discussion.
Questionnaires	User answers specific questions.
Participatory Evaluation	User works through task scenarios and explains the actions.

Source: Jaspers *et al*., 2004; Ivory & Hearst, 2001; Maguire, 2001

Other existing methods – including for example Programmable User Models or Facial Expression Analysis – are not very common due to their complexity.

According to Nielsen (2005) the most effective way to measure Usability is the Formal Usability Inspection. The Formal Usability Inspection is – following the Mixed-Methods-Approach - a combination of both qualitative and quantitative methods as well as Expert Based and User Based methods to examine a website's Usability in a clearly structured Test Setting.

In the present study all methods mentioned in Table 1 were used. Nevertheless only the User Based Testing Methods are being put into question concerning Usability Testing with Silver Surfers. Expert Based Inspection methods have already been proved suitable in previous examinations (Mirski *et al*., 2006; Bernsteiner *et al*., 2006) and are not subject to change in the context of testing with seniors.

Therefore this special context requires slight adaptations regarding the age-related decline of abilities for the first four methods (Performance Measurement, Log File Analysis, Interviews, and Questionnaires). The main challenge though lies within adapting the Participatory Evaluation in a way that is suitable for seniors. For the Participatory Evaluation the user has to work through task scenarios and explain the actions performed – either by "Thinking Aloud" or "Retrospective Review".

Thinking Aloud

For the method of "Thinking Aloud" test-subjects are urged to speak their thoughts out loud (Frommann, 2005), which allows for insights into the personal thoughts of a person, and therefore insights into their thinking processes. This can lead to a better understanding of the subjective perception. The task of the test conductor is to repeatedly remind the test-subjects to Think Aloud in case they fall silent.

The resulting data pool is usually highly valid, since not only the actions of the participants are shown, but also the reasoning behind those actions (Harms & Schweibenz, 2000). Restrictions also have to be made regarding the cognitive system.

It is assumed that a person is only able to express thoughts processing in the short term memory (Jaspers *et al*., 2004). Due to those reasons, the method of "Thinking Aloud" only qualifies for certain tasks. For example: those having to do with the order of information requested in accordance with the order of the task to be completed, or those only dealing with information directly concerning completion of the task (Jaspers *et al*., 2004). Furthermore thought processes proceed faster than people are able to talk. Due to that, the actual thoughts can only be enunciated at a fraction (Eger *et al*., 2007).

Since seniors tend to show a significant decline of concentration, perception, interpretation, and memory retention (Schulte, 2005), the method of "Thinking Aloud" has to consider these possible limitations in analyzing the data. These limitations could also be perceived as additional stress factors.

Retrospective Review
The "Retrospective Review" or "Retrospective Think Aloud" is a method that collects the thoughts on the task of the user after this task is over (Guan *et al*., 2006). Participants perform the given tasks silently and are afterwards asked to verbalize their cognition and emotions. The main advantage of this approach is that the double challenge resulting from thinking and acting in a parallel way is avoided (Gediga & Hamborg, 2002).

Ohnemus and Biers (1993) compared "Thinking Aloud" and "Retrospective Review" regarding effectiveness and efficiency and came to the conclusion that the data acquired through a retrospective interview generates information of higher qualitative value. A conclusion also supported by Dickinson *et al*. (2007). Although in most studies a difference between the two methods could not be detected (Bowers & Snyder, 1990; Eger *et al*., 2007; Guan *et al*., 2006).

Concerning the method of "Retrospective Review", better results can be generated when the interview takes place right after the completion of the task, because most of the relevant information is still available at that time and thus can be verbalized directly. Still, the method's main problem is the reliability of memory. The processes of encoding, storage and recall are affected by generalization, manipulation and forgetfulness. Also spontaneous thoughts emerging during the performance of the task are also very likely to be lost (Eger *et al*., 2007).

3 Methodology

(1) Test A:
A Web Usability Test focusing on searching and booking behaviour on touristic websites was conducted. The goal of this test was to observe obstacles for older people while booking on an eTourism website and to find out which method for explaining the actions performed by the users fits test settings with Silver Surfers the best. Therefore a Formal Usability Test Setting was applied. Initially an Expert Review including Guideline Review, Heuristic Evaluation and Cognitive Walkthrough was conducted. Subsequently a User Based Test was performed, where Performance Measurement, Interviews, Questionnaires (e.g. demographic data,

computer skills and the System Usability Scale (Brooke, 1996)) and the Participatory Evaluation came into operation.

According to Nielsen (2000) a Usability Test does not need more than five participants to give accurate results. Therefore the tested user-group consisted of ten Silver Surfers (average age 65.4 years) acquired with the help of the Tyrolean senior association and a control group of ten "Tween" Surfers (average age 26.3 years). All participants were asked to search for a holiday on the Austrian website of the tour operator TUI in a specific time of the year and were given a budget of 1.200€ to book a holiday according to their likings. The task was counted complete, when the participant reached the page to fill in all the necessary data (credit card information etc.) for finishing the booking process. For the evaluation each test subject was situated in a Usability Lab, in front of a Computer, and an Eye-Tracker and was thereby monitored, and at times helped by the test conductor. During this process the screen content and the Gaze Plot were recorded. With this method it was possible to define Hot Spots – certain areas of very high interest and thereby get an overview of the test-subject's handling of the website (Stoessel, 2002).

Five participants of the user-group and five participants of the control group were asked to Think Aloud while searching for their holidays and were observed by the test conductor sitting next to them. The remaining participants were asked to give a Retrospective Review after the completion of the task. As described in section 4, analysis could identify Retrospective Review as a more appropriate method to explain the actions performed during a Usability Test for Silver Surfers.

(2) Test B:
Due to these findings, the next research step consisted in conducting another Web Usability Test, but this time focussing on Retrospective Review as a method for the Participatory Evaluation.

Therefore a different sample of ten seniors – again acquired with the help of the Tyrolean senior association - with an average age of 59.5 was asked to do the same task already described in Test A. To avoid a laboratory surrounding, this time the participants were asked to solve the task parallel in a usual computer-room. Eye-Tracking was not used in this scenario, since the location of Usability problems was not part of this test. It merely focussed on the examination of the testing method. After the completion of the task, all participants were asked to sit around a table and discuss the website and their perception of it within a focus group led by the test conductor. This was done to be able to compare the utility of these results to the results of the previous test.

(3) Test C:
In addition to that, and also with the intention of taking a closer look at Alpine Tourism especially in the Tyrol, a questionnaire on seniors' information and booking behaviour in terms of holidays in a Tyrolean ski resort was conducted. The applied sample consisted of 186 random people older than 50 years with an average age of 57.5, all currently being on holiday in the respective ski resort. They were asked to

give insight into their information process and booking procedure concerning this very trip, to be able to also make regional conclusions.

4 Results

For a better understanding results are split in three groups according to the three bullets described in section 3.

(1) Test A:
Results show that Silver Surfers stayed almost three times longer on each page to search for information than the younger participants. As the website of TUI contains a broad variety of travel and booking information in various colours and forms, it took Silver Surfers 220 seconds on average to scan the entrance page of TUI for any helpful information. The younger control group only needed 79 seconds to find this information. In addition to that Silver Surfers needed 348 seconds to display an overview of hotels they wanted to stay in - three times longer than the younger control group that only needed 123 seconds for that. Silver Surfers took an extensive time to read through all the information, possibly due to their inexperience with eTourism website design and information structure. According to observations, older test subjects had difficulties in comprehending all the information on the screen, understanding the underlying concept of searching, browsing and booking, and accurately moving the mouse to click on smaller formatted links and form fields. By contrast, the younger control group did not show any distinctive features.

Results of the System Usability Scale (SUS), a questionnaire to easily quantify a website's Usability (Brooke, 1996; Bangor *et al.*, 2008), rank TUI at 48/100 (not acceptable) for Silver Surfers and 65/100 (just acceptable) for the younger control group. This trend is also reflected in the task completion rate. Whereas all participants of the younger control group could finish the booking process without help, the task completion rate for Silver Surfers resulted in 70%, mainly due to heavy support by the test conductor - without whose help none of the Silver Surfers could have completed the task. Difficulties for Silver Surfers were also shown concerning the Participatory Evaluation. The participants of the Thinking Aloud group had major problems completing the given task, and at the same time verbalize their thoughts, which could be explained due to age-related decline in the ability to concentrate. While performing the Usability Test, other indicators have been noted unexpectedly. Silver Surfers needed all kinds of repeated intervention to "Think Aloud" again, as they had to concentrate very hard on their current task and fell silent quite often, compared to the younger control group. At times the Silver Surfers even reacted aggressively towards the computer itself, by insulting the machine for not doing what they actually wanted it to do. In addition test subjects started talking loudly to themselves, obviously not intending to "Think Aloud" as instructed. Also the senior participants of the Retrospective Review did not seem to be free of difficulties. After completing the task, test subjects had difficulties reproducing the steps they had to take to reach their goal, as already noted by Dickinson *et al.* (2007). However, the data gathered during the evaluation with the method of Retrospective Review was less distorted and therefore of higher quality for analysis.

(2) Test B:
Having identified the method of Retrospective Review as a more appropriate way to explain the actions performed during a Usability Test with Silver Surfers, as a next step another Web Usability Test with a different sample of seniors was conducted, trying to arrange the Retrospective Review within a focus group. This approach was chosen to make it easier for the participants to talk about their perception of the website. Observation showed that despite a lack of Usability, Silver Surfers tend to see difficulties with finishing the booking process as a personal inability rather than a problem of the website. Concerning this matter the assumption that a focus group would facilitate this process was drawn, based on the psychological fact that being in a group and realizing that other people are having the same problems, makes it easier and less embarrassing to talk about the own problems. Test B could confirm this assumption.

Although in the beginning the general opinion of the participants reflected the previous results and had a tendency of self-critique, the longer the focus group lasted, the more participants put their real feelings towards the website of TUI into words.
A statement quite accurately reflecting the atmosphere in the beginning of the focus group is:

> "*You know, it was my own mistake that I could not finish it [note: the booking process], because I did not see this button*".

The majority of the participants blamed themselves for not being able to finish the booking process, and had the feeling that it is necessary and usual to adapt to new websites. However, after a short period of time, the participants started talking more and more about their problems concerning the Internet. A self-explanatory statement concerning this matter is:

> *"My son only needs to click a button and gets what he wants. I need to read through everything and many of my friends have the same problem. It seems as if the younger generation has a photographical view for Internet stuff".*

Information design was one aspect discussed excessively after all the participants realized that the problem lies within the website and not within their inability to handle the website. One participant brought this to the point with the following statement:

> "*There is so much information on it. I would need days to read through all of that. And after I would have finished, I would not know what to do anyway*".

The general feeling towards the information design on the website of TUI was devastating and, through that completely corresponded to the results of the Expert Based Review. A result that could not be reflected in this depth through the single-Retrospective-Review in Test A. This leads to the assumption that in addition to choosing Retrospective Review as the method to gather further knowledge during the Participatory Evaluation, arranging this Retrospective Review within a focus group can lead to even better results in terms of Usability Testing with Silver Surfers.

(3) Test C:

Results of the questionnaire-study conducted in a Tyrolean ski resort conform to previous studies. 56.4% of the seniors spending their holidays in the respective ski

resort booked their trips on the Internet, whereas only 16.7% of the sample group gathered information about their trips on the Internet. This emphasizes the different information behaviour of Silver Surfers already described in section 2, with a focus of tourism also in this regional context. Taking a closer look at the results, in terms of booking the Internet ranks number one (56.4%), followed by the telephone with 34.9%. Travel agencies with 4.3% or other options with 3.8% are rarely an alternative. In terms of information behaviour, Silver Surfers' main sources of information are family and friends with 66.7%, already followed by the Internet (16.7%). In the study at hand, the findings of other studies, making travel agencies the second most used source of information, could not be confirmed. Only 2.2% of the tested sample did indeed gather information via travel agencies.

Analyzing the interrelations between information and booking behaviour, significant conclusions could be drawn. 81.1% of the participants, who gathered information online, also booked their trip online. Only 13.2%, who retrieved information online, booked their trip via telephone afterwards. Other options were merely chosen for the booking process by people who gathered information online.

Looking at family and friends (66.7%) as the major source of information in this context, 53.9% of the participants that retrieved information through this option, afterwards booked their trip on the Internet and 37.4% via telephone. This makes obvious that a significant number of Silver Surfers tends to separate the information process from the actual booking process.

5 Conclusions and Further Research

According to socio-demographic studies, our society is constantly growing older in the next four decades. Defining Silver Surfers as young at heart members of the Generation 50plus, having an increased amount of leisure time as well as disposable income and using the Internet at least occasionally, this results in a significant group of people with a larger-than-average purchasing power that is very likely to be dismissed as an important target group in the context of eTourism.

However, international studies show that this group of Silver Surfers especially stands out due to brand loyalty. While using the Internet they tend to adhere to websites they once found useful and reliable and do not really bear in mind potential price differences resulting from this behaviour. This makes it even more important to see the relevance of Silver Surfers in terms of eTourism. As literature shows, improving satisfaction within this user group, especially in the context of tourism platforms and successful booking experiences, is vital in building a loyal customer clientele.

Since Silver Surfers tend to not be as well versed in exposure to the Internet as their younger equivalents, subliminal anxieties result in the urge to read everything displayed on a website very carefully. The more content is displayed on a website, the more insecurity arises. Due to the fact that Silver Surfers evidentially separate the process of information gathering from the process of booking, a possible solution for

this could be to anticipate this separation and therefore simplify the booking process fundamentally.

Another important aspect to be considered and maybe also changed, lies within the process of website-development. Many companies and institutions already see the need for iterative Usability Testing in the process of web design, but – though being one of the major target groups - a special focus on Silver Surfers is merely set in this context. Typically Usability Tests are conducted with a sample consisting of young people, since they tend to be easily accessible for the organizations performing the test as well as more open towards technological developments. However, this approach leads to websites being optimized for a young target group, leaving aside the needs of Silver Surfers. We suggest a change of mind integrating Silver Surfers' interests in the development process.

The study at hand especially focussed on the question whether Standard Usability Testing Methods are appropriate in the context of testing with Silver Surfers and came to the conclusion that in this special context also these methods have to be reconsidered. The method of Thinking Aloud may be in question as an adequate testing method for Silver Surfers. Older people tend to have natural difficulties in engaging in various activities at the same time, especially when focusing their concentration on a task they are not familiar with, and at the same time verbalizing their thoughts. The method of Retrospective Review may provide a useful alternative for testing this very special and characteristic user group. Following this method participants are allowed to concentrate solely on solving the given task and their problem solving strategies are allowed to flow freely.

Still, senior users have difficulties in remembering every single step while booking, and tend to feel ashamed of their felt gaps in knowledge concerning the Internet. Results of the study at hand propose a realization of Retrospective Review in form of a focus group as a possible solution for this problem. Further research should focus on a broader inspection of this solution.

Also, additional methods for analyzing the retrospective protocol and the focused interview after the test should be developed in order to improve website design of eTourism websites. GABEK (Zelger, 2008), as an advanced qualitative research method is proposed, providing a number of analysis steps in order to collect unordered knowledge and systematize it. This data is provided by normal language utterances, notes, quotations and texts, which are processed and presented systematically.

Recognizing the constant increase of senior computer users endeavouring to use the Internet and being especially interested in travel and leisure information websites, testing this user group and focussing on their needs may prove very necessary for future touristic webpage design.

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Progress of attraction websites in Mainland China: From 2005 to 2010

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Abstract

This study analyzed the progress of Chinese attraction websites by comparing the tourists' perception of evaluation criteria importance and performance of Chinese attraction websites in 2005 and 2010. Drawing on the responses from 100 respondents collected in 2005 and 2010, the proliferation of adopting Internet technologies by attractions in China and the change of tourist needs were clearly revealed. Moreover, the comparison of website performance showed the progress of Chinese attractions websites. Implications of results and future research are discussed.

Keywords: Attraction website; Website evaluation; Mainland China

1 Introduction

Dynamic tourism development and technological progress have been going hand in hand for years (Sheldon, 1997). Ever since the introduction of Internet technology in the late 1990s, the Internet has drastically transformed the distribution and marketing of tourism product (Buhalis & Spada, 2000). Website quality has long been an important research topic because tourists' perceived quality affects their satisfaction levels, behavioural intentions, loyalty, word of mouth behaviour, and, ultimately, eCommerce profits (Morrison, Taylor & Douglas, 2005). Research in tourism has so far measured website quality for nearly all the industrial sectors (Law, Qi & Buhalis, 2010). In a study of reviewing research pertinent to tourism website evaluation, Law *et al*. (2010) reported that hotel websites evaluation has been one of the most researched areas in the tourist websites research (Rong, Li & Law, 2009; Schmidt, Cantallops & dos Santos, 2008). DMO websites and agency websites are the second most popular topic (Bornhorst, Brent Ritchie & Sheehan, 2010; Feng, Morrison & Ismail, 2004; Qi, Law & Buhalis, 2008). As a major sector of tourism, relatively less attention was paid to sectors such as attractions and airlines. Moreover, as stated by Morrison, Taylor, and Douglas (2005), tourism industry is a complicated industry which is hard to provide a standardized method to evaluate all sectors. As a main part

in a whole trip (Middleton, Fyall, Morgan & Ranchhod, 2009), attraction websites are particularly important because computer-mediated tour information, such as traffic, activities, and tour-package information can increase awareness, interest, and the likelihood of visiting a specific attraction (Ho & Chou-Yen, 2003). Moreover, the content and function of each attraction website are different from website of destination organizations and website of other related sectors such as hotel and airlines (Park & Gretzel, 2007). In summary, evaluation research would be of limited value if it does not pay enough attention on attraction sector, a unique and ultimate supplier to tourists.

The same situation applies to mainland China (hereinafter to be referred as China) where online tourist services, including information search, purchases and distributions have brought fundamental changes in the tourism industry (CNNIC, 2010). As per the key barometer of tourism development in mainland China, attraction sector endeavoured to online distribution and marketing especially after the year 2004 when Digitalization Construction of Attractions was jointly initiated by the Ministry of Construction and the Ministry of Science and Technology in mainland China (Wang, 2006). Since then, more and more attractions have begun to embrace the Internet technologies. In spite of the wide establishment of business websites by attractions in China, little effort has been devoted to attraction websites in China compared to plethora of prior studies on evaluating the performance of Chinese hotel websites (Liang & Law, 2003), Chinese DMO website (Feng, Morrison & Ismail, 2004; Qi, Law & Buhalis, 2008) and Chinese tourism websites (Lu, Deng & Wang, 2007). The attraction managers do not, however, understand how they could build their websites and how to improve theirs websites quality. Besides, after the 5-year development of attractions websites in China, researchers and practitioners in the tourism context may wish to know the changes in the tourists' perceived importance of evaluation criteria and perceived performance of attraction websites in China. In this vein, the purpose of this study is twofold: (1) Build a model to evaluate attraction websites by identifies the criteria and the perceived importance index. (2) Use this model to measure the change of quality of Chinese attraction websites and perceived importance of evaluation criteria during five years period.

2 Literature Review

Academic researchers have long advocated the importance of assessing website in the context of tourism (Buhalis & Law, 2008; Law, Qi & Buhalis, 2010). Researchers struggled to determine important factors for evaluating online service and marketing in nearly all sectors. For hotel websites, Baloglu and Pekcan (2006) identified language, navigation and functionality as measurements. Chan and Law (2006) evaluated hotel website's quality in five factors, which were website usability, interface effectiveness, information, ease of navigation, and user friendly. Schmidt, Cantallops, and dos Santos (2008) measured promotion, multimedia, navigability, privacy, security and service promptness. For destinations organizations, Douglas and Mills (2004) modified balanced scorecard model into user friendness, site attractionness, marketing effectiveness and technical aspects to evaluate attraction websites. Qi, Law, and Buhalis (2008) proposed a detailed Web Assessment Index

cataloging in: language, layout and graphics and information architecture, user interface and navigation. For general travel websites, Hassan and Li (2008) identified web usability as screen appearance consistency, accessibility, navigation, media use, interactivity, and content. Kim and Ho (2008) identified four usability criteria, which includes usefulness, effectiveness, satisfaction and supportiveness. Nusair and Kandampully (2008) selected 53 attributes and categorized around the six web quality dimensions. Although several studies have examined the web site dimensionality in travel settings, no previous study has perfectly matched the other studies in terms of web quality dimensions and greater difference exits in different sectors of tourism. As mentioned before, researchers paid more attention to destination organizations than destination/attraction itself, whose needs apparently are somehow different. Hence, a standardized criteria, tools or techniques for evaluating sites in attraction are needed.

Additionally, there is a lack of historical perspective on websites evaluation and application. Although abundant research on tourist websites evaluation, most of the previous research only evaluated websites at a specific time and presented a "snapshot in time" (Morrison *et al*., 2005). Few researches tracked the change of website performance or information technologies applied in tourism. Kim, Morrison, and Mills (2003) tracked the changes of web-based marketing efforts between two points of time. Gilbert and Powell-Perry (2003) traced the progression in the use of online relationship marketing techniques by hotels between May 1997 and November 1999. Wang, Hwang, and Fesenmaier (2006) used change propensity analysis and suggest a number of emerging activities that will be adopted on bureaus' websites during the next few years. Given the web environment and information technology is constantly evolving, a one-time evaluation of a site is certainly interesting, but inadequate. There is a need to develop a set of standardized evaluation perspectives and measures, and to have these applied in a successive time period to determine the evolution of website performance in specific sectors of the business.

3 Methodology

3.1 Identifying the criteria to evaluate attraction websites

A focus group method within 5 tourism scholars, 3 industry practitioners and 3 IT professionals was conduct in 2005 to establish the attributes for evaluating attraction websites. Consequently, 35 criteria within six important dimensions that contribute to a successful attraction web site were identified based on the commonality that exists among the previous studies and applicability of attraction websites (please refer to Table 1). In other words, most criteria mentioned in the literature that are applicable to evaluating attraction websites were kept and categorized into six dimensions based on the discussion of focus group. These dimensions are: Accessibility, Experience, Effectiveness, Interaction, Commerce and Marketing.

3.2 Gathering opinions of tourists in 2005 and 2010

After finalizing the questionnaire, the first data collection was conducted with 100 tourists in August 2005. In order to analyze the progress from 2005 to 2010, the

second data collection was conducted with another 100 tourists in August 2010. Both groups of tourists were chosen by simple random sampling method from the same online travel community sharing the same percentage of age, education and net age to insure the data reliability. Qualified respondents should have previously visited at least three Chinese attraction websites before. In the questionnaire, respondents were asked to rate the perceived importance of 35 criteria by applying the five-point Likert scale ranging from (1) least important to (5) most important. In terms of data analysis, all data were analyzed through descriptive statistics. The descriptive mean scores of two dataset were calculated, and the difference of mean in each criterion was highlighted in rank ("+"means increase rank, "-" means decrease rank) to present the change.

3.3 Evaluating attraction websites in China in 2005 and 2010

As another core objective of this study is to analyze the progress of Chinese attraction website performance, 75 5A-level attractions, representing the most important and representative attractions which are authorized by China National Tourism Administration (2010), were selected for analysis. A panel of six evaluators, which composed of tourism practitioners chosen by convenience sampling method, was divided into three groups of two. Each group evaluated twenty to thirty randomly selected attraction websites. According to Wan (2002), using two assessors to evaluate a website can alleviate the problem of personal bias. The evaluators rated attraction websites using a five-point Likert scale, with 1 being "doesn't fulfil this criterion at all" to 5 being "totally fulfil this criterion". Prior to the evaluation, evaluators were briefed about the criteria with instructions. The evaluation was then performed with the researchers' presence to clarify queries and to answer questions. Each of the websites was evaluated in a double-blind fashion by two evaluators in the group. If the two ratings for each website differed by one point, the average of the two ratings was taken as the final rating. If the two ratings differed by more than one point, the two evaluators discussed the reasons of their choices, and then to make a collective decision on their ratings. The evaluation work conduct in 2005 and 2010 respectively by two different groups of evaluators. In analyzing the data, the descriptive mean scores of website performance were calculated, and the mean gap of each criterion was presented in rank ("+"means increase rank, "-" means decrease rank).

4 Findings and Discussions

4.1 Change of perceived importance of evaluation criteria for attraction websites

The perceived importance indices of all evaluation criteria in six dimensions collected in 2005 and 2010 are presented in Tables 1. In general, the mean score of perceived importance from data collected in 2010 (M=3.89) was significantly higher than that of 2005 (M=3.36), which meant tourists required higher quality website services now. Of the 35 criteria analyzed, 24 of them were perceived as more important as time

changed while the remaining 11 became less important in the eyes of tourists. “Call centre”, “Currency” and “Security” were the top three criteria having the highest increase in the importance score from 2005 to 2010. In contrast, “Links to DMS and tourism portal”, “Links to Travel agency website” and “Download speed” dropped their importance most. “Commerce” was the dimension having the highest increase in perceived importance, and followed by “Effectiveness”. With an exponential growth in online travel ordering in China (CNNIC, 2010), tourist now paid much more attention to the online purchasing function and information quality of websites than ever before.

Chan and Law (2006) advocated that irrespective of how good the design or content that a tourism website is, a tourism website remains largely unknown to users if they can not easily find and access to it. The success of a website is directly influenced by its accessibility. By 2005, tourists perceived “Correct links” and “Downloading speed” as important (4 = Important) and “Search engine friendly” was just important (3 = Just important) to attraction websites. Five years later, “Correct links” and “Search engine friendly” increasingly became very important criteria (5 = Very important) from tourists’ perspective. Given the existence and prevalence of Baidu, Souku and other search engines in China, there is a growing reliance on searching for information including travel-related information through search engines (EyeforTravel, 2010). This might be one of the explanations to the dramatic increase in these two criteria.

Table 1. Perceived importance of evaluation criteria for attraction websites

Criteria/Dimension	Mean (2005)	Mean (2010)	df.	Change in Percentage	Rank
Accessibility	3.89	4.27	0.37	10.09%	5
Correct links	4.05	4.85	0.81	20.00%	19
Search engine friendly	3.64	4.65	1.02	28.00%	11
Downloading speed	4.00	3.29	-0.71	-17.73%	-3
Experience	3.39	3.77	0.38	14.30%	4
Search function	4.36	4.75	0.38	8.75%	22
Navigation	4.15	3.82	-0.34	-8.10%	-8
Browsers suitability	2.64	3.13	0.49	18.62%	21
Adequate web design	2.36	3.24	0.87	36.92%	17
Aesthetical design	3.45	3.82	0.36	10.53%	23
User-friendly registration	3.82	3.13	-0.69	-18.05%	-5
Multilanguage	2.64	3.64	1.00	37.93%	13
Effectiveness	3.69	4.65	0.96	27.78%	2
Currency	3.27	4.76	1.49	45.56%	2
Correct and	4.73	4.80	0.07	1.54%	24
Abundant info	3.40	4.69	1.29	37.95%	8
Local information	3.64	4.62	0.98	27.00%	15
Multimedia	3.57	4.47	0.91	25.39%	16
Relevant tourist information	3.55	4.58	1.04	29.23%	9
Interaction	3.19	3.85	0.66	22.73%	3

Contact information	3.82	4.67	0.85	22.38%	18
BBS	3.82	3.13	-0.69	-18.10%	-4
Instant message	3.27	4.56	1.29	39.44%	7
Complains	3.09	4.53	1.44	46.47%	4
Internet investigation	3.27	3.07	-0.20	-6.11%	-9
Helpdesk	2.55	2.40	-0.15	-5.71%	-11
Call canter	2.55	4.60	2.05	80.71%	1
Commerce	3.39	4.57	1.18	35.09%	1
Ticket booking	3.52	4.55	1.03	29.31%	10
Marketing information	3.42	4.42	0.99	29.03%	14
Tour booking	3.42	4.44	1.01	29.56%	12
Convenience shopping	3.21	4.62	1.41	43.77%	5
Security	3.36	4.84	1.47	43.78%	3
Marketing	3.04	2.90	-0.14	-4.66%	-1
Personalized marketing	3.18	3.75	0.56	17.71%	20
E-magazine and newsletter	2.91	2.27	-0.64	-21.88%	-6
Special discount	3.18	4.55	1.36	42.86%	6
Exchange links with relevant web sites	2.64	2.49	-0.15	-5.52%	-10
Links to tourists BBS	2.64	2.27	-0.36	-13.79%	-7
Links to Travel agency website	3.18	2.47	-0.71	-22.29%	-2
Links to DMS and tourism portal	3.55	2.49	-1.05	-29.74%	-1

Note: In row “Mean (2005)” and “Mean (2010)”, 1 represents least important; 5 represents most important.

4.2 Performance of Chinese attraction websites

Based on a comparison of website performance evaluated by the respondents, Chinese attraction websites were found to improve a lot during these five years which was shown in Table 2. Regarding the adoption of Internet technologies, of the selected 75 5A-level attractions, the number of attractions who owned a website was increased from 63 (84% of the total) to 74 (98.7% of the total). Besides, the result suggested that the selected attraction websites had a better performance in 28 out of 35 criteria, whereas the performance of another seven criteria was worse. Among these seven criteria which showed worse performance, majority of them were under “Interaction” and “Marketing” dimensions.

Most marked changes were found in the commercial services ("Commercial” dimension) of the websites. In 2010, 48 websites provided online booking services while only 19 were found in 2005. Moreover, all criteria measuring commercial services performed better in 2010, particularly “Convenience shopping” and “Security”. This revealed that more and more attractions embraced Internet technologies as an online distribution channel for selling their products and services. Despite insignificant changes in the performance, all the criteria in “Accessibility” and “Effectiveness” dimension continued to be perceived as well performed. In

"Accessibility", respondents suggested that the Chinese attraction websites performed very well in all aspects. One thing need to be noticed is that the "Search engine friendly" of attraction websites received a significant improvement in their performance. This implicated that attractions in China recognized and paid considerable effort in improving their website accessibility and optimization in search engines over the past few years.

From a marketing perspective, one of the greatest advantages of the Web is that it offers an unprecedented opportunity for hotels to interact and direct communication with guests (Martin, 2004). Since the attraction managers in China might acknowledge this, there were also great positive changes in interaction functionality ("Interaction" dimension) of their websites. As customers in China are getting more busy and spending less time in travel planning (Zhang & Han, 2004), current customers tend to use conventional channels to get travel-related information. As "Instant message" and "Call centre" could make the customers get the instant reply to their inquiries, these two channels were well perceived by the customers in the latest result. As for the "Experience" dimension, "Search function" and "Multilanguage" showed enhancement in their performance. However, "Considerable web design" which represented reasonably use of the plug-in controls, pop-up windows and length of the webpage showed worse performance. That implied some designers might inappropriately use web information technology in their website which might lead to customers' dissatisfaction.

Table 2. Performance of Chinese attraction websites

Criteria/Dimension	Mean (2005)	Mean (2010)	df.	Change in Percentage	Rank
Accessibility	4.39	4.69	0.30	7.61%	5
Correct links	4.77	4.84	0.07	1.36%	27
Search engine friendly	3.84	4.56	0.72	18.74%	13
Downloading speed	4.55	4.67	0.12	2.72%	25
Experience	3.62	3.90	0.27	11.61%	3
Search function	1.89	2.52	0.63	33.07%	7
Navigation	4.43	4.59	0.16	3.52%	23
Browsers suitability	4.74	4.74	0.00	0.02%	28
Adequate web design	4.67	4.25	-0.42	-8.93%	-5
Aesthetical design	4.11	4.34	0.23	5.64%	21
User-friendly registration	2.83	3.11	0.28	9.94%	17
Multilanguage	2.70	3.72	1.03	38.04%	6
Effectiveness	4.02	4.29	0.27	7.04%	4
Currency	3.61	3.95	0.34	9.43%	18
Correct and	4.80	4.95	0.14	2.98%	24
Abundant info	4.33	4.60	0.27	6.19%	20
Local information	3.95	4.45	0.50	12.60%	15
Multimedia	3.24	3.51	0.27	8.36%	19
Relevant tourist information	4.15	4.26	0.11	2.70%	26
Interaction	2.80	3.10	0.30	12.90%	2

Contact information	3.41	3.83	0.42	12.38%	16
BBS	2.89	2.80	-0.09	-3.11%	-7
Instant message	2.61	3.71	1.10	42.34%	5
Complains	2.70	3.29	0.59	22.01%	11
Internet investigation	3.20	2.30	-0.90	-28.14%	-2
Helpdesk	2.67	2.53	-0.14	-5.24%	-6
Call centre	2.16	3.24	1.08	50.04%	4
Commerce	2.00	3.08	1.08	54.73%	1
Ticket booking	2.16	3.49	1.32	61.29%	3
Marketing information	2.09	2.75	0.66	31.84%	8
Tour booking	1.97	2.36	0.39	19.76%	12
Convenience shopping	1.81	3.35	1.54	84.84%	1
Security	1.97	3.46	1.50	75.90%	2
Marketing	2.76	2.57	-0.19	-0.30%	-1
Personalized marketing	2.06	2.41	0.34	16.73%	14
E-magazine and newsletter	1.24	1.52	0.28	22.39%	10
Special discount	1.73	2.18	0.45	26.10%	9
Exchange links with relevant web sites	3.61	2.98	-0.63	-17.38%	-4
Links to tourists BBS	3.44	2.74	-0.70	-20.44%	-3
Links to Travel agency website	3.64	2.39	-1.24	-34.22%	-1
Links to DMS and tourism portal	3.58	3.74	0.17	4.68%	22

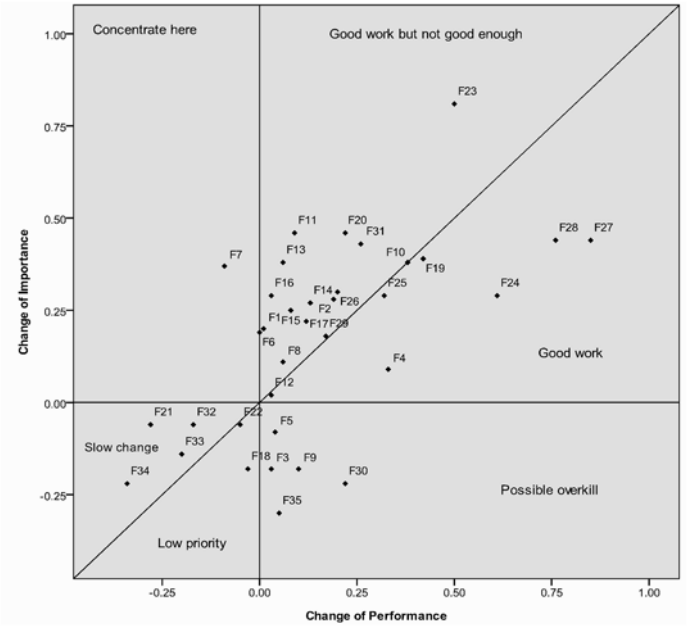
Note: In row "Mean (2005)" and "Mean (2010)", 1 represents "doesn't fulfil this criterion at all"; 5 represents "totally fulfil this criterion".

4.3 Correlation analysis

To industry practitioners, the existence of website performance improvement is undoubtedly good news to them. However, as the customers' perceived importance of evaluation criteria may have a direct impact on their evaluation on website performance. In order to examine their relationship, a two-tailed correlation method was conduct to test the relationship between the change of tourist perceived importance and performance of websites.

These changes had a highly significant correlation at a level of 0.00. This implied Chinese attraction websites were changing along with tourist need in general. The mean score of perceived importance and the performance of 35 criteria were plotted in a modified IPA grid (Martilla & James, 1977). As shown in Figure 1, 22 criteria were captured in Quadrant I which meant they performed better in accordance with customers' need increase. Also noted is that the growth of performance did not catch up with the growth of importance for most of these criteria. Tourists would like to have more information in the area of "Currency" and "Abundant information of the attraction", yet the progress in performance of these criteria were not remarkable. It implied that Chinese attraction websites have done good work but there was still a gap between customers' expectation and perception. Criteria in Quadrant III should

been paid special attention which demonstrated where performance decline while importance increase. “Considerable web design” was becoming more important but this criterion has been overlooked by websites designers instead. It is also worth noticing that the performance of four criteria in the Quadrant III, which are “Internet investigation”, “Exchange links with relevant web sites”, “Links to tourists BBS” and “Links to Travel agency website”, dropped faster than tourists’ perceived importance. Attraction managers should pay attention that tourists would still value these criteria as important; hence the decreasing input on these criteria should be slow down.



Quandrant *I (23):*
Good Work (8)： F10. Multilanguage; F28. Security; F4. Search function; F19. Online services; F12. Correct and understandable content; F24. Ticket booking; F25. Marketing portfolio; F27. Convenience shopping.
Good Work but not good enough(15);F6. Browsers suitability; F20. Complains; F26. Tour booking; F1. Correct links;F8. Aesthetical design; F2. Search engine friendly; F16. Additional facility information; F17. Contact information; F13. Abundant information of the attraction;F31. Special discount; F23. Call center; F29. Personalized marketing; F11. CurrencyF15. Multimedia; F14. Local reference information
Quandrant II - Concentrate Here(1):
F7. Considerable web design
Quandrant III- (6):
Slow Change(4):F33. Links to tourists BBS; F21. Internet investigation;F32. Exchange links with relevant web sites; F34. Links to Travel agency website
Low Priority(2):F22. Helpdesk; F18. BBS
***Quandrant* IV - Possible Overkill(5):**
F30. E-magazine and newsletter; F35. Links to DMS and tourism portal; F5. Navigation; F9. User-friendly registration; F3. Downloading speed

Fig. 1. Importance-performance analysis for the criteria

5 Conclusions

Increasingly, information and communication technologies (ICTs) play a critical role for the competitiveness of tourism organisations, destinations as well as the entire industry as a whole in the whole world (UNWTO, 2001). Coupled with the steady economic growth and significant domestic tourism sector, China is also witnessing the rapid development of this trend (Lin & Guo, 2008). In view of the importance of attraction sector and absence of framework for evaluating attraction websites, this paper developed a standardized evaluation instrument for evaluating Chinese attraction websites. In addition, this study also empirically utilized it to examine the change of tourist perceived importance of evaluation criteria and websites performance. Of the selected 35 evaluation criteria, 24 of them were perceived as more important while the importance of the remaining 11 decreased as far as tourists were concerned. To be specific, "Call centre", "Currency" and "Security" were the top three criteria having the highest increase in perceived importance. "Links to DMS and tourism portal", "Links to Travel agency website" and "Download speed" dropped most in terms of the perceived importance. Drawing on the comparison of data collected in 2005 with those in 2010, the proliferation of adopting Internet technologies by attractions in China and the change of tourist needs were clearly revealed. Some new technologies is being used and dressed in tourism while some were going out of the stage. Regarding the website performance, a significant improvement was noted that respondents rated higher score in 28 out of 35 criteria in the 2010 survey while 7 of them received lower performance score. This implicated that attraction managers in China have acknowledged the importance of website quality and subsequently paid much effort on improving their websites.

Based on the correlation analysis, it is also worth noting that the changes of the tourist perceived importance and performance of websites were correlated at a significant level. Most of the criteria which tourists perceived as more important showed improvement in their performance. But there were still 15 of these criteria should have better performance in accordance with tourists need. Particularly, 5 of them were found to be "Overkill" and "Considerable web design" was the most important factor website providers should focus because it did not catch the change of tourist need at all. As there are only a limited number of published articles on attraction website evaluation, the findings of this study can serve as a reference for subsequent researchers and practitioners on how to evaluate attraction websites. For academic researchers, the evaluation instrument developed in this study can fill the research gap about lack of substantive analysis on tourist attraction evaluation as previously stated. For industry practitioners, the current research findings can serve as a structured collection of elements that are vital to a successful attraction website. As this study has identified the areas which tourists perceived as important and the fundamental deficiencies Chinese attraction websites generally had, attraction managers could thus wisely utilize their resources on website development in order to help them remain competitive in the marketplace.

This study has several limitations. First, there are more than over 2,000 attractions authorized by CNTA. Thus, the sole inclusion of 75 5A-level attractions in the analysis might limit the generalizability of the finding of this study. In addition, the

inclusion of different types of attractions may affect the evaluation results. In order to provide a clearer picture of how Chinese attraction websites perform, future research should expand the scope of study by including all attractions in mainland China and targeted at different segments of attraction types. Future research can also compare the performance of attractions websites by types and regions, and discuss the differences. Lastly, this study focused on comparing the data collected in 2005 and 2010. It would gain more insights to the researchers and practitioners if the same evaluation can be conducted over a successive period.

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Harvesting Online Contents: An Analysis of Hotel Reviews Websites

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Abstract

Hotel Reviews Websites (HRWs) are the most used online sources to evaluate accommodation alternatives. However, they often present an overwhelming amount of unstructured or only semi-structured information which is not shared between all the systems and which cannot be easily analyzed in an automatic way. This study aims to automatically analyse hotel evaluations for a given number of Swiss hotels by comparing hotel reviews. Furthermore, the consistency of users' countries of origin in their evaluations has been studied. The results show that there is an overall agreement on considered HRWs and a general consistency among reviewers with different countries of origin.

Keywords: hotel reviews website, evaluation tools, online content harvesting

1 Introduction

During the tourism consumer decision-making process, prospective consumers can access Internet as a platform for booking, and for information and recommendation seeking (Fesenmaier et al., 2010). The amount of tourism related purchases online are numerous and continuously growing. The greatest share of online tourism sales in fact is generated by air travel, followed by hotel bookings, which accounts for 19%, and package tours, rail and car rentals (Marcussen, 2009). Amongst consumers, the preferred criteria for online hotel booking are recommendations from friends and online reviews (Dickinger & Mazanec, 2008). Both criteria represent the most important factors that influence online hotel booking. Hotels Reviews Websites (HRWs) are the most widely used online resources to help with the evaluation of accommodation alternatives (O'Connor, 2008). Chatterjee (2001) noted that consumer reviews and ratings are the most accessible and prevalent form of user-generated-contents (UGCs) available online. HRWs present mainly UGCs, such as reviews of tourism products and services, which are generally perceived as equally or more trustworthy than those of official websites (Nielsen Global Online Consumer

Survey, April, 2009). However, the amount of online data can overwhelm prospective travellers and tourism managers in their decision-making process or their evaluation of hotels online performance, due to the fact that different HRWs can potentially present different types of more or less consistent hotel information. Related work from Schegg and Fux (2010) about a Swiss hotel presence online, shows that small evaluation differences exist between two HRWs such as Tripadvisor and HolidayCheck. The authors suggest furthering analyzing the reviewers' country of origin as a possible determinant in their evaluation of tourism services and offers. Therefore, the aim of this research is: (i) to compare a group of relevant Swiss hotels' evaluations among HRWs in order to confirm the HRWs tendency to provide similar hotel evaluations; (ii) to understand if hotel evaluations are consistent among different countries; (iii) to investigate whether consumers' country of origin can predict a higher or lower hotel evaluation. The comparison of information belonging to different HRWs is performed on a dataset gathered by scraping data from the Web and aggregating matching information with semi-automatic tools that have been developed ad-hoc for this study. From a research perspective, this study shows how hotel evaluations are consistent among different HRWs systems. This study expands on the findings of Schegg and Fux (2010), further analysing the coherence among the nationalities of the reviewers, and leveraging automated tools to harvest and analyse online information. Contributions to the Internet-based data acquisition are also made by this research, in particular with regard to the information provided by HRWs; which can be an alternative source of marketing research for the forms of assessment analysis on customer evaluation portals. This work should also be apt for all destination marketers who need to monitor the online performance of their hotels and competitors on HRWs, and understand the markets involved on their evaluation.

The paper is organized as follows: the following section presents a literature review about the use of HRWs in travel planning and the creation of valuable knowledge from unstructured and semi-structured sources. Succeeding that, the research approach is presented, showing the instruments used to gather information from the Web, the characteristics of the collected dataset, and the analyses that have been performed over it. The following section shows the results of the analyses; and finally, conclusions are drawn and a plan for possible future work is sketched.

2 Literature Review

2.1 eTourism and web2.0

Tourism has been always recognized as an information intensive domain (Sheldon, 1997), where the use of technology is essential for the day to day life and management (Poon, 1993). The advent of the Internet dramatically changed the tourism landscape, giving a real added value to those wise tourism and hospitality managers who were able to exploit the potential of such an instrument (Buhalis, 2003). In fact, tourism and hospitality managers started to use the Internet firstly as a mean of communication and promotion (Buhalis, 2000) and secondly as a selling channel (Werthner & Klein, 1999). As a result, consumers have been more and more overwhelmed by different content providers and different selling channels (Inversini

& Buhalis, 2009). What is clear nowadays is that around a given destination, a tourism online domain does exist (Xiang et al., 2009): information about a given destination or hotel made available from official information sources but also by unofficial ones (Inversini et al., 2009). The different players (being them official or not) are competing to reach the end user's attention offering them both information and purchasing possibilities (Inversini & Buhalis, 2009).

From a traveler perspective, this content can be useful within all the tourism phases (Gretzel et al., 2006): before going to the destination (e.g. image creation, decision making support and purchase), during the stay at the destination (e.g. updated information about events and places) and after the stay at the destination (experience recall and experience sharing). Moreover, the advent of web2.0 (O'Reilly, 2005; Cantoni & Tardini, 2010) as preferred way to express personal feelings and emotions (Inversini et al., 2010; Marchiori et al., 2010) radically reshaped the way tourists are actually browsing for travel information, promoting the so called eWord-of-Mouth (Xiang & Gretzel, 2009).

2.2 Use of HRWs in Travel Planning

Internet offers the opportunity to seek information, book, and leave feedback (Buhalis, 2003). eWord-of-Mouth (eWOM) is a major driver for hotel purchase decisions (Dubé & Renaghan, 2000). As Smith et al. (2007) pointed out, in an information intensive situation such as the online environment; consumers actively seek others' opinions as a means of managing perceived risks. Hotels are characterized by different attributes that give information on their quality, namely star category and ranking evaluation. This information is a basis for making purchase decisions (Callan, 1998). HRWs are the online platforms which provide these "other's opinions" in the form of:

- Hotel's Popularity Index: hotel ranking among other hotels on a selected destination; this parameter is usually provided by the system without entering the details of how it is calculated; only in Booking.com the hotel popularity index is a direct consequence of the sum of the hotel's characteristics;
- Rating of hotels specific characteristics (i.e. cleanliness, service, location) given by users;
- Consumer Hotel's Reviews: unstructured text written by past guests regarding their experience in a specific hotel.

The amount of this unstructured or semi-structured information about a given hotel in a HRW can be potentially different in another one. As noticed by O'Connor (2008), in HRWs like Tripadvisor users might leave a comment on a site even if they have booked their hotel room somewhere else. For the providers who cannot afford the task 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 in their sites. As affirmed by Shao and Gretzel (2010), looking doesn't mean booking; a prospective consumer can remain online searching for the best offer without taking a decision. In order to be sure of the evaluations they find, they usually compare them across different websites. Popular good hotels on a given tourism destination should be presented on the top rank positions of these HRWs, and the

expectation is to have hotels' evaluation coherence among these websites creating the wisdom of crowd effect (Surowiecki, 2005) which is popular within the social web environment (Kittur & Kraut, 2008).

2.3 Knowledge creation from unstructured sources

The success of participative systems such as HRWs relies on concepts like wisdom of crowds and collective intelligence. The first one, introduced by Surowiecki (2005), states that under the right circumstances (diversity of opinion, independence, decentralization, aggregation) groups are often smarter than the smartest people in them. According to Surowiecki, collecting information from every single person in a group (no matter whether the individual is an expert or not), and then calculating an average of all the responses, allows to obtain an answer that is at least as good as the one of the smartest members in the group. Segaran (2007) generalizes the concept of collective intellignece by focusing on the idea of drawing new conclusions by using more or less sophisticated algorithms to combine data collected from many different people. However, as information becomes more and more available, even just locating a particular piece of it becomes a complex task, and trying to combine it with other information is even harder. Stuckenschmidt and van Harmelen (2005) suggest that this problem of information sharing can only be solved by allowing machines to have a better access to the semantics of information. As all the sources accessed within the current project provide information as Web pages, in formats which are semi-structured (as in hotel ratings) or completely unstructured (as in plain text user reviews or hotel name and address), a consistent part of the research is represented by the extraction of useful information out of this data. To perform this operation, ad-hoc Web Data Extraction Systems have been developed. Baumgartner et al. (2009) define a Web Data Extraction System as a software system that automatically and repeatedly extracts data from web pages with changing content, and delivers the extracted data to a database or some other application. The five main functions of these systems are: web interaction, that is the navigation to the Web pages that contain desired information; wrapper generation, where a wrapper (also called scraper) is a software able to extract data from a target Web page and save it into a structured format; scheduling, which manages the repeated execution of scrapers; data transformation, that includes data filtering, conversion, and integration; and delivering, which is returning the resulting data in the format required by an external application. For this specific project, scrapers have been developed following the textual approach model, which considers Web pages as text strings and relies on string pattern matching with regular expressions for data extraction (Muslea et al., 1999).

3 Research Design

Given this context the research focuses on three (and then two) popular HRS, namely Tripadvisor, Booking and Venere. The aim of research is to (i) understand the level of agreement among different HRWs (ii) to study the coherence among different national groups and (iii) to explore the general appreciation of Swiss hotel by guests coming from different countries. The study has been performed on a sample of Swiss hotels and data was collected in July 2010. The following paragraphs outline the research design used, the data collection and the data analysis.

3.1 Sampling and research instrument

The research focuses on Swiss hotels which are present in the three above mentioned Hotel Review Websites with a given number of reviews. In order to compile the sampling of hotels to be analyzed, an investigation of the tourism cities (i.e. using the name of the city as driver to perform a search activity within the websites) in Switzerland was needed. The website of MySwitzerland.com, the Swiss Destination Management Organization, was analyzed and the summer holiday destinations were listed region by region. This preliminary activity detected 197 cities and destinations. This list has then been checked against the three HRWs and all those cities which did not appear in any of them have been removed as well as the destinations that cannot be considered as a "city", such as aggregated destinations (e.g. mountains or lakes). The shortened version contains 170 cities, which represent 86% of all the cities harvested on Myswitzerland.com. What is clear from this preliminary result is that 170 Swiss cities are present in at least one of the three sources analyzed (Tripadvisor, Booking and Venere). Researchers then built a web scraper able to submit all the cities to the HRWs internal search engines and to collect reviews from the websites. Reviews and other relevant indicators were then stored in a MySQL database. A description of the dataset we collected is shown in table 1: for each source, the total number of cities, hotels, and reviews are shown; aggregate data are also present like the maximum, minimum, and average number of hotels per city, and max, min, and average number of reviews per hotel.

Table 1. A summarized view of our dataset.

Source	Cities	Hotels	Reviews
Booking	146	1442 (max: 102, min: 1, avg: 9.87)	94102 (max: 820, min: 5, avg: 79.61)
Tripadvisor	162	1818 (max: 115, min: 1, avg: 11.22)	26852 (max: 418, min: 1, avg: 18.58)
Venere	108	639 (max: 54, min: 1, avg: 5.91)	2891 (max: 93, min: 1, avg: 9.00)

From this information, it is possible to deduce the importance of the different sources in this specific domain: Venere is the one which has the least amount of hotels and reviews, with an average of 9 reviews per hotel; Tripadvisor is the one which has the most cities and hotels, while Booking has the most reviews. The average number of reviews per hotel in Booking is about four times the amount in Tripadvisor and almost nine times the amount in Venere. This information is even more surprising if we look at the *timespan* covered by these reviews: while Venere and Tripadvisor both have reviews that date back to 2002, the oldest review in Booking dates back to May, 2009. For this reason, we chose to keep for our comparison only the reviews dated after June, 2009. Due to this constraint, the number of reviews from Venere became so small that it was decided to omit them from the following analysis. When reviews were downloaded, they were stored separately according to the source they were derived from. To understand if two reviews coming from different sources were related to the same physical hotel or not, we needed to *infer* new information from the one we have downloaded. The inference process was actually very simple: as hotel names and addresses were provided in an unstructured format (i.e. not consistent

across the three HRWs) we matched two hotel ids *a1* and *a2* if their name or their addresses "loosely matched" each other. The loose match was implemented by using the SQL LIKE comparison operator, with wildcards that allow one string to match if it appears as a part of the other one (i.e. the strings "Hotel Beau Site" and "Boutique Hotel Beau Site Fitness & Spa"). Albeit simple, the double match on name and address allows us to have satisfying results. For instance, for the city of Zurich we were able to download information about 54 hotels and hotel reviews from Venere, 102 from Booking, and 115 from Tripadvisor. The semi-automatic aggregation procedure gave the following results: 36 triple matches (i.e. hotels belonging to all of the sources) were correctly identified, together with 54 double matches (i.e. hotels belonging only to two of the three sources). Hotels which, at the end of the semi-automatic matching process, did not belong to a match were actually present in only one HRW.

3.2 Details on collected data

From this linked dataset, 77 hotels were selected satisfying the following conditions: (i) the hotel must have reviews in all of the considered sources (reduced to only Tripadvisor and Booking, due to the small number of reviews available in Venere); (ii) the total number of reviews per hotel must be greater than 200. The information available for each hotel follows: (i) hotel rating (normalized on a 1-10 scale);(ii) number of reviews per hotel (timeframe: June 2009-July 2010); (iii) reviewer information (i.e. name/nickname and country of origin). Figure 1 shows an example of the data harvested from the two HRWs and table 2 shows the quantity of information scraped during the research.

Fig. 1. An example of evaluation data scraped from Tripadvisor and Booking.

Table 2. Quantitative details of scraped information

	Booking	Tripadvisor
# REVIEWS	19434	2630
# VALID EVALUATIONS	19434	2630
# VALID COMMENTS	15656	2541
# VALID AUTHORS ' NAMES	12820	2019
# VALID NATIONS OF ORIGIN	18804	1993

Table 2 shows that all the reviews harvested on Booking (19434) and on Tripadvisor (2630) presented a valid evaluation (i.e. the number corresponding to the hotel rating), but not all presented a valid comment (in terms of text): 20% of hotel reviews in booking, and 3.4% in Tripadvisor do not present any text. Author name is present only in 65% of the reviews in Booking and 75% in Tripadvisor. Finally, it has been noticed that the countries of origin were present in 96% of the reviews in Booking and 75% in Tripadvisor.

3.3 Data Analysis

After the first phase of scraping, hotels matching and selection of the top 77 hotels, the work followed the objectives of the study:
i) two tables for each HRW, containing the list of hotels and for each one the evaluation given by the reviews of the two booking systems per month were created. The weighted average of each hotel's reviews in the chosen timeframe and their standard deviation for the two HRWs was calculated;
ii) the work on the country of origin presented more problems. In fact, only Booking provides a standard way to choose one's nation, while in Tripadvisor a reviewer can fill the country of origin field with any value. As a result, while the extraction of countries from Booking was trivial, in Tripadvisor a lot of abbreviations, different spellings for the same place, or even city names instead of countries were found. To solve this problem we implemented a semi-automatic tool which allowed us to cluster reviews under a chosen name. This step allowed us to study reviews according to their country of origin. A limitation of this approach is the fact that many reviewers, especially in Tripadvisor, did not specify their country of origin at all. For all those reviews which could not be definitely geographically located (6% of the total), we were able to automatically identify the language from the review text.

4 Results

Among the 22.064 reviews about the 77 Swiss hotels, Booking was the HRW which presented more reviews with respect to Tripadvisor (19,434 against 2,630) for the period between June 2009 and July 2010. The average of the users' evaluation per each hotel was compared between the two HRWs. Results show how the level of evaluation agreement between HRWs was significant (Table 3). Considering a threshold of 1 for the standard deviation (as the hotel evaluations on HRWs were from point 1 to 10 without half points), only 2.06% of the hotels did not show an evaluation agreement. Moreover, a threshold of 0.5 for the standard deviation confirmed an agreement on the evaluation for almost 80% of the hotels.

Table 3. Agreement on hotel evaluations between Tripadvisor and Booking.

	%hotels (SD>0.5)	%hotels (SD>1)
Agreement	79.03	97.04
Non-agreement	20.07	2.96

Each review, of the 22.064 chosen, was associated to a hotel evaluation, and it was possible to identify the country of origin of most of their authors. Results show that

69.7% of the hotel evaluations got a nationality attribution. 6% were attributed to "none" due to the fact that for those reviews no country of origin had been specified. 24% of the evaluations were grouped as "other" due to the fact that no country within this group reached the frequency of 2% (i.e. minimum threshold to be considerate relevant for the study). Therefore, only nations with greater than or equal to 2% of presence (n=10) were taken into consideration for the actual analysis: Switzerland (24%), France (8%), Italy (7%), UK (7%), Germany (6%), USA (5%), Netherlands (5%), Spain (4%), Russia (2%), and Belgium (2%), represented the main audiences around Swiss hotels on HRWs.

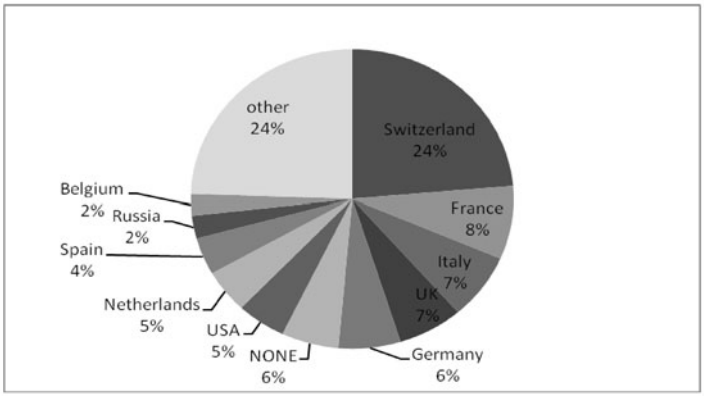

Fig. 2. Review nationalities for the Swiss hotels case study.

The standard deviation among evaluations per hotel and country of origin were calculated. Then, the average of the standard deviations obtained for each hotel was compared with the ones obtained within each country. Results show how countries of origin were coherent on their evaluation, with no differences for UK and USA (Standard deviation is 1.45).

Table 4. Hotels evaluation coherence within each country of origin.

Countries of Origin	Switzer	France	Italy	UK	German	USA	Netherlar	Spain	Russia	Belgium
STDEV(s) Average	1.30	1.24	1.32	1.45	1.28	1.45	1.05	1.31	0.92	1.00

To investigate if being part of a country is predictive of an higher or lower hotel evaluation, we took into account the proportional difference of each country evaluation, based on the number of reviewers per each hotel.

Table 5. Proportional difference according to the country of origin.

Countries of Origin	Switzer	France	Italy	UK	German	USA	Netherlar	Spain	Russia	Belgium
% proportional difference	0.62%	1.15%	-1.73%	0.70%	-1.98%	3.00%	-1.17%	-1.91%	1.46%	-0.09%

Findings show that the proportional difference was lower mainly for Germany, Spain, Italy, and Netherland; these results allow to consider these countries as the ones that least appreciate Swiss hotels. On the contrary, users from USA seem to appreciate

Swiss hotels more (with a percentage of 3%), followed by France, Russia and UK. Swiss users showed coherence with the overall hotels evaluations; it is important to note that Swiss reviewers represent the 24% of the audience in range.

Frequencies analysis showed that the analyzed evaluations were mainly around the mean (Figure 3), and only few of them differ significantly. These results allowed to consider further research on the hotels group sample in order to investigate which factors can cause this effect.

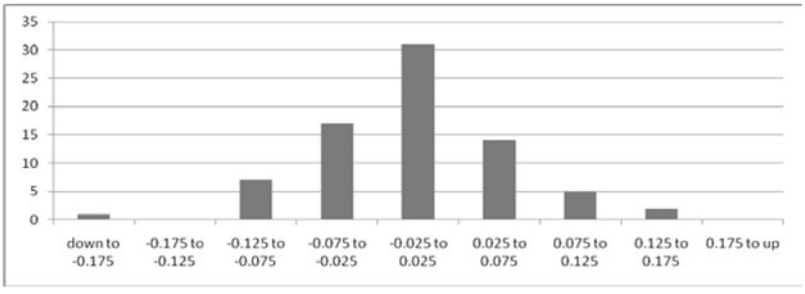

Fig. 3. Frequencies down to -0.175 and up to 0.175

One of the possible factors could be the number of hotels' stars. Thus a further analysis was conducted in order to assess possible statistical significance using the number of the hotels' stars to segment the sample. Findings show that the hotel evaluation coherence within each country of origin remains constant without any significant change with respect to the segmentation per stars hotels (Table 6).

Table 6. Hotels evaluation coherence within each country of origin per stars hotel

Countries of Origin	Switzer	France	Italy	UK	Germany	USA	Netherlan	Spain	Russia	Belgium
STDEV(s) Average - All	1.30	1.24	1.32	1.45	1.28	1.45	1.05	1.31	0.92	1.00
STDEV(s) Average 5*hotels	1.51	1.27	0.89	1.77	1.39	1.94	0.95	1.31	0.85	1.25
STDEV(s) Average 4*hotels	1.36	1.31	1.40	1.49	1.31	1.46	1.07	1.26	0.92	1.06
STDEV(s) Average 3*hotels	1.23	1.19	1.32	1.36	1.27	1.40	1.06	1.32	0.86	0.93
STDEV(s) Average 2*hotels	1.20	1.04	1.47	1.67	1.25	1.31	0.91	1.57	0.98	0.55

Moreover, the analysis of the proportional difference shows that 5 and 2 star hotels are the ones which present different tendencies. This could be partially explained by the fact that among 77 hotels only 4 belong to the 5 star category and 3 to the 2 star. As an example it is possible to consider the Swiss HRW users (Table 7 column 1) which showed coherence within the overall hotel evaluations mainly for 3 and 4 star hotels. Less appreciation is shown for 5 and 2 star hotels.

Table 7. Proportional difference according to the country of origin per stars hotel

Countries of Origin	Switzer	France	Italy	UK	Germany	USA	Netherlan	Spain	Russia	Belgium
% proportional difference ALL	0.62%	1.15%	-1.73%	0.70%	-1.98%	3.00%	-1.17%	-1.91%	1.46%	-0.09%
% proportional difference 5*hotels	-2.32%	9.28%	7.63%	-3.91%	-14.12%	-1.75%	2.60%	2.62%	10.56%	-7.30%
% proportional difference 4*hotels	0.11%	-0.97%	-2.19%	0.76%	-0.05%	3.23%	-0.04%	-1.79%	-0.60%	1.49%
% proportional difference 3*hotels	0.98%	1.99%	-2.13%	1.31%	-2.48%	3.18%	-2.46%	-1.76%	3.05%	-1.38%
% proportional difference 2*hotels	3.83%	4.31%	-3.36%	-2.93%	-2.57%	5.11%	-3.69%	-7.34%	0.86%	8.68%

5 Discussions and Conclusions

Technical instruments and statistical comparisons were applied to the analysis of the level of evaluation agreement about Swiss hotels (n=77) within HRWs. Tripadvisor and Booking seem to be similar on their hotel evaluations, and this result confirms the trend identified by Schegg and Fux (2010) between Tripadvisor and HolidayCheck.

Alternatively, it has been showed that users belonging to the same country of origin tend to be coherent with their hotel evaluation. Moreover, the analysis of the proportional difference highlighted which are the nationality groups (i.e. from the ten analyzed countries of origin) that are more likely to appreciate Swiss hotels. European countries (such as Germany, Spain, Italy, and Netherland) seemed to less appreciate Swiss hotels; in contrast with users from USA seem to appreciate more (with a percentage of 3%). 3 and 4 star hotels, which are the majority of the sample (n=70) indicate that nationality groupings are coherent in the evaluation also with the introduction of different clustering rules. These results allow researchers to design further works in this direction.

One of the main limitations of this study is that it is related to a group of hotels from only one specific country (Switzerland); and the results allow us to hypothesize some future works: (i) to test our approach using hotels from other countries, and extend the number of HRWs, in order to evaluate the coherence among systems and the influence of countries of origin; (ii) to group the hotels according to their actual star quality in order to investigate further type of coherence; (iii) to compare the results with the sentiment expressed on the reviews in order to understand which kind of factors are more likely to predict the single evaluation within a nationality. Therefore, the implication for future research could be on the prediction of evaluation from specific countries of origin. A complementary integration with the analysis of the online reputation (stakeholders opinions expressed online particularly on user-generated contents), can increase the awareness of the hotels presence online, and suggest actions to better communicate with prospective consumers.

Nevertheless, in line with the related work of Schegg and Fux (2010), a proactive use of customer evaluation presented on HRWs is an opportunity, particularly in the area of customer relationship management (CRM). The technical solutions presented in this study about data collection and analysis can finally contribute to methods for Internet-based data acquisition, and for the creation of value from online unstructured data.

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Automatic Compilation of an Online Travel Portal from Automatically Extracted Travel Blog Entries

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Abstract

For travelers who plan to visit a particular tourist spot, information about it is required. In this paper, we propose a method for extracting and organizing appropriate information from weblogs (blogs). Recently, increased numbers of travelers have been writing of their travel experiences via blogs. We call these travel blog entries, and they contain much useful travel information. For example, some bloggers introduce useful web sites for a tourist spot, while others report on transportation between tourist spots. Here, we extract hyperlinks of web sites for tourist spots from travel blog entries and organize them via automatic classification. We also extract transportation information automatically from travel blog entries. To investigate the effectiveness of our method, we conducted experiments. For the extraction of transportation information, we obtained an 80.3% for Precision. For the classification of hyperlinks, we obtained a high Precision. Finally, we constructed a prototype system, which provides information about (1) transportation between tourist spots and (2) useful web sites for tourist spots.

Keywords: Blog; Information Extraction; Travel Information; Link Classification

1 Introduction

For travelers who plan to visit a particular tourist spot, information about the place is necessary. Travel guidebooks and portal sites provided by tour companies and governmental tourist boards are useful information sources about travel. However, it is costly and time-consuming to compile travel information for all tourist spots and to keep this data up to date manually. Therefore, we have studied the automatic compilation of an online travel portal, which provides useful web sites for travel, and transportation information.

For this compilation, we focused on travel blog entries, which are defined as travel journals written by bloggers in diary form. Travel blog entries are considered a useful information source for obtaining travel information, because many bloggers' travel experiences are written in this form. For example, some bloggers introduce useful web sites for a tourist spot, while others report on transportation between tourist spots. Nanba *et al*. (2009) identified travel blog entries in a blog database, then extracted pairs comprising a location name and a local product from these entries. In this paper, we propose a method that extracts transportation information from travel blog entries, which are identified automatically by Nanba's method. From these entries, we also

extract the hyperlinks by which bloggers describe useful web sites for a tourist spot, and thereby construct collections of hyperlinks for a tourist spot.

The remainder of this paper is organized as follows. Section 2 shows the system behavior in terms of snapshots. Section 3 discusses related work. Section 4 describes our methods. To investigate the effectiveness of our methods, we conducted some experiments, and Section 5 reports the experimental results. We present some conclusions in Section 6.

2 System Behavior

In this section, we describe our prototype system, which provides information about (1) transportation between tourist spots and (2) useful web sites for tourist spots.These are the steps in the search procedure.

(Step 1) Input the location name for a tourist spot, such as "Hiroshima", in the search form (shown as ① in Figure 1).

(Step 2) Click the "search" button (shown as ②) to generate a list of transportation options, such as "Hiroshima → Osaka" and "Hiroshima → Tokyo", for the location name.

(Step 3) Click the "link" button (shown as ③) to generate a list of URLs for web sites related to the location together with automatically identified link types and the context of citations (we call them "citing areas"), by which the authors of travel blog entries describe the sites. Figure 2 shows a list of links related to "Osaka".

3 Related Work

In this section, we describe some related studies on geographic information retrieval, extraction of transportation information, and link classification.

- **Geographic Information Retrieval**

GeoCLEF (http://ir.shef.ac.uk/geoclef/) is the cross-language geographic retrieval track run as part of the Cross Language Evaluation Forum (CLEF), and it has been operating since 2005 (Gey *et al.*, 2005). The goal of this task is to retrieve news articles relevant to particular aspects of geographic information, such as "wine regions around the rivers in Europe". In our work, we focus on travel blog entries rather than news articles, because bloggers' travel experiences tend to be written as travel blog entries.

Fig. 1. The travel information search system

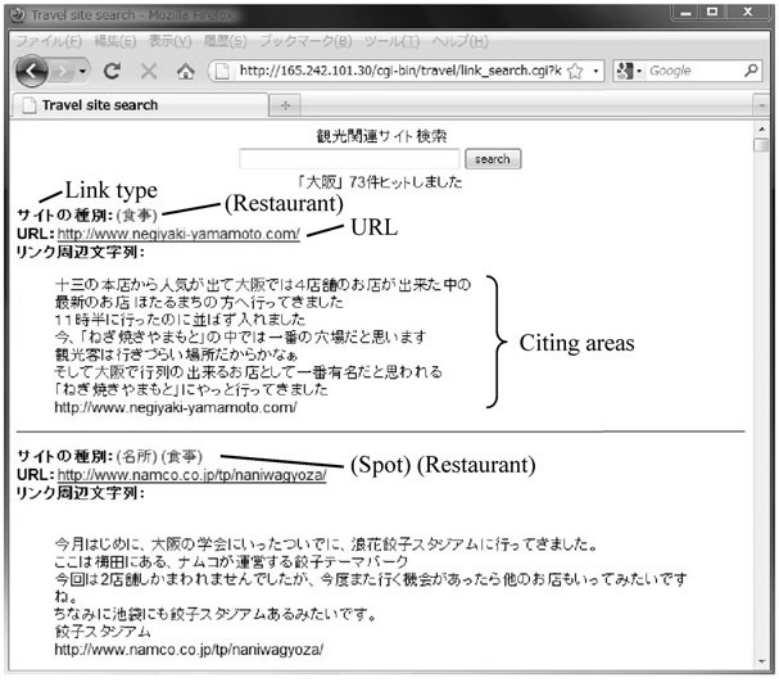

Fig. 2. A list of web sites for a travel spot.

- **Extraction of Transportation Information**

Davidov (Davidov, 2009) presented an algorithm framework that enables automated acquisition of map-link information from the Web, based on surface patterns such as "from X to Y". Given a set of locations as initial seeds, they retrieved from the Web an extended set of locations, and produced a map-link network that connects these locations using transport-type edges. In this paper, we propose a method for extraction of transportation information via machine-learning techniques.

- **Link Classification**

There have been several reports on research that automatically classifies links in blog entries (Kale *et al.*, 2007; Martineau & Hurst, 2008). Kale devised a method that classifies links in blog entries as positive or negative, using manually created rules (Kale *et al.*, 2007). Alternatively, Martineau proposed a machine-learning approach for link classification from several viewpoints using words that appear in the context of citations of URLs as features. In our work, we classify links into four categories of travel, which we will describe in Section 4.2.3, using a machine-learning technique.

4 Automatic Compilation of an Online Travel Portal

The task of compiling travel information is divided into three steps: (1) identification of travel blogs, (2) extraction of transportation information, and (3) classification of links in travel blog entries. For Step 1, we use Nanba's method (Nanba *et al.*, 2009). Steps 2 and 3 are explained in Sections 4.1 and 4.2.

4.1 Extraction of Transportation Information

We use information extraction based on machine learning to extract information, such as "a departure place", "a destination", or "a transportation device", from travel blog entries. First, we define the tags used in our examination.

- **FROM** tag includes a departure place.
- **TO** tag includes a destination.
- **VIA** tag includes a route.
- **METHOD** tag includes a transportation device.
- **TIME** tag includes the time for transportation.

This is a tagged example.

[original]
<FROM>広島</FROM>から<TO>大阪</TO>まで<TIME>5 時間</TIME>かけて、
<METHOD>バス</METHOD>で行った。
[translation]
It took <TIME>five hours</TIME> from <FROM>Hiroshima</FROM>
to<TO>Osaka</TO> by <METHOD>bus</METHOD>.

We formulate the identification of the class of each word in a given sentence and solve it using machine learning. For the machine-learning method, we opted the Conditional Random Fields (CRF) method (Lafferty, McCallum, & Pereira, 2001), whose empirical success has been reported recently in the field of natural language processing. The CRF-based method identifies the class of each entry. Features and tags are used in the CRF method as follows: (1) k tags occur before a target entry, (2) k features occur before a target entry, and (3) k features follow a target entry. We used the value k = 4, which was determined via a pilot study. We use the following 15 features for machine learning. A sequence of nouns (a noun phrase) was treated as a noun. We used MeCab (http://mecab.sourceforge.net/) as a Japanese morphological analysis tool to identify the part of speech.

- A word.
- Its part of speech.
- Whether the word is a quotation mark.
- Whether the word is a cue phrase, detail as follows.

Tag	Cue phase	The number of cues
FROM	Whether the word is a cue that often appears immediately after the “FROM” tag, such as “から” (from) or “を出発” (left).	40
FROM TO	Whether the word is frequently used in the name of a tourist spot, such as “博物館” (museum) or “遊園地” (amusement park).	45
	Whether the word is frequently used in the name of a destination, such as “観光” (sightseeing tour) or “駅” (station).	11
	Whether the word is the name of a tourist spot.	13,779
	Whether the word is the name of a station or airport.	9437
TO	Whether the word is a cue that often appears immediately after the “TO” tag, such as “まで” (to) or “に到着” (arrival).	271
VIA	Whether the word is a cue that often appears immediately after the “via” tag, such as “経由” (via) or “通って” (through).	43
	Whether the word is the name of a highway.	101
METHOD	Whether the word is the name of a transportation device, such as “飛行機” (airplane) or “自動車” (car).	148
	Whether the word is the name of a vehicle.	128
	Whether the word is the name of a train or bus.	2033
TIME	Whether the word is an expression related to time, such as “分” (minute) or “時間” (hour).	77

4.2 Link Classification

The procedure for classifying links in travel blog entries is as follows.

1. Input a travel blog entry.
2. Extract a hyperlink and any surrounding sentences that mention the link (a citing area).
3. Classify the link by taking account of the information in the citing area.

In the following, we will explain Steps 2 and 3.

Extraction of citing areas

We manually created rules for the automatic extraction of citing areas. These rules use cue phrases. When authors of travel blog entries introduce web sites, quotation marks or brackets are often used immediately before and after the title of the site. The authors also use particular words, such as “紹介” (introduction), “公式サイト” (official site), or “の HP” (web page of), or particular marks, such as quotation marks or brackets. Therefore, we manually selected 26 cues and used them for citing area extraction using the following rules.

1. Extract a sentence that includes the link.
2. Extract *X* sentences that appear before or after a web hyperlink, and add them to the candidate. Here, we used the value of $X = 2$, which was determined via a pilot study.
3. Extract keywords from the candidate area in Step2 using the following rules (a) and (b), if the area includes cues.
   (a) Extract character strings within quotation marks or brackets as keywords.
   (b) Extract character strings just before or after particular cues, such as “の HP” (web page of).
4. Extract all sentences including the keywords in the blog entry and the sentences extracted in Step 2 as a citing area.

We explain these rules using the following travel blog entry.

[original]
1 チェックアウト後、いつものようにパパ&ママの寄り道が始まります!!
2 ということで、まずは河津の【バガテル公園】に行ってきました☆
3 四季の蔵から、車で数分圏内にあります。
4 ワンコもお散歩 OK なので、犬連れには嬉しい場所です
5 **メッチャ 綺麗でしたよ～♪**
6 ※バガテル公園の HP は、こちら→
7 http://www.bagatelle.co.jp/index.html
8 ↑いうまでもなく、美しいバラの数々(写真)
9 四季の蔵の朝ごはんがボリューム満点だから、これくらいで充分です!!
10 初めて来たバガテル公園ですが、ワンコ OK だし、
11 季節によってはお花が綺麗なのでいいかも～♪
12 ランチメニューも充実しているし、また今度も来ようっと(ノ▽≦*)キャハッッッ♪

[translation]
1 Dad and Mom started to take a side trip after the checkout!!
2 Firstly, we visited “Bagatelle Park” in Kawazu☆
3 It took a couple of minutes from Shikinokura by car.
4 In this park, we could take a stroll with dogs.
5 Very very beautiful♪
6 (*) Following is the web page of the Bagatelle Park
7 http://www.bagatelle.co.jp/index.html
8 ↑ Beautiful roses (pictures).

9	As we had a big breakfast in Shikinokura, the lunch in this park is enough!!
10	We visited the Bagatelle Park for the first time, and we could take a stroll with our dog here.
11	And flowers are beautiful in high season ♪
12	The lunch menu is abundant. I hope to come again :-) ♪

In Step 1, we extract sentence 7, which includes a hyperlink as an initial candidate area. In Step 2, we also extract the two sentences that appear before and after the hyperlink (5, 6, 8, and 9) and add them to the candidate. In Step 3, we extract "バガテル公園" (Bagatelle Park), which appears just before a cue phrase "の HP" (web page of), as a keywords. In Step 4, we add sentences 2 and 10, both of which include the keyword "バガテル公園" (Bagatelle Park), to the candidate. Finally, we extract the sentences 2, 5, 6, 7, 8, 9, and 10 as a citing area.

Definition of link types

We classify link types into the following four categories.

- **S (Spot)**: Whether the information is about tourist spots.
- **H (Hotel)**: Whether the information is about accommodation.
- **R (Restaurant)**: Whether the information is about restaurants.
- **O (Other)**: Other than types S, H, and R.

It is possible to classify a hyperlink into more than one link type. For example, a hyperlink to "ラーメン博物館" (Chinese noodle museum, http://www.raumen.co.jp/home/) is classified into types S and R, because the visitors to this museum can learn the history of Chinese noodles in addition to eating Chinese noodles.

Method of link type classification

Here, we explain how to classify hyperlinks automatically. We employed a machine-learning technique using the following features. A sequence of nouns (a noun phrase) was treated as a noun.

- A word.
- Whether the word is a cue phrase, detailed as follows, where the numbers in brackets shown for each feature represent the number of cues.

Cues for type S

Cue phrase	The number of cues
A list of tourist spots, collected from Wikipedia.	17,371
Words frequently used in the name of tourist spots, such as "動物園" (zoo) or "博物館" (museum).	138
Words related to sightseeing, such as "見学" (sightseeing) or "散策" (stroll).	172
Other words.	131

Cues for type H

Cue phrase	The number of cues
Words that are frequently used in the name of hotels, such as “ホテル” (hotel) or “旅館” (Japanese inn).	9
Component words for accommodations, such as “フロント” (front desk) or “客室” (guest room).	29
Words that are frequently used when tourists stay in accommodation, such as “泊る” (stay) or “チェックイン” (check in).	14
Other words.	21

Cues for type H

Cue phrase	The number of cues
Dish names such as “omelet”, collected from Wikipedia.	2,779
Cooking styles such as “Italian cuisine”, collected from Wikipedia.	114
Words that are frequently used in the name of restaurants, such as “レストラン” (restaurant) or “食堂” (dining room).	21
Words that are used when taking meals, such as “食べる” (eat) or “おいしい” (delicious).	52
General words that indicate food, such as “ご飯” (rice) or “料理” (cooking).	31
Other words.	31

5 Experiments

In order to investigate the effectiveness of our methods, we conducted two experiments: (1) extraction of transportation information from travel blog entries, and (2) extraction and classification of hyperlinks. We report on these in Sections 5.1 and 5.2, respectively.

5.1 Extraction of Transportation Information

Data Sets and Experimental Settings

We randomly selected 10,000 sentences from 193 travel blog entries, and manually assigned tags to them, as described in Section 4.1. The number of manually assigned tags is shown in Table 1. We used CRF++ (http://www.chasen.org/~taku/software/CRF++) software as the machine-learning package. We used Recall and Precision as evaluation measures.

Table 1. Numbers of manually assigned tags in the extraction of transportation information

	Training	Test
FROM	136	30
TO	384	126
VIA	58	15
METHOD	245	55
TIME	87	27

Results and Discussion

The evaluation results are shown in Table 2. As shown in the table, we obtained a high Precision. Among these results, both the Recall and Precision of "VIA" were low, which is due to the low frequency of this tag in both training and test data (Training: 58, Test: 15).

Table 2. Evaluation results for the extraction of transportation information

	Recall (%)	Precision (%)
FROM	30.0	75.0
TO	45.2	75.0
VIA	33.3	55.6
METHOD	66.0	94.9
TIME	50.0	87.6
Total	46.8	80.3

There were two typical errors causing low Precision: (1) ambiguity of cues (69.6%) and (2) the traveler's desire (17.4%). We describe these errors as follows:

(1) Ambiguity of cues (69.6%)

In the following example, the "VIA" tag was assigned to "結局お昼" (noon, after all), because a cue for VIA "過ぎて" (past) appears immediately before it. However, the "VIA" tag should not have been assigned in this case.

VIA	**[original]** **(Correct)** 結局お昼を過ぎても動かなかった。 **(Analysis result)** <VIA>結局お昼</VIA>を過ぎても動かなかった。 **[translation]** **(Correct)** I did not move though it was past noon, after all. **(Analysis result)** I did not move though it was past <VIA>noon, after all</VIA>.

(2) The traveler's desire (17.4%)

In the following example, the "METHOD" tag was mistakenly assigned to "Shinkansen bullet train", which the visitor did not actually use. This was because the "METHOD" cue "で帰る" (return by) appears immediately before it.

METHOD	**[original]** **(Correct)** 新幹線で帰るのがベターだったのですが、ちょっとは旅気分を味わいたいということで、別ルートで。 **(Analysis result)** <METHOD>新幹線</METHOD>で帰るのがベターだったのですが、ちょっとは旅気分を味わいたいということで、別ルートで。 **[translation]** **(Correct)** It was better to return by Shinkansen bullet train, but I chose another route, because I wanted to draw out the journey. **(Analysis result)** It was better to return by <METHOD>Shinkansen bullet train</METHOD>, but I chose another route, because I wanted to draw out the journey.

We now discuss the low Recall of our method. There were two typical errors for low Recall: (1) the lack of contexts (59.1%) and (2) the lack of cues (17.3%). We describe these errors as follows.

(1) The lack of contexts (59.1%)

In the following example, the "TO" tag should be assigned to "寺田屋" (Teradaya), but our method did not assign any tags to this word because there were no cues in this short sentence. To solve this problem, we need to take account of a longer context. For example, the "TO" cue "来ました" (came), which appears in the previous sentence, would be necessary for solving the problem in this case. However, taking account of a longer context might result in lower Precision.

TO	**[original]** **(Correct)** いよいよ来ました！ 「<TO>寺田屋</TO>」 **(Analysis result)**いよいよ来ました！ 「寺田屋」 **[translation]** **(Correct)** Finally I arrived! "<TO>Teradaya</TO>" **(Analysis result)** Finally I arrived!! "Teradaya"

(2) The lack of cues (17.3%)

In the following example, the "FROM" tag was not assigned to "東京駅" (Tokyo station), because "に別れを告げる" (I say good-bye to) was not included in the "FROM" cues. To increase the number of cues, a statistical approach is required.

FROM	**[original]** **(Correct)** 駅弁買い込んで<FROM>東京駅</FROM>に別れを告げる。 **(Analysis result)** 駅弁買い込んで東京駅に別れを告げる。 **[translation]** **(Correct)** I bought a station lunch and said good-bye to <FROM>Tokyo Station</FROM>. **(Analysis result)** I bought a station lunch and said good-bye to Tokyo Station.

5.2 Extraction and Classification of Links

Data Sets and Experimental Settings

Among the 7,412 hyperlinks in 17,266 travel blog entries, we removed 2,987, which link to Wikipedia and news sites. These sites are easily classified into type O by their URLs. We randomly selected 1,000 of the remaining 4,155 links, manually classified them, and used them for our examination. Table 3 shows the number of hyperlinks for each type. We performed a four-fold cross-validation test. We used TinySVM (http://chasen.org/~taku/software/TinySVM/) software as the machine-learning package and used Recall and Precision as evaluation measures.

Table 3. The number of hyperlinks for each type

Link types	S	H	R	O
the number of links	353	98	343	250

Alternatives

To investigate the effectiveness of our method, we classified link types using the following two methods for citing area classification.

- Our method: Extract sentences by manually created rules, as described in Section 4.2.1.
- Baseline method: Extract the *X* sentences before and after the link.

Results and Discussion

We used a value of $X = 2$, which was determined via a pilot study, for the baseline method. The evaluation results are shown in Table 4, where our method generally shows improved Recall and Precision in comparison with the baseline method. In particular, the Recall and Precision for link type S were significantly improved.

Table 4. Evaluation results for link classification

Link Type	Baseline Method		Our Method	
	Recall (%)	Precision (%)	Recall (%)	Precision (%)
S	54.5	64.7	62.5	72.7
H	63.3	79.8	64.9	81.3
R	72.3	76.0	71.9	76.7
O	59.2	42.2	71.6	48.6

There were two typical errors in link classification: (1) the lack of cues and (2) ambiguity in cue phrases. We describe these errors as follows.

(1) Lack of cues

For the machine learning, we used manually selected cues, as described in Section 4.2.3. To improve the coverage of cues, a statistical approach, such as applying n-gram statistics to a larger blog corpus, will be required.

(2) Ambiguity in cue phrases

We used “visit” (訪れた) as an S cue. However, “visit” (訪れた) is also frequently used when a visitor eats in a restaurant, as in “食事を取るためレストランを訪れた” (I visited the restaurant for taking a meal). Therefore, our method has misclassified a link type R as a link type S.

6 Conclusion

In this paper, we have proposed two methods: (1) extraction of transportation information from travel blog entries, and (2) extraction and classification of hyperlinks in the travel blog entries. From our experimental results, we have confirmed the effectiveness of our methods. Finally, we have constructed a system that can search for a destination to which the user can travel from the present location and that can provide links about the destination.

In this paper, we focused on travel blog entries written in Japanese. In our future work, we will translate cue phrases from Japanese into other languages, and apply our method into blog entries written in various languages.

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When tourists give their reasons on the web: The argumentative significance of tourism related UGC

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Abstract

This paper proposes an innovative approach to the study of UGC based on the theory of argumentation, an ancient discipline which, since the half of last century, is receiving an increasing attention from a wide number of subject areas. A pilot study is presented where an argumentative analysis of UGC related to a specific destination – Lugano – has been conducted, with the aim of finding out the reasons why a tourism experience becomes worth to be communicated. In particular, the argumentative analysis allowed to highlight the touristic value of the destination, which decisively influences its reputation and can be exploited, therefore, for its better promotion on the market.

Keywords: UGC; argumentation; destination promotion; reasoning; destination reputation.

1 Introduction

Tourism is an experience which needs to be communicated. In fact, be it wonderful or terrible, a travel experience is usually shared talking with others. Someone who is just come back from a journey gladly tells his adventures, discusses them and compares them with previous ones. Since the tale of a journey is the tale of a life experience, it has a witness value and, thus, it is trustworthy. It is, indeed, an emotional kind of witness, where objective facts are intertwined with judgments and personal comments, which work as implicit or explicit advice for the person one is talking to. The process of tourism organization and consumption is constituted by a series of *deliberative acts*, directed towards the goal of shaping a personal unique travel experience. Judgments and comments given by fellow tourists can be considered, therefore, arguments for going or not going somewhere and for doing or not doing something there. The tale of a journey has, actually, a high argumentative value. The fact that tourism is an experience worth to be communicated may reasonably be the main reason why travel reviews today flourish on the Internet. A number of studies confirm the growing importance of social media in the online tourism domain, especially for travel planning (Xiang & Gretzel, 2009; Gretzel, 2006; Pan, MacLaurin & Crotts, 2007). Travel reviews, posts in travel *fora* and, widely, contents published and enjoyed online by tourists on social networks are known as User Generated

Contents (UGC), and can equate electronic word-of-mouth. UGC work as a sort of incubator for the reputation of a destination. They are, in fact, written reports of people's tales about their travel experience and if, from one side, they can be used to verify the actual reputation of a destination, from the other side they contribute fixing such a reputation. The ancients said that *verba volant, scripta manent*. Lugano, for instance, shares the reputation of a small city with all the facilities of a big one, laid in a pleasant environment with a beautiful lake landscape; in travel reviews and fora it is, in fact, frequently described as a 'gem', a 'Paradise on Earth' or a 'postcard'.

The study of UGC may provide important results about travelers' expectations, needs and interests. All these aspects are worth to be taken into account for the design of information systems to better support travel planning, and for developing effective strategies for online tourism marketing. Most of the studies on tourism-related UGC adopt a quantitative approach, focusing, for instance, on the ranking obtained by specific destinations on social media websites (Dowling, 2008), or on the frequency of keywords and their relationship (Pan, MacLaurin & Crotts, 2007). Nevertheless, they seldom involve any analysis of UGC content itself. Inversini *et al*., (2010) developed a model called DORM (Destination Online Reputation Model), with the specific aim of classifying the content of online dialogues around a destination, and to measure its reputation. DORM relies on twenty two drivers categorized into seven core dimensions to differentiate among types of content and assign to each content a positive or negative value, according to the main orientation of the judgments expressed in the text. DORM allows to make sense out of a huge amount of UGC related to a destination, but it allows no distinction among the different judgments retrieved; thus, it leaves out the very *reasons* why a tourist enjoyed or not his experience at a specific place.

More in general, using a quantitative approach to UGC does not tell us the whole story about how users read their fellow travellers' comments. Intuitively, it is clear that it makes a difference whether a tourist suggests a destination for a short visit or for a longer-term holiday; for a family trip, a honeymoon or a study stay. Thus, it is not sufficient to look at whether a certain destination is more often positively or negatively reported, but it is worth investigating what is precisely said about it. Since prospective tourists must deliberate about their journey (both in terms of place to go and things to do), they are primarily interested in the reasons why it is or it is not worthwhile to visit a certain destination. Having access to these reasons and being able to study them carries a lot of implications at the practical level. As a prime factor, it means understanding which features of a certain destination are appreciated by tourists themselves, and why; then, on this basis, it means to improve the destination promotion. The paper proposes a theoretical and methodological approach to accomplish such a task.

2 Research approach

How is it possible from the methodological point of view to identify and analyse the reasons given by tourists to recommend a certain destination? An approach is needed

that enables to analyse these reasons, after having extrapolated them from UGC. The authors maintain that such an approach can be found in *argumentation theory* (van Eemeren and Grootendorst, 2004; Rigotti & Greco Morasso, 2009). In order to understand how an argumentative analysis could enhance the understanding of UGC, it is worth introducing some of the aspects of argumentation that are most relevant to tourism. More details about the theories adopted will be given, when needed, during the presentation of the analyses.

First, argumentation is the study of the attempt made by a subject to reasonably persuade an audience of his/her position (*standpoint*) on some subject-matter. A direct consequence of this commitment to reasonableness (Rigotti & Greco Morasso, 2009) is that arguers make an appeal to their readers' capability of making reasonable decisions, weighting arguments and considering their strength. They do not just want to win their cause; they want to do it in a motivated fashion. In UGC, often tourists do not simply put forward a standpoint ("Go to Lugano!"); they support it with reasons (arguments), sometimes producing very articulated and well-refined texts. Analysing argumentation, thus, means identifying the *standpoint* that an arguer has put forward and the arguments that support it, including the relations between these arguments and the overall *structure* of the argumentation. Tourists' recommendations in UGC can be understood as standpoints; the argumentative analysis not only helps identify these recommendations, but it connects them to the arguments by which they are supported.

At a more fine level, doing an argumentative analysis means making the internal *inferential configuration* of each single argument explicit: i.e. understanding on which logical-inferential pattern it relies and which premises it is founded upon. This level of micro-analysis, based on a combination of tools from logic, linguistic pragmatics and rhetoric, is necessary to evaluate the strength of the arguments themselves: i.e. to understand whether or not they conclusively support the standpoint that has been put forward. Evaluating arguments is the art of understanding which strong and weak points a certain message has.

The theoretical orientation adopted is situated in the broader framework of the pragma-dialectical theory of argumentation (van Eemeren & Grootendorst, 2004) in its extended version (van Eemeren & Houtlosser, 2009). It offers the theoretical and methodological tools to identify standpoints and arguments and reconstruct the argumentative structure of a text through an *analytical reconstruction* (see section 4). Concerning the analysis of the inferential configuration of arguments, *Argumentum Model of Topics* (Rigotti, 2006; Rigotti & Greco Morasso, 2009, 2010, see section 4.3) will be adopted. Amongst the advantage of this model, a determinant one is that it not only accounts for the formal, logical structure of arguments, but it also offers a methodological tool to identify the common knowledge, beliefs, values and preferences – more synthetically, the cultural or contextual premises – on which these arguments are constructed. Underlying each argument, in fact, there are cultural premises that are not necessarily shared by the whole set of potential visitors of a certain destination, but which tell us a lot about the drives that can bring specific sets of tourists to a certain destination. Let us quote a simple example. If you ask to a scuba diver club, they will probably tell you that the Adriatic Sea is the less attractive

destination in Italy. A grandmother, instead, might say that it is the best place to bring children because it is not dangerous: even if they jump into the water, they cannot sink because the sea level is low. This example shows that the same morphological aspect can become an advantage when paired with the right contextual premises ("the best sea is the less dangerous one"). The premises identified with the help of the model, may then be confronted against the different targets of tourists that may visit a certain TD, and the hold of these premises on these targets may be evaluated.

3 Collection of data

The following sections present the steps and findings of a research conducted on a *corpus* of UGC about a destination, which applied an argumentative approach. Lugano has been chosen as destination of attention, due to its limited dimensions and because it is or it has been the authors' place of work. Lugano is, in fact, a small city in the Southern part of Switzerland, which counts about 30,000 inhabitants, but has all the services and facilities of a big city. It is the biggest touristic destination in Ticino – the Italian-speaking canton of Switzerland; business and academic tourism has developed in the last few years also thanks to the congress centre and the University.

UGC about Lugano have been collected on some of the most common Web 2.0 websites for tourism, including texts in English and Italian. Only UGC containing comments or reviews about the destination were considered, and all those commenting or reviewing services or attractions, like hotels, transports, cultural events were ignored. Texts were then filtered a second time to sort out only argumentatively relevant ones. The corpus of analysis was made up of two kinds of texts: forum posts and reviews. They both are directed towards an unknown audience, and are at free disposal, so that one can see what have already been said, this way endorsing or rejecting others' arguments. While forum posts are usually short dialogical moves in an asynchronous discussion, reviews are longer monographic texts, where argumentation develops in an articulated fashion. Considered the organization process of a trip, if travel reviews support the first phase, that is the deliberation about the place to visit, travel fora are more useful to decide about specific aspects of the trip, by directly asking to the virtual community constituted by those who already visited the destination. The selection process, undergone in July 2010, resulted in a corpus of 82 texts: 47 posts in the Lugano Travel Forum of www.tripadvisor.com (out of over 1000 posts divided in 335 threads); 10 reviews from the Lugano Travel Guide of www.tripadvisor.com; 10 reviews from www.igougo.com; 2 reviews from www.dooyoo.com; 11 reviews from www.virtualtourist.com; 2 reviews from www.bootsnall.com.

4 Data analysis

4.1 Identification and classification of arguments

The corpus was firstly carefully read, looking for frequent occurrences of arguments supporting Lugano as a destination worth to be visited (standpoint). Arguments giving

negative feedbacks about the city were ignored, to focus on those ones that can provide direct support for the promotion of the destination. Three are the main types of argument supporting this standpoint which have been identified.

1) The *'nature' argument* focuses on the morphological aspects of Lugano, praising its location (often defined as a nestle in the foothills of the mountains), the scenic views of the Alps tumbling down to the lake, the small fishing villages around the city, the romantic and peaceful atmosphere.

2) The *'confidence' argument* exploits the stereotype according to which Switzerland is well-organized, punctual, efficient, respectful of the rules, clean, tidy: these aspects contribute to create a sense of confidence, since nothing dangerous or unexpected can happen if everything remains at its place. The predictability of the city makes it 'child friendly', that is, in its turn, an argument for families with children to visit Lugano.

3) The *'culture-mix' argument* states that Lugano is a combination of the best traits of the Italian and the Swiss culture. This argument seems to particularly strike Lugano visitors: it is frequently reported and extensively argued.

The *'nature' argument* occurs almost in every text, usually in addition to other arguments, to make the argumentation stronger. Since it is based on the morphological aspects of the destination, it may be taken as a first necessary move to convince about its touristic value. In fact, the appearance is the aspect of a destination which immediately draws the attention. If this aspect is not valuable – i.e. because the destination cannot naturally boast a beautiful location – then, to support its touristic value one should concentrate on other aspects, which should constitute a sufficient defense. Lugano is naturally set in a charming location, so that the 'nature' argument can be exploited, but it is not a sufficient argument, since a tourist may like to find more than just natural attractions. This argument, in fact, is used as a sufficient defense of the standpoint only when arguing for a selected audience, that are the 'nature lovers' or 'outdoorsy types'. There are no solitary occurrences, instead, of the *'confidence' argument* in the corpus. It is always put forward in combination with other arguments. Lugano's reputation of an efficient and well-organized place does not suffice to support its touristic value. The *'culture-mix' argument* opens in many cases the text, and it is proposed as a sufficient argument to support the standpoint, or it functions as the focus around which the text is developed.

Thus, the *'culture-mix' argument* has been selected for a deeper analysis. It has been considered in all its occurrences, the most complex of them have been analyzed and compared, in order to likely reconstruct its inferential structure and its contextual and cultural premises, and to capture its persuasive power. For reasons of space, this paper is focused on a few examples taken from the corpus, some complementary analyses having been presented elsewhere (De Ascaniis, Cantoni & Tardini, 2010). However, it is important to say that the detailed analysis of the corpus has been functional to the selection of the examples analysed here. In fact, classifying all arguments in the above-described types has clarified that there is some amount of repetition in UGC and that the recommendations to go to Lugano fall into these three macro-types. Besides, as said, the culture-mix argument type has a higher number of occurrences

and it is more extensively elaborated; for this reason, the argumentative analysis in this paper is focused on it.

4.2 Reconstruction of arguments

The reconstruction of argumentative moves containing the 'culture-mix' argument followed the pragma-dialectical model of a *critical discussion*, particularly the studies of Snoeck-Henkemans (1997, 2001) concerning argumentation structure and indicators. The model functions as a guide to reconstruct the discussion, with the aim of producing an *analytical overview*[7] of all the components of a discourse or text that are pertinent to the resolution of a difference of opinion (van Eemeren & Grootendorst, 2004). The analytical reconstruction applies to everyday conversations as well as to formal discussions, and to any other type of written or oral text which is, to some extent, argumentative in nature. Twenty one occurrences of the 'culture-mix' argument have been counted in the corpus. Each time this type of argument appears with some degree of variance at the level of length, detail and expressive means used, depending on each author's choices. However, the basic pattern is always the same: Lugano is recommended as the combination of the best of Switzerland and Italy. Here, two cases are discussed, in which the culture-mix pattern is particularly evident and originally developed. The aim is to show how the method helps to clearly define the meaning, the function and the structure of an argument.

Example (1) (from http://www.bootsnall.com; "Lounging in Lugano", Aug 23, 2006):

Lugano, the pride of Southern Switzerland, conjures up images of beautiful scenery and delightful Mediterranean weather. I was holidaying in Switzerland last May with my family and had decided to spend a few days at this distinctly Italian flavored resort in the Ticino region. I had heard that Lugano enjoyed the best of Italian and Swiss culture – the vibrant charm of the Italians and the order and punctuality of the Swiss. I was soon to discover more than just that. (…) I had found this beautiful city to be a laid-back and cheerful place, with warm locals, their easy-going attitude, superb cuisine and great scenery – not to mention eyeing the handsome Lugano men; even middle aged guys are quite dashing, from the cab driver, to the carpenter, to the housekeeping guy – all with a smile on their faces and trying their best to help you. The Lugano ladies must have been beautiful too, but for that you will have to ask my husband! Mamma Mia, lovely Lugano, we promise to come back again!

The argumentation put forward in the review can be reconstructed as shown in Figure 1. The author is very enthusiastic of her experience, and gives a list of reasons why Lugano can be considered the "pride of Southern Switzerland" and, therefore, one may add, deserves a visit. The standpoint may be re-formulated in a more functional fashion: "Lugano is worth a short visit". Why? The author says that she was persuaded to visit the town by others' tales reporting its peculiar cultural mix (i.e. by

[7] Van Eemeren and Grootendorst distinguish four *reconstruction transformations* to carry out an analytical overview. The transformations aim at rearranging the discussion so to reveal the route that has been followed in attempting to resolve the difference of opinion. In the case of *deletion*, irrelevant parts of the discourse are removed, while in the case of *addition*, implicit relevant parts are added; with *substitution*, ambiguous formulation are replaced with clearer ones; finally, *permutation* is applied when a rearrangement of some parts of the text is necessary to highlight their relevance for the resolution process.

Word-of-Mouth!), which works, therefore, as the main argument supporting the standpoint. The fact that this argument is reported from another source is an indirect indication of its persuasive power. Nonetheless, the author wants to add further evidence for the standpoint, since she puts the sufficiency of the first proposed argument into question ("I was soon to discover more than just that"). For her, Lugano is the pride of Southern Switzerland also for a number of other reasons, that are mentioned further on in the review. This is a case of *coordinatively compound cumulative argumentation*: it is 'compound' because the arguer advances a series of arguments to convince the listener of the acceptability of her standpoint; it is 'coordinative' because the chain of arguments can provide sufficient support for the standpoint only if they are taken together (even if they individually support the standpoint directly); it is 'cumulative' because every new argument is added to strengthen the standpoint by providing more evidence (Snoek- Henkemans, 1997). At a closer glance, the arguments listed after the 'culture-mix' one, are nothing else than typical aspects of Italian culture: a laid-back and cheerful place, where locals have a warm and easy-going attitude, cuisine is superb. Thus, they can be considered reinforcement of the "Italian component" of the 'culture-mix' argument.

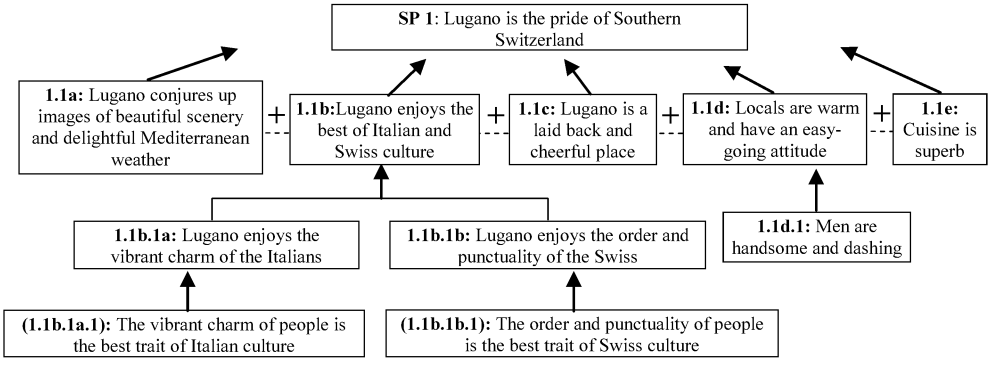

Fig. 1. Argumentation structure of example (1).

Example (2) (from www.dooyoo.com; "Italian Swiss-style", Aug 14, 2000):

I only went to Lugano for a day but that was probably enough to see most of the 'sights' such as they are. It is on Lake Lugano (surprisingly!), in the foothills of the Alps in the Italian-speaking canton of Ticino. It was a very clean and beautiful city and it seems to be well-kept. (…) It seemed as if it would be a lovely place to spend a few days although not terribly lively. It is a little part of Italy, with the organization and efficiency of Switzerland. An odd, but somehow charming combination. (…) For a quiet holiday, it was very charming and picturesque and the surrounding countryside is absolutely exquisite.

The argumentation can be reconstructed as follows (rather than a diagram, it is now presented a hierarchical representation):

SP – Lugano is a lovely place to spend a few days.
- **1.1a** – Lugano is very clean, beautiful and well-kept.
- **1.1b** – The fact that Lugano is not terribly lively does not impact its touristic value.
- **1.1c** – It is an odd, but somehow charming combination of Italy and Switzerland.
  - **1.1c.1a** – (It is a little part of Italy =) Lugano shares the typical features of an Italian city.

> **1.1c.1b** – (with the organization and efficiency of Switzerland =) The organization and efficiency of Lugano are typical of Switzerland.

The example above was selected because it reports a contrasting opinion about Lugano, whose analysis helps, nevertheless, to highlight the key function of the 'culture-mix' argument for the positive reputation of Lugano. Together with supporting arguments (1.1a and 1.1c), the author puts forward a counter-argument, according to which Lugano is not a lively place. However, the structure of the argument suggests that, even if this is true, it may be regarded as insufficient for attacking the touristic value of the destination which relies, instead, in its "odd, but somehow charming combination". The author acknowledges that the combination of Swiss and Italian features gives Lugano a special charm, which is more attractive than its unquestionable aesthetic beauties and also overshadows the lack of liveliness. The arguer knows well that Lugano is in Switzerland (he previously gave a precise geographical localization), but describes it as "a little part of Italy" having some Swiss features, that are organization and efficiency. It is thus likely to interpret the "combination" as an *inseparable integration* of cultural traits: Lugano is Italy (it does not look like Italy!), unless for the efficiency and the organization, that are truly Swiss (and, one may add, are not Italian!).

This interpretation of the 'culture-mix' argument is supported by a number of other examples found in the corpus, among which:

(3)"The combination of two sets of national traits is probably the single most appealing thing about the place." (from www.igougo.com, "Lugano - The home of la dolce vita, Swiss style", Nov 6, 2003)

(4)"Trust me when I say that the Ticino, Switzerland's only Italian-speaking canton, is where the country comes alive. It's Italian lifestyle with Swiss efficiency: the best of both worlds." (from www.dooyoo.com; "Lugano - The home of la dolce vita, Swiss style", May 27, 2009)

In (3), the author explicitly identifies in the combination of different cultural traits the aspect of Lugano which exceeds expectations. In (4), the two cumulative arguments ("Lugano has the Italian lifestyle" and "Lugano has the Swiss efficiency") are linked by the indicator "with", which makes think of a new unique entity, not simply defined by the sum of its parts. The exhortation "trust me", moreover, not only functions as a reinforcement of the argument, but also points out its relevance: the combination of two worlds is the very value of Lugano. The argumentative analysis allows understanding that the different arguments put forward in UGC are not simply juxtaposed. Examples (1) and (2) show that the 'culture-mix' argument is even more important than the 'nature' one, because it characterizes Lugano more decisively.

4.3 The inferential configuration of arguments: analysis and evaluation

In the last step of the analysis, the internal *inferential configuration* (see section 2) of the 'culture-mix' argument will be considered. The aim is to verify how this argument supports the standpoint that Lugano is worth a short visit and what its strong and weak points are. Different variants of this argument have been advanced; here, its core formulation is analysed, which could be expressed as "Lugano is particularly worth a short visit, because it combines the value of Italy and Switzerland". The *Argumentum Model of Topics* is used to investigate in detail how this argument is

internally structured. Figure 2 is a graphical representation of the inferential configuration of this argument:

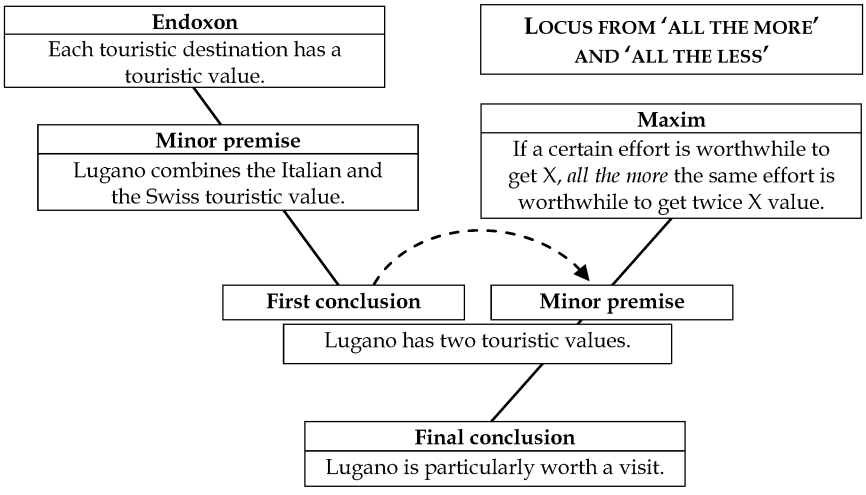

Fig.2. Synergic representation of the 'culture-mix' argument.

This type of representation presents a Y-like structure, constituted by the intertwining of two reasoning lines. The right-hand line (Maxim-Minor premise – Final conclusion) represents the logical pattern that underpins this type of argument; because of its logic-oriented, procedural nature it is called the *procedural* component (Rigotti and Greco Morasso 2010). The left-hand component (Endoxon – Minor premise – First conclusion) derives from the anchoring of the argument in the cultural and factual premises supplied by tourists who have visited Lugano; its culture-dependent and context-dependent nature justifies the term *material* component (ibid.). Let us specifically analyze these two components and their combination.

The procedural component represents, in abstract terms, the type of relation that occurs between the standpoint and the argument. The argument-standpoint relation is called *ontological relation*, as it mirrors a state of affairs in reality; in terms of the traditional approach to the study of arguments, this relation is named with the Latin term *locus*. A locus is, literally, the *place* from which actual arguments are drawn. In this case, the locus is based on an analogical relation, as the touristic value of Lugano is implicitly compared to the touristic value of another generic destination – it is a relation among similar alternatives. It is, more precisely, the *locus from 'all the more…' and 'all the less…'*, which instantiates a relation between premises and conclusion on the base of the probability or value of one of their factors. It is an *'all the more…'* principle that makes us reason that if a destination having a recognized touristic value is worth a visit, a destination combining *two* recognized touristic values is particularly worth a visit[8]. More specifically, in the example, the actual

[8] Rigotti & Greco Morasso (2009) classify the *loci* according to a taxonomy, which distinguishes among: *paradigmatic loci*, based on relations *in absentia* (of alternativeness),

inferential connection (called *maxim*) derived from the locus from 'all the more…' and 'all the less…', is the following: "If a certain effort is worthwhile to get X, *all the more* the same effort is worthwhile to get twice X value" (Fig. 2). This line of reasoning goes on saying that "Lugano has a double touristic value" and, thus, it "is particularly worth a short visit".

Now, while the maxim is an abstract principle whose validity could be judged independently from its field of application, the fact that Lugano has this double touristic value is a questionable statement. This is why, in the arguments, some further backing is usually provided. Such backing is represented by the *material component* of the argument, which shows the cultural premises, knowledge, values and experience that the tourists are evoking (Rigotti & Greco Morasso, 2010; see Fig. 2). This reasoning line is composed by an endoxon and a datum, which together support the conclusion. Aristotle introduced the term *endoxon* (plur. *endoxa*) to indicate those opinions that are largely shared in a certain segment of the community: "*Endoxa* are the remarkable opinions of a community, that is to say the propositions that are in the common opinion (the *doxa*) and, as a consequence, are generally accepted, reliable and credited within a community" (Tardini, 2005: 281). The community to which authors of travel reviews or travel forum posts refer to is the generic community of tourists, constituted by all those who intend to organize a trip or are simply keen on travelling. It is reasonable to argue that the *endoxon* here evoked is: "Each touristic destination has a touristic value." The idea behind such statement is that, whatever destination you choose, you are implicitly selecting some advantages and deciding to bear some disadvantages. You may for example enjoy a trip to Lapland to visit Santa Claus' homeland but, of course, you must be prepared to freeze. Simplifying the matter, one could say that each touristic destination has different positive and negative traits and, say, one "best feature" or "touristic value". Then this endoxon is associated with a datum: "Lugano combines the values of Italy and Switzerland" to conclude that Lugano has a double touristic value. As it appears in Fig. 2, this provisionary conclusion is the connection between the material and the procedural component of the argument, because it is used in both. Following this line of reasoning, if a destination like Lugano is able to combine two best features – the Swiss orderly society with the Italian warm attitude – then, it is twice worth a visit.

Having analyzed the inferential configuration of the culture-mix argument, the attention can now be turned to *evaluate* its *argumentative strength*. It is an advantage of the AMT that the Y-structure for argument analysis also offers a valuable basis for evaluation, because each node can become the source of *critical questions* (Guerra, 2008). In the case at issue, the most prominent aspect that is to be put under question is the idea of the *double touristic value* Lugano is argued to have. Does the concept of "touristic value" make sense? Is that always possible to identify a single value, independent from the type of tourism one is considering, the seasonal changes, and other factors? The key to answer these questions is to closely consider the type of

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both of opposition and of analogy; *syntagmatic loci*, based on relations *in praesentia* as for instance that between the whole and its constituent parts; *complex loci*, which are on the borderline between the previous ones.

standpoint that has been put forward in the majority of the UGC: here, Lugano is advertised as a destination for a short visit. If one thinks to this scenario, it is clear that he is trying to combine the most beautiful location possible with an easy-going organization, because the time one puts in the organization could not unreasonably exceed the time available to enjoy the touristic experience. Should one decide to live in Lugano permanently, or even to go for a longer holiday (for example, to study Italian), maybe other aspects could become prominent. For a short visit, what a tourist normally wants is to enjoy a beautiful place, relax and feel at ease, possibly without having technical or bureaucratic problems. This is why the combination of the Italian welcoming attitude and the Swiss efficiency sounds so attractive.

The *datum* highlights that the fact that the touristic value of Lugano is double is a direct consequence of tourists' experience. The strength of this datum relies on the reasonableness of trusting fellow tourists as reliable witnesses because they already visited a given destination; thus they are in the *position to know* (Walton, 1997) about it. Trusting fellow travellers as reliable witnesses seems to be the key to understand UGC in tourism. Like word-of-mouth recommendations, UGC are supposedly unbiased (differently from official reviews); moreover, an e-tourist normally has access to some different reviews; she can confront them and make a well-weighted decision. For this reason, it might be opportune also for official marketing agencies to know which arguments are put forward in UGC to re-orientate their strategies.

5 Conclusion

The choice of visiting a certain destination is the last step of a series of deliberative acts, which are influenced by the information collected about that destination and about competing ones. In this process, the tales of fellow tourists (UGC) play a decisive role as, together with tips and practical hints, they report the *reasons* why a destination should or should not be worth a visit, according to the author's experience. In this article, a qualitative approach to the analysis of tourism-related UGC has been presented, which is based on argumentation theory. The analysis of the reasons given by tourists is able to provide a number of valuable indications for DMO and for all those actors working on destination reputation. a) Thanks to the identification of the arguments put forward by tourists sharing similar profiles, classes of tourists may be built and marketing strategies may be tailored accordingly. The same argument, in fact, could be more or less relevant, or congruous, depending on the type of tourist one encounters. It is important, in this respect, to analyze not only the arguments that support a certain standpoint but what exactly is said in the standpoint. b) Argumentation analysis allows to understand the relation among different types of arguments, and how they are related to each other. This kind of 'structural' knowledge may be exploited to design sound and convincing promotional messages. c) The reconstruction of the arguments cultural and contextual premises via the AMT allows to grasp the core touristic value of a destination, which may become its identification mark or the focus around which to develop promotional campaign.

Clearly, this type of approach needs further development and more extensive analyses. Two are the directions that the research may take in the immediate future. First, face-to-face interviews with tourists coming back from a holiday could be undertaken, to directly ask them if they believe their experience is worth to be communicated and why. The interviews should be designed and conducted to let people argue about their experience, this way allowing to let emerge their expectations, values and beliefs. The comparison between "offline" and "online" arguments, then, may provide a more complete overview on the destination reputation and, from a theoretical perspective, it may reveal peculiar aspects of the online interaction. Second, the analysis of arguments could be enriched by the consideration of indicators like *absolutely*, *probably*, *distinctively*, *should* (visit), *must have been* (beautiful) and several others, which qualify the author's perspective on her recommendation. Contemporary studies on *modality* in argumentation offer a theoretical and methodological perspective on this aspect (Rocci, 2008).

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Travel Preferences of Overseas Destinations by Mainland Chinese Online Users

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Abstract

Despite the financial crisis in the second half of 2008 together with the global outbreak of Influenza A H1N1 in 2009, Mainland China's (hereafter known as China) outbound tourism continued to grow steadily. The rapid development of the Chinese economy is the major force propelling the development of sustainable outbound tourism. Other factors, such as a consistent policy about the expansion of outbound destinations and on-going improvement in living standards have provided good motivations for the growth of the Chinese outbound tourism. Therefore, understanding the travel preferences of Chinese travellers is regarded as one of the important issues in tourism businesses worldwide. Along with the rapid development of Internet applications in China, the Internet is a new way for Chinese travellers to search and share travel information. Due to the growing size of Chinese online users, the Internet becomes the most resourceful medium to understand consumers from this huge market. This paper presents the findings of a study that investigates the travel preferences of Chinese online users by collecting data from Elong.com and Ctrip.com, representing the major and the most popular travel websites in China. Research findings are expected to make a meaningful contribution to better understand what Chinese online users like to visit.

Keywords: Chinese online users, China outbound tourism, travel preferences, electronic word of-mouth channels

1 Introduction

Chinese outbound tourism is regarded as one of the most important phenomena that influences future global tourism development (UNWTO, 2003; Zhang & Heung, 2001; Zhang, Yan & Li, 2009). The issue could gain the worldwide attention not only because of the dramatic increase of Chinese outbound tourists, but also the extraordinary purchasing power of Chinese residents. Predicted data indicate that China will become the fourth largest international tourism market in the world by 2020, occupying 6.4% of market share worldwide, and nearly 100 million outbound travelers will be from China (UNWTO, 2000). Also, each Chinese traveler on average spent about US$ 3,000 per trip in 2006 (AC Nielsen, 2007; Zhang, *et al.*, 2009). At the same time, the size of Chinese online users is booming. According to the Internet World Stats (2010), there are almost 420 million Internet users in June 2010 in China, exceeding the numbers in the United States and Japan (239 million and 99 million Internet users, respectively). Given the unprecedented growth in China's online

population, the Internet becomes the most resourceful platform to understand consumers across this enormous market (AC Nielsen, 2007). Destination marketers should get used to the Internet to reach consumers in order to capture the attention of the increasing Chinese online population. Despite this huge potential, relatively little research has been conducted on the travel preferences of Chinese online users.

Since the influence and recognition of the Chinese outbound market are growing, it would be amiss for ignoring this market. Together with the rapid development of Internet application, the purpose of this study is to understand the travel preferences of Chinese online users. Using the data collected from Elong.com and Ctrip.com, the leading travel websites in China in terms of number of users, findings are expected to make a meaningful contribution to identify what the travel preferences of Chinese online users are. Destination management offices, government tourism offices, and travel agents could then use the information to position their destination in order to attract travelers from this potentially huge market.

2 Literature Review

A number of research articles have stated that the China outbound tourism began in the early 1980s and has passed through three initial stages (Zhang & Heung, 2001). The first stage started in 1983, during then Chinese residents were permitted to visit Hong Kong and Macau by joining a limited number of organized tours. These tours were under the supervision of the China National Tourism Administration (CNTA) and only for the purpose of visiting friends and relatives (Qu & Lam, 1997). The second stage began in 1990. At that time, the Chinese government signed bilateral agreements with Singapore, Malaysia, Thailand, Russia, Mongolia and the Philippines (Guo, Kim & Timothy, 2007). These agreements allowed Chinese citizens visiting these countries by self-fund travel. A breakthrough in outbound tourism appeared in 1997 (the third stage) when the Chinese government granted its first bilateral agreement with Australia and New Zealand. This stage provided a valuable opportunity for Chinese residents to experience the Western culture.

Since then, the Chinese outbound tourism has managed and regulated by the Approved Destination Status (ADS) system. This system is based on bilateral agreements between China and overseas destinations in which Chinese residents are allowed to travel to specific outbound destinations (China Contact, 2010). Also, the aim of this system is to control the operation of local travel agencies and international tour operators in order to provide safe and reliable tourism services to Chinese residents. By mid-2009, 110 countries/regions signed the ADS agreements with China, including the United States and Taiwan (CNTA, 2010). Along with the release of outbound travel policy and the increase in disposal income among most Chinese citizens, there is an astounding growth of Chinese outbound tourism (as illustrated in Table 1). This phenomenon is recognized as one of the most important oncoming markets in the world which has drawn worldwide attention. Industry practitioners should therefore pay more attention on this huge market by understanding how Chinese travelers act in terms of their travel preference, behavior, travel motivation and satisfaction levels towards the hospitality and tourism industries (AC Nielsen, 2007).

Table 1. Number of Chinese Outbound Tourists (1993-2008)

Year	Number of Outbound Tourists	Growth Rate (%)
1993	3,740,000	27.70
1994	3,733,600	-0.17
1995	4,520,500	21.08
1996	5,060,700	11.95
1997	5,323,900	5.20
1998	8,425,600	58.26
1999	9,231,600	9.57
2000	10,468,600	13.40
2001	12,133,100	15.90
2002	16,602,300	39.83
2003	20,220,000	21.80
2004	28,852,900	42.90
2005	31,000,000	7.50
2006	34,520,000	11.35
2007	40,954,000	18.64
2008	45,844,400	11.94

Source: CNTA (2010)

Apart from the number of outbound travellers, tourism expenditure is another indicator that reflects the potential of the China market**.** According to UNWTO (2010), China overtook France to be the fourth position among the top 10 rankings by international tourism spenders in 2009. Chinese travellers' spending has been growing since the last decade, even during the financial crisis. According to ACNielsen (2007), each Chinese traveler on average spent about US$ 3,000 per trip in 2006, making them being the top spenders in Europe (Xie & Li, 2009). Some researchers even predict that China would become the world's top spender in the future (Zhang & Liu, 2008).

At the same time, there is a dramatic growth of China's online population. According to the Internet World Stats (2010), China has the largest number of Internet users around the world (as presented in Table 2). Since the number of Chinese online users has skyrocketed, the Internet is being the most effective and efficient source to keep track of the latest development in this lucrative market. A study which was conducted by AC Nielsen (2007) suggests that marketers could utilize the Internet in order to reach the potential market since online content could influence travellers' decision making, particularly their destination choices. Additionally, the Internet is now providing a driving force for the growth in popularity of the new electronic word-of-mouth (eWOM) channel. This channel not only allows consumers to share information and opinions, but also directs them towards and away from specific products, brands and services (Hawkins, Best & Coney, 2004). Due to the popularity of electronic word-of-mouth (eWOM) channel, consumers' opinions become more powerful and influential which can affect others to use or buy the right products and

services (Litvin, Goldsmith & Pan, 2008). Unlike information provided from traditional service providers, contents obtained from electronic word-of-mouth channels are believed by many as more updated and reliable (Gretzel & Yoo, 2008). As such, more travellers would like to seek information from these eWOM channels as the main sources (Hennig-Thurau, Gwinner, Walsh & Gremler, 2004; Pan, MacLaurin & Crotts, 2007). This changes the balance of power from the supply side to the demand side. Examples of the major applications of this channel in the hospitality and tourism industries are Tripadvisor.com and Ctrip.com. These sites are becoming a tremendous source for travellers to get travel advices and suggestion (Au, Law & Buhalis, 2010). Most importantly, Chinese online users are more engaged in consumer generated comments (CNNIC, 2009) and more likely to search for and respond to these comments because they encourage information sharing and rely on personal sources of information (Fong & Burton, 2008).

Table 2. Top 20 Countries with the Highest Number of Internet Users (June 2010)

Rank	Country of Region	Users Latest Data
1.	China	420,000,000
2.	United States	239,893,600
3.	Japan	99,143,700
4.	India	81,000,000
5.	Brazil	75,943,600
6.	Germany	65,123,800
7.	Russia	59,700,000
8.	United Kingdom	51,442,100
9.	France	44,625,300
10.	Nigeria	43,982,200
11.	South Korea	39,440,000
12.	Turkey	35,000,000
13.	Iran	33,200,000
14.	Mexico	30,600,000
15.	Italy	30,026,400
16.	Indonesia	30,000,000
17.	Philippines	29,700,000
18.	Spain	29,093,984
19.	Argentina	26,614,813
20.	Canada	26,224,900

Source: Internet World Stats (2010)

By far, there have been a number of academic studies on Chinese outbound travellers in terms of travel preferences (Heung, 2000; Kim, Guo & Agrusa, 2005; Mok & DeFranco, 1999; Qu & Li, 1997; Zhang & Chow, 2004). Also, a number of prior studies stated that shopping is one of the most important attributes for Chinese travellers (Hsu & Lam, 2003; Lehto, Cai, O'Leary & Huan, 2004). Zhang and Lam (1999) reported that Chinese travellers prefer to choose a shopping paradise together with a well-connected transportation system and the highest standard of services.

Chinese travellers also like shopping because of traditional Asian value of building relationship through gift-giving (Mok & Iverson, 2000). In addition, dining, city sighting, visiting historical places, visiting amusement and theme parks, visiting national parks and casino/ gambling are viewed as important considerations for Chinese travellers (Cai, Lehto & O'Leary, 2001; Kim *et al.*, 2005). Other than shopping, the Annual Report of China Outbound Tourism development 2006 stated that the primary influential factor for Chinese residents choosing outbound travel products is the culture of a destination instead of the price (Du & Dai, 2008). Besides, high-income travellers prefer a high-quality holiday with remarkable experiences rather than a single package tour visiting multiple countries. This implied more Chinese travellers are willing to pay for upgrading the quality of their trips (Xie & Li, 2009).

3 Methodology

This study is to understand the travel preferences of overseas destinations by Chinese online users in Ctrip.com. The first step is to find out what the most popular destinations are in the world's six major continents. However, there is no official statistics available from the National Tourism Administration of the People's Republic of China. In this research, the dataset for the most popular overseas destinations was collected from Elong.com which is one of the biggest online tourism intermediaries in China. Chinese simplified version of Elong.com had been viewed to ensure authenticity of data collection. Finally, six destinations including Bali (Asia), Cairo (Africa), Provence (Europe), Hawaii (North America), Lima (South America) and Auckland (Oceania) were selected as the most popular destinations since they were the most viewed destinations on Elong.com Also, Hong Kong was chosen for data collection because it is one of the most popular travel destinations in the country (China Tourism Academy, 2010).

Based on these seven destinations, 694 comments from Ctrip.com were collected and 575 of them were analyzed in the period June 2010 to August 2010. 119 comments were left out since thee contents of those comments were not related to any particular destination. For example, some of them were advertisements. Ctrip.com is a leading travel website in China, which provides information about hotel accommodation, airline tickets, and packaged tours (Ye, Law & Gu, 2009). The simplified Chinese version of Ctrip.com was used to maintain authenticity of data gathered. Comments posted by online users on Ctrip.com were retrieved using a content analysis method.

4 Findings and Discussions

As indicated in Table 3, six destinations together with the travel preferences and related attributes were shown. Interestingly, different destinations represent different travel preferences. While Hong Kong relates to theme park and shopping; Bali, Hawaii and Auckland correspond to natural landscape; Provence images cultural architecture; and Cairo represents ancient culture. Somewhat unexpected, Lima is the most favourite destination in South America, but there was no comment posted by online users about this destination.

Table 3. Travel Preferences and Related Attributes of Chinese Online Users

Destinations	Travel Preferences	Related Attributes	Others
Hong Kong	Theme park, shopping	Parades, shows, cartoon photo taking, queuing time, brands	Not available
Bali	Natural scenery	Sea, beaches, terraced fields, sunset, monkeys, countryside, drifting	Friendly and hospitable locals
Hawaii	Natural scenery	Volcanoes, beaches	Not available
Auckland	Natural scenery	One Tree Hill, sailing	Maoris
Provence	Cultural architecture	Theaters, churches, chapels	Not available
Cairo	Ancient culture	Museums, the Pyramid, the Sphinx, long history, heritage, mystery	Not available

4.1 Travel Preferences about Hong Kong

Comments from Ctrip.com show that theme park and shopping are the main travel preferences for Chinese online users to visit Hong Kong, as reflected in the following selected posts.

What attracted me was the opportunity to see the parades and animal shows in two theme parks. Also, it was great to experience the attractiveness of "shoppers' paradise". (Comment A)

The motivation for being there was to enjoy the rides in theme parks and it was excited to take photos with different cartoon characters. (Comment B)

It was great to shop in Hong Kong as there are many well-known brands with high quality. (Comment C)

It is not surprised to note that theme parks and shopping activities are regarded as the most popular motivation for Chinese online users. According to the Themed Entertainment Association/ Economics Research Associates' Attraction Attendance Report (2008), Ocean Park and Hong Kong Disney were ranked 15th and 18th around the world. This reflected their performances are outstanding by offering a wide array of quality attractions, world-class facilities and exhibits for different ages and interests. Also, these two theme parks are promoted by the Hong Kong Tourism Board as the most popular attractions in the city. This could show theme parks are one of the most famous attractions in the minds of the potential customers within its target markets.

Likewise, shopping is the mostly mentioned activity on the site among Chinese travelers in Hong Kong. Although the number of outbound Chinese travelers is growing, a relatively small percentage of Chinese residents are able to travel aboard (Guo *et al.*, 2007). As such, buying souvenirs is a way for Chinese travelers to build up the relationship between relatives and friends (Park, 2000), since part of the Chinese culture is gift-giving. Also, a Quality Tourism Service (QTS) Scheme is carried out in Hong Kong which is an assessment for whether shops can meet the high standards of product quality and services. Therefore, travelers are more confident to buy any kinds of products, especially food and luxury products, in Hong Kong. Another reason of this shopping behavior in Hong Kong is due to the exchange rate between Renminbi (the currency in China) and Hong Kong dollar. By the end October 2008, the value of Renminbi had largely risen, which is significantly stronger than the Hong Kong dollar. Therefore, products in Hong Kong are welcomed by Chinese travellers because of their valuable price and quality.

4.2 Travel Preferences about Bali, Hawaii and Auckland

Natural scenery is regarded as the travel preference for Chinese online users to visit Bali, Hawaii and Auckland. Based on the comments collected from Ctrip.com, Chinese online users consider beautiful and natural environment to be the most important attributes.

I am interested in wildlife and ecology. It would be sad if we could not enjoy the natural environment. Hopefully, I had a chance to experience this beautiful landscape. (Comment D)

Sun, sand and beaches. What beautiful scenery is here! I love it. (Comment E)

Here is beautiful, just like a heaven! We enjoyed walking down the beaches and looking at the sunset. Also, it was great to see fishes in this clear sea. It is worth to travel! (Comment F)

Within the context of natural landscape, eco-activities (rafting and sailing) are also considered as the motivation for Chinese online users.

Rafting was the most excited and enjoyable activity in this trip. I love it! (Comment E)

To experience the natural neighborhood of this destination, sailing is the best way. (Comment F)

Interestingly, friendly and hospitable locals as well as Maoris are also emerged from the related attributes of travel preferences.

It was great to do something different during traveling - living with the locals. They were friendly and hospitable. It was my pleasure to experience different culture apart from China. (Comment G)

Local people were nice and helpful. It was excited to experience the countryside and local culture which were totally different from a big city in China. (Comment H)

Clearly, the travel preference of Chinese online users is related to beautiful natural environment. These findings are supported by Kim *et al.* (2005) as well as Keating and Kriz's (2008) study in which their results indicated that Chinese tourists prefer to go overseas with beautiful scenery. It is generally known that there are a lot of attractive and beautiful landscapes in Bali, Hawaii and Auckland. For example, Bali is surrounded by coral reefs with a variety of wildlife; Hawaii is formed by six major islands with Waikiki Beach and active volcanoes; Auckland is known as "City of Sails" and ranked as 4th in the 2010 Mercer Quality of Living Survey (Mercer, 2010) and 10th in The Economist's World's Most Livable Cities (The Economist, 2010). These show Bali, Hawaii and Auckland are perceived as attractive destinations by Chinese travelers.

4.3 Travel Preferences about Cairo and Provence

Based on the comments from Ctrip.com, cultural architecture and ancient culture are considered as the travel preferences of Chinese online users to visit Provence and Cairo as illustrated in the following comments.

To experience cultural atmosphere, you should visit here. When traveling, I was surrounded by different cultural churches and theaters. They were stunning! (Comment I)

I was excited and shocked by this magnificent civilization! The Pyramid and the Sphinx were spectacular. (Comment J)

Gorgeous! Wonderful! You must feel regret if you do not travel here. I love the long history and mystery here. (Comment K)

According to Sparks and Pan (2008), Chinese travelers like to visit destinations which are culturally different from China. It is thus reasonable that Provence is the most favorable overseas destination in Europe for Chinese online travelers since they are dazzled by the cultural architectures, such as churches, chapels and theaters. It is commonly known that Western architecture is very different from Chinese

architecture. On the other hand, Cairo is regarded as the most favorable destination in Africa due to its ancient culture. As stated, Chinese travelers prefer to visit overseas countries which are culturally different from China (Sparks & Pan, 2008). Also, Kim *et al.* (2005) mentioned that experiencing a destination with a long history is another motivator for Chinese travelers. Cairo is thus considered to be an attractive destination for Chinese travelers because of the Egyptian history. It can be traced to thousands of years ago which is similar in time length to the history of China. Besides, Cairo has internationally well-known ancient pyramids, the Sphinx, and artifacts.

5 Conclusions

This research has investigated the travel preferences of Chinese online users in different overseas destinations. As previously discussed, after the introduction of the national reformation and open-door policy, China's outbound tourism has been flourishing. Together with stable and rapid developments of China's economy, renewed Renminbi appreciation, and on-going improvements in the quality of travel products, China is now an important international tourist source-generating market. As predicted by China Tourism Academy (2010), China will become the number one tourism source market in 2015. At the same time, the size of Chinese online users is increasing. The Internet is now serving as an important platform for many Chinese travelers to search for information, including destination information, prices and schedules. More importantly, Chinese online users highly rely on information from electronic word-of-mouth channels since they trust personal sources of information (Fong & Burton, 2008). Therefore, the impact and influence of these channels cannot be overlooked and underestimated. In this study, the data were collected from two major and popular travel websites in China – Elong.com and Ctrip.com. Findings of this study pointed out that Bali, Hawaii, Auckland, Provence, Cairo and Lima are the most popular destinations in different continents while Hong Kong is the most favorable destination in China. This study thus analyzes the travel preferences of Chinese online users in these destinations. Interestingly, different destinations represent different travel preferences while Hong Kong is well known for theme park and shopping; Bali, Hawaii and Auckland are related to natural landscape; Provence corresponds to cultural architecture, and Cairo represents ancient culture. Apparently, future studies can investigate more thoroughly the demographic profiles of Chinese online users. It would be beneficial for future research to focus on exploring who these online users are. Tourism and hospitality marketers would then target their potential customers precisely.

Although the potential of China outbound tourism market is tremendous, there is a lack of research on the demand of Mainland Chinese outbound tourism (Kim *et al.*, 2005). With an estimation of 100 million Chinese outbound travellers in 2020 (UNWTO, 2000), many destinations will be benefited from this market with almost one fifth of the world's population. Thus, the results of this study are expected to provide considerable and valuable information to competing countries/destinations. By understanding the travel preferences of Chinese online users, different countries/destinations can then develop their marketing and promotion strategies to attract travellers from this potentially huge market. Moreover, this study used two travel websites as the sources of data collection. This may inspire tourism and

hospitality marketers to utilize the Internet in order to reach their potential markets. Due to the popularity of electronic word-of-mouth channels nowadays, different travel websites could provide valuable first-hand information and comments posted by travellers. As such, it would be very costly for hospitality and tourism practitioners to neglect the importance and impact of electronic word-of-mouth sources.

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Destination Marketing and Users' Appraisal: Looking for the reasons why tourists like a destination

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Abstract

Forum posts written by tourists on travel social media like Trip Advisor report very quick impressions on a trip or give practical indications to prospective tourists. They are usually only a few words long and sketch the author's global impression about a destination or focus on the aspects of the destination considered the most valuable. In this paper, forum posts are looked at as short argumentative texts, conceived to help prospective tourists make decisions while organizing their trip. A corpus of posts about the Republic of Malta have been investigated to identify the arguments frequently used to support its touristic value; arguments have been later classified and compared with those put forward by the DMO in its official promotion materials.

Keywords: UGC, arguments, destination marketing

1 Introduction

Today most of the travelers who have Internet access search for information about destinations, plan trips and purchase tourism products online (Milligan, 2006). Tourism has become the number one industry in terms of online transaction volume (Werthner & Klein 1999; Werthner & Ricci 2004). The Internet plays an important role both for the travelers and the tourism industry: Destination Management Organizations (DMOs) and tourism marketing managers increasingly understand the importance of online marketing and consequently are adopting new and more efficient online marketing strategies.

Pires, Stanton and Rita (2006), argue that travelers are even empowered by the Internet; the increasing use of Information and Communication Technologies (ICT) shifted gradually the market power from suppliers to consumers, while consumers' empowerment is considered as an unintended consequence of online marketing. Travelers can connect with other travelers by reading blogs or giving online feedback about a certain product or service, generating an electronic word-of-mouth. Since tourism is essentially an experience good, advice from other consumers who have prior experience and who are interpersonally available ranks as the preferred source of pre-purchase information, as well as the most influential information in travel decision making (Crotts, 1999). Because of the personal relation involved, then, electronic word-of-mouth is viewed as a more reliable source of accurate consumer

information than marketing information obtained through mass media or through tourism professionals (Pan, McLaurin & Crotts 2007).

Due to the increasing competition in the market and the volatility of demand, the providers of touristic products and services need to carefully monitor consumers' tastes and expectations to improve their performance. Thanks to the Internet and, more specifically to social networks, tourism suppliers can access information on travelers that would have been difficult to achieve just a few years ago.

The study here discussed presents a method for exploring travel fora (sing. forum), with the aim of finding out the aspects of a destination which represent the core of a touristic experience. Tourism related User-Generated-Contents (UGC) have been explored looking for the reasons given by tourists when commenting positively on their experience at a destination. The authors believe that this study can suggest alternative strategies for understanding tourists' preferences and perceptions, therefore providing insights in tourists' experiences as well as solid starting points for the development of effective online marketing strategies.

2 Background of the Study

2.1 Studies on User-Generated Contents

Recent marketing studies have tried to investigate tourism related UGC focusing on linguistic aspects. Understanding the language used by tourists is in fact precious for promotion, marketing, and social control (Xiang, Wober & Fesenmaier, 2008). The meaning of words, sentences and broadly texts, is the object of study of Semantics, a part of Linguistics. With the birth and rapid development of the Web 2.0, many attempts have been made to apply Semantics to the online domain, in order to undergo automated text analysis and to better understand the relationship between 'what is said' and 'what is meant to be said' in online communication. Within the online tourism domain, semantic studies have focused on consumers' satisfaction and destination marketing, in the majority of the cases relying on software for Computer-Aided Text Analysis (CATA software). A study was conducted by Pan, McLauren and Crotts (2007) who examined the full texts written by bloggers reporting their travel experience using the semantic network technique. The study was conducted on different blogs selected according to Google's search queries. Texts were analyzed with a CATA software, which helped to count word frequencies and form connections among words. Additionally, they made a content analysis of the blogs, with the intent of gaining an overview of the positive and negative orientations of bloggers towards the destination.

Other studies focused on the language used to communicate touristic contents, both by suppliers and consumers. Xiang, Gretzel and Fesenmeier (2008), considering the huge amount of information available on the web concerning tourism, tried to understand if the information provided on tourism-related websites matches with the effective information needs of travelers. They compared the language used by tourism websites to the one emerging from user queries. They counted the respective word frequencies

and the proximity among words, and found out a relevant discrepancy between the two domains' ontology.

However, automated procedures such as the semantic network analysis or search engine queries through keywords risk leading to false or imprecise inferences, due to the context-dependency of language. The very meaning of a text, in fact, goes far beyond what is explicitly said, since it is bound to contextual elements which an automated tool is not able to reconstruct, and to cultural elements that are taken for granted by the speakers. All the ambiguity facets of a language, like polysemic words or metaphors have to be accounted for. The methodological claim of this paper is that an investigation of the UGC shall also rely on human researchers who, making use of adequate methods, are able to grasp the message a given author intended to transmit with her text. The method presented was developed on the base of concepts derived from logic and rhetoric.

2.2 The deliberative function of tourism-related UGC

Online discussion fora are considered a new type of communicative situation, characterized by the absence of most of the contextual features of face-to-face conversation. They present a considerable dialectical variability, in that the discussion usually moves from a focus on a given topic towards a focus on the interaction and the participants, while topic tends to decay, turn-taking is dislocated and several conversations are jumbled together (Lewis, 2005). Tourism-related online fora are usually the place to ask about specific and quick pieces of information or tips from other travelers to organize a trip. They are helpful to get an overview of the destination and to size expectations according to unofficial voices that are authoritative and trustworthy thanks to their personal experiences gained at the given destination.

Tourism related UGC can be generally said to have a *deliberative function*. To deliberate means to make a choice among alternatives, after a mental or verbal process of comparison and weighting of the pros and cons of each solution, according to personal needs and preferences. People consulting travel fora or reviews directly ask or simply look for information that can help them organizing their trip. Deliberation thus implies argumentation. The decisions such as whether to go to Malta by plane or by sea, which hotel to stay at, what things to do there, and every other decision concerning the trip imply arguing (subtly). One can argue with herself or in front of an audience, anyway, arguing means putting forward different claims, giving arguments to support them and evaluating each argument according to logic and pragmatic elements. Argumentation is a common practice that everyone often performs during a day for a number of tasks, such as: clarifying a doubt, taking a decision, taking position in a debate, counseling, increasing knowledge, persuading oneself as well as the others. Actually, it takes place every time that one is – directly or indirectly – asked to give reasons for her opinion or action. Argumentation in forum posts occurs usually at a basic level, in the sense that they do not contain articulated discourses supporting contrasting or defeasible claims, but they rather give quick opinions or recommendations, based on one or a few more arguments.

Nonetheless, an argumentative approach to travel fora can give precious insights into tourism-related UGC, at least helping to find out the main reasons why (arguments), according to tourists, a destination shall be worth a visit. The identification of the arguments in forum posts supporting Malta as a nice destination to visit, has been undergone through the reconstruction of syllogisms.

In Aristotle's philosophy, a syllogism (Greek: συλλογισμός – 'conclusion', 'inference') is a kind of logical argument where one of the three prepositions, the conclusion, is deducted or inducted by the previous others, called premises. There are two kinds of syllogism: the *categorical* and the *hypothetical syllogism*. In the former, both premises and conclusion are categorical propositions, which are constituted by subjects (ex. Socrates) and predicates (ex. Beings who die/who are mortal). The predicate is called *major extreme* (T) while the subject is called *minor extreme* (t). The premise that contains the major term is called *major premise* and the one that contains the minor term is called *minor premise*. The term that functions as a mean to link the major and minor extremes to lead to the conclusion is called *middle term* (ex. man) (Cantoni et. al 2008). Aristotle makes the following example:

Major premise	All men are mortal.
Minor premise	Socrates is a man.
Conclusion	Socrates is mortal.

Hypothetical syllogisms are those in which the major premise is a compound hypothetical proposition and the minor premise confirms or denies one of the propositions in the major premise. An example is the following:

Major premise	If a city is big, it is chaotic.
Minor premise	London is a big city.
Conclusion	London is chaotic.

In ordinary language syllogisms occur rarely in their complete form (i.e. premises and conclusion). Some parts are omitted because they can be easily added by the interlocutor and, if put explicitly, they would slow down the communication flow and would only add redundant information. They are called *natural syllogisms*, to indicate that some elements are left implicit in the reasoning, but they should be added by the interlocutor in order to understand the reasoning itself.

3 Methodology

3.1 Research goal and research design

The case study presented in this paper is part of a broader research, whose purpose is twofold: a) to improve the understanding of people's reasons for travelling, and b) to enhance the effectiveness of destination promotional strategies. The case study was designed with the aim of developing a reliable method to find out, classify and evaluate the reasons given by tourists when reporting on a travel experience. Once the question: "why do tourists decide to spend a holiday in destination x?" has been answered, a comparison can be made with the official arguments used by the DMO, and the offer can be adapted accordingly. The study focused on the Republic of Malta

and followed three steps: a) identifying the main reasons given by tourists (demand side) for visiting Malta through the analysis of a corpus of UGC, collected from a social media website for tourism and travel; b) sorting out of the arguments used by the DMO of Malta (the supply side) for promoting the destination in official marketing campaigns; c) comparing the reasons given by the demand side and the supply side, to verify their correspondence and, if the case, suggest improvements.
To identify the arguments, the analytical tools proper of argumentation theory were used. In particular, the syllogistic structure of each argumentatively relevant post was reconstructed, to point out implicit premises and to check its logical validity.

3.2 Collection of data

The destination chosen for the study was the Republic of Malta, an island in the Southern Mediterranean Sea. The choice of an island was not casual: one of the most frequent words in tourism is 'destination', but it is used with different meanings by different actors. Sometimes cities are called 'destinations', some other times entire districts or regions - including a variety of economical, cultural and social variables - are called 'destinations'. An island has natural physical boundaries given by the surrounding sea that makes it easier to 'isolate' it from other destinations; the Republic of Malta, then, is a small island, with a variety of attractions and the possibility to meet different touristic tastes (e.g. 'beach and sun' tourists, cultural tourists, nature-lovers).

The UGC to be analyzed was collected on TripAdvisor (TA), which is the most frequented social network website for travel and tourism. The sister sites of TA in English, Italian, German, France and also Spain have been considered because according to the last annual report of the Malta Tourism Authority (MTA), the main tourism markets of Malta are the UK, Italy, Germany and France. The collection of data has been performed from the 9th of March 2010 till the 13th of May 2010, and considered all the posts written on TA until that date. In order to focus on travelers' feedback exclusively concerning the destination, and to avoid statements about transport, accommodation or other technical issues, UGC were retrieved from the fora grouped under the voice 'Travel Forum' on the webpage of TA dedicated to the destination. Posts from TripAdvisor.com (the US and cover website) and TripAdvisor.co.uk (the British sister website) have been categorized together with the label 'US+UK', because it came out that they correspond to the same website. Posts on TripAdvisor.it, TripAdvisor.es, TripAdvisor.de, and TripAdvisor.fr have been categorized together with the label 'Europe', because of the relatively small number of data retrieved. If not significant from a numerical point of view, the posts from "continental Europe" were counted in the analysis for their communicative significance, that is for the deliberative function they play in the peculiar communicative context of online tourism. Results have been grouped according to these two main groups, and discussed separately; no comparison among the groups has been made. The corpus of analysis counted: 4,577 threads from TripAdvisor.com (TripAdvisor US + TripAdvisor UK); 67 threads on TripAdvisor.it; 29 threads on TripAdvisor.fr; 84 threads on TripAdvisor.es; 7 threads on TripAdvisor.de.

The analysis of the supply side has been performed on the advertising brochure "Malta – Gozo – Comino" used by Malta's DMO for promotional goals[9]; the brochure is written in English and is distributed by the DMO website.

3.3 Analysis of data

The corpus of data was first filtered to sort out only destination-related contents, because tourists frequently use TA Travel Fora to ask for technical information or write comments on services or attractions, also if TA provides dedicated fora for commenting on products and services.
The second filtering was undergone to sort out only *argumentatively relevant* posts, as a means to look for arguments. In order to be considered relevant from an argumentative point of view, a post must contain a claim and, at least, one argument supporting that claim. Informative texts or requests, for instance, are usually not argumentatively relevant.
The following is an example of a post containing a claim: "Most of us love Malta", supported by three arguments: "(in Malta) there is always a lot to see", "(in Malta there is always a lot to) do", (in Malta) locals are very friendly".

Example 1 (from www.tripadvisor.com)

Malta - trip report - Sep 16, 2008, 3:58 PM

Hi, welcome to the Malta forum, so glad to hear you had a lovely holiday. Most of us love Malta and go back year after year. ***There is always a lot to see*** and ***do*** *and* ***the locals are very friendly****. Many people make friends there and go back to see them too.*

In the fora many issues are discussed other than the suitability of the island for a holiday: there are people wishing to move there because they enjoyed their visit, people asking for specific activities to do on the island (e.g. scuba diving, windsurfing), and some others dreaming of a wedding on a Maltese beach. The arguments put forward depend on the claim that is advanced, and on the audience taking part to the discussion. This means that an argument supporting the fact that Malta is a nice place to go is 'tailored' for a specific claim (e.g. "It is a good idea to move to Malta", "Malta is the perfect place to go surfing") and for a certain audience (e.g. a family wishing to move, sea-sport lovers). In order to identify the aspects of Malta which appeal to the general public of tourists, the claim the researchers were interested in was defined at the beginning of the analysis, claiming that: "Malta is worth a visit". It represented the "mandatory" *conclusion* of the chain of syllogisms which were time by time reconstructed in the selected forum posts. Only posts supporting such claim s were taken into account for the analysis; the analyst had to consider that often the claim was formulated with a different wording (e.g. "I loved Malta", "We had a great time in Malta").

The following step was to build a *codebook,* to guide the analysis of the contents of the selected posts, with the specific aim of identifying the arguments supporting the claim and classify them. The unit of analysis was the *argument*, so that a post could be codified several times, according to the number of unique arguments it contained.

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[9] The official brochure can be found at the following address http://www.visitmalta.com/e-brochures

Each unit of analysis was codified on the base of two types of categories: *formal categories*, such as the author of the post or the title of the respective thread, which allowed the univocal identification of the unit of analysis in the corpus of data, and *content categories*, which classified argumentative aspects related to the unit of analysis. The following table reports the categories of the codebook:

Table 1. Codebook categories

Formal categories	K1	Post number	Position of the posts within the thread
	K2	Thread title	Title of the thread in the forum
	K3	Questioner's country of origin	-
	K4	Date	-
	K5	Respondent's country of origin	-
Content categories	K6	Argument head	Class of argument
	K7	Argument	-
	K8	Sub-argument	Subordinate argument
	K9	Argumentative keyword	Middle term of the syllogism
	K10	Connective predicate	Dialogical move in the thread

Arguments have been reconstructed making explicit what the author left implicit (both conclusion or premises), and then applying the syllogistic scheme, that is distinguishing the major premise from the minor premise, substituting unclear formulations, identifying the middle term, and verifying the validity of the inference. Some verbal indicators helped the identification of arguments and sub-arguments, such as 'and', 'because', 'but', 'also', 'since'. Example 2 simplifies the procedure.

The posts reporting arguments *against* Malta were not considered for the analysis, because the study was intended to find out only the aspects of the destination which positively appeal to its visitors. In the case of complex argumentation introduced by adversative conjunctions, such as "but", "although", "however", usually the subordinate proposition constitutes the speaker's own argument. Such argument is strengthen by the acknowledgment of a counter-argument (the main proposition): the speaker acknowledges that what is said in the counter-argument is the case (e.g. "Malta does not have sandy beaches…"), but claims that her argument is even more the case (e.g. "…but its rocky beaches let you better appreciate the crystalline sea") (Snoeck-Henkemans, 1995). To correctly classify complex argumentation, therefore, the analyst should "decode" the interplay between argument and counter-argument.

Example 2 (from www.tripadvisor.com)

"Visiting Malta" - May 12, 2009, 4:44 PM

Hey travelingmac,
I've recently returned from a holiday to Malta. I went for almost 2 weeks last month. I was also travelling alone (and am female). Normal precautions apply, the kind of sense you would follow anywhere. Other than that ***Malta is a safe destination to choose because crime is low****, and* ***very 'see-able' on your own*** *[…].*

Claim (conclusion)	(Malta is a destination to choose =) Malta is worth a visit	
(Major premise)	(Safe destinations are worth a visit)	Argument 1
Minor premise	Malta is safe	
Indicator	*and*	
(major premise)	(Destinations that can be visited without anyone's help are worth a visit)	Argument 2
(minor premise)	(Malta is very 'see-able' on your own =) Malta can be visited without anyone's help	
Argument 1 (conclusion)	Malta is safe.	
(Major premise)	(A place where crime is low is safe)	Sub-argument
Indicator	*because*	
Minor premise	crime is low	

The user argues that Malta is a destination to choose for a (solitary) holiday at least for two reasons: because it is safe and because one can go around seeing different attractions without the help of others. She also gives an argument (sub-argument) to support another argument, when she explains the reason why Malta should be considered 'safe', that is because crime is low (and not, for instance, because there are not traffic jam or poisonous insects!).

After data screening and arguments coding, they were obtained the following cumulative results: TripAdvisor.com = 155 threads, 1,185 posts containing 201 arguments; TripAdvisor.it = 7 threads, 81 codified posts containing 41 arguments; TripAdvisor.fr, = 2 threads, 8 posts containing 6 arguments; TripAdvisor.es = 3 threads, 11 posts containing 16 arguments 7; TripAdvisor.de = 2, 10 posts containing 10 arguments

4 Results

4.1 Classification of arguments

The arguments found in the posts were classified according to *argument heads*, that are classes of similar arguments, grouped taking into account the dialogical context in which they occurred and the topic of the argument. The content category "argument head" in the codebook, thus, were codified in a second step, after all the arguments and sub-arguments had been identified. This classification allowed a quantification of the results. Ten argument heads were built, defined as shown in table 2. In some cases arguments were precisely formulated regarding the topic; in some other cases they had a more general connotation. Where present, the subordinate argument helped to classify the argument.

The brochure of Malta DMO, used for investigating the supply side, was analyzed first by looking for the arguments used to promote the destination, then by reconstructing such arguments following the scheme of the syllogism, and classifying them according to the argument heads previously defined.

Table 2. Classes of arguments – *Argument heads*

Atmosphere	the aesthetic quality, the emotional and intellectual attitude, especially distinctive and pleasing, associated with a particular place
Beach	aspects of the destination and activities related to the sea
Culture	costumes, traditions and way of living of the inhabitants
Dimensions	Distance between hot spots and perceived dimension of the island
History	historical heritage in terms of architecture and works of art
Landscape	morphological aspects and panorama
Nightlife	clubbing and entertainment activities
Quality of life	standard of living
Sightseeing	activities aimed at discovering the destination
Variety of Activities	entertainment activities

4.2 Results in TripAdvisor.com

In TripAdvisor.com the most frequent argument heads were: 'Culture' (22%), 'Atmosphere' (16%), 'Variety of activities' (13%), and 'History' (10%). This result can be interpreted as a preference of British and Americans to choose Malta for their holidays, because they appreciate customs and popular traditions as well as its historic heritage, its pleasant atmosphere and the offer of entertainment activities.

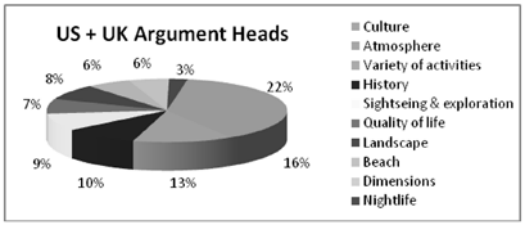

Fig. 1. Argument Heads in TripAdvisor.com

The friendly attitude of the locals (22% of the arguments classified in the 'culture' head), the sense of safety of the island (17% of the arguments classified in the 'quality of life' head), its beautiful natural views (15% of the arguments classified in the 'sightseeing and exploration' head), and the authenticity, not touristy taste of the destination (14% of the arguments classified in the 'atmosphere' head) were particularly appreciated.

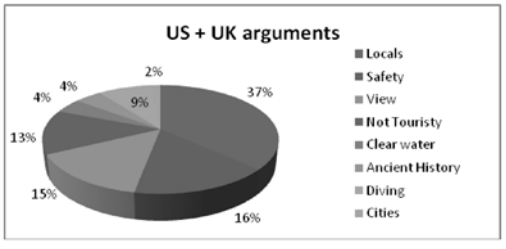

Fig. 2. Most relevant arguments in TripAdvisor.com

4.3 Results in TripAdvisor EU

After the screening, only 110 posts collected in the European TA sister sites (excluded Great Britain) turned out to be relevant from an argumentative point of view, the majority of them having being retrieved from TripAdvisor.it. The search for arguments and their classification showed that the most frequent argument heads were 'Atmosphere' (20%), 'Beach' (20%) and 'Culture' (18%). Arguments were usually put forward in a very general form, without adding details or evidences to further support the claim (e.g. "Meglio se andate di sera per godere la magica atmosfera della città silenziosa " [10]; "Valletta è una città meravigliosa, con una storia molto interessante e unica al mondo"[11]). It seems that for continental Europe tourists Malta is a destination of interest above all for the "relaxing atmosphere", the "sandy beaches" and the "welcoming" locals.

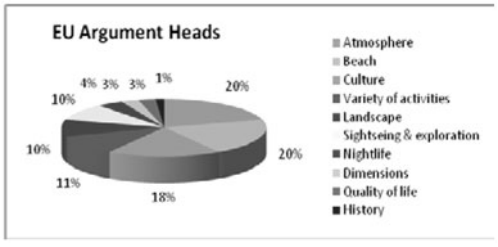

Fig. 3. Most relevant Argument Heads in TripAdvisor EU

4.4 Results of the supply side and comparison of results

The promotional message of Malta DMO focuses on arguments related to cultural and historical aspects of the island, besides presenting its numerous touristic attractions. Arguments are first put forward in very general terms – ex. "our islands have an astonishing concentration of unique cultural and historical attractions" – and they are then supported with descriptions of peculiar attractions or aspects of the island, which function as sub-arguments. The argument regarding whether Malta is worth a visit because of its cultural and historical heritage, is supported by a brief description of the megalithic temples, the baroque capital Valletta and the walled medieval city of Mdina. Two parts of the brochure are dedicated to present the many kinds of sport that can be practiced on the island (argument head 'Variety of activities'), especially during summer, and the many cultural events that are organized, both at the local (e.g. popular feasts) and the international level (e.g. music festivals) (argument heads 'Culture' and 'Variety of activities').

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[10] Trans. "It is better if you go on evening, in order to enjoy the magic atmosphere of the silent city (Mdina)". From www.tripadivor.it, *Mangiare a Malta*, 27.02.2008.

[11] Trans. "Valletta is a wonderful city, with a very interesting and unique history." From www.tripadivor.it, *Malta a gennaio?* 29.11.2008.

Fig. 4. Supply arguments heads

The analysis of the brochure showed that the DMO tries to catch the attention of different types of tourist, with plenty of photos and poetic language, focusing time by time on a specific aspect: sandy beach, welcoming inhabitants, rich historical heritage, wild nature and beautiful landscape, a range of cultural events, vibrant nightlife, and opportunity to learn English. There is a substantial consistency between the classes of arguments built to classify the arguments found in the posts, and the arguments exploited by the DMO for promoting the destination. From the other side, some difference can be observed in the importance given to the arguments. The 'History' class receives scarce attention by the demand-side (more by Americans then by Europeans), while in the brochure historical heritage emerges as one of the most precious and peculiar aspects of Malta. Only a few times the demand side argues about sport or cultural events. The linguistic aspect – that is that English is an official language – received no attention in the analyzed posts, while the DMO relies on it to address prospective students.

Above all, tourists seem to be attracted to the warm attitude of the locals and by the relaxing and non touristy atmosphere. Americans and British report to be enthusiastic also about the variety of activities and the high quality of life. Europeans result to be more 'fun-directed', giving positive opinions about 'Nightlife', 'Beach' and 'Variety of activities'. It is worth mentioning that the majority of European tourists advancing arguments concerning the 'Beach' class were Italians. Spanish tourists, instead, wrote in the forum mainly to get to know each other and to meet once at the destination.

5 Conclusion and Further Research

The paper advanced a methodological claim regarding the study of UGC. The authors argued that an investigation of the content of UGC cannot be undergone relying completely on automated tools, since only human researchers are able to catch the message a given author intended to transmit with her text. A corpus of UGC concerning tourists' feed-back about the Republic of Malta was analyzed using an integrated method, which applied core concepts of logic and rhetoric to develop a deep content analysis. The aim of the study was to find out the arguments put forward by tourists to support the claim that Malta is a destination worth to be visited. The source for data collection was the social website TripAdvisor, considering the commercial (.com), British, Italian, French, Spanish and German sister sites. After subsequent screenings to sort out only argumentatively relevant data, out of the initial 4,764 threads, only 169 threads (1295 posts) passed the selection, and 311 arguments were found. Despite their reduced volume, the posts that were analyzed should be

considered particularly relevant due to their deliberative function. Prospective tourists consult or write on travel fora to gain information and collect the opinions of fellow travelers, to take more reasoned decisions about their trip. Such opinions are exactly the arguments the study intended to find out.

After having analyzed the arguments used by the demand-side, the same analysis was extended to the supply-side, which is Malta's DMO. The official brochure used by the DMO to promote Malta was investigated. The comparison showed that the reasons why tourists appreciated Malta are only partially in line with the arguments used by the DMO to promote it. In order to verify the results gained through this study, and to further validate the method, a wider corpus should be built, retrieving data from other social websites. Since different reasons are more or less convincing for a different audience, it may be interesting to distinguish among groups of tourists, and look for the respective typologies of arguments.

The study presented is part of a broader research, which connects two knowledge domains which are currently disjointed, namely, argumentation theory and online tourism. The research is thus expected to contribute to both of them, giving new insights to the industry as well as to the academy. The contribution to the domain of online tourism is represented by the definition of a qualitative method that allows a deeper investigation of UGC, this way supporting the elaboration of new marketing strategies. From the point of view of argumentation theory, online tourism represents a new context where to study the peculiar configuration of argumentative processes, and UGC are a new textual genre working according to proper – often implicit – rules. Despite yielding precise results, the method presented is also quite time demanding. A faster way, to be validated in the future, is to employ the middle terms of the syllogisms as keywords to select posts. By pairing such keywords with indicators of argumentation, posts that are relevant from an argumentative point of view can be retrieved with a high degree of probability.

Travel for a destination, then, revealed to be not an adequate source for finding out texts relevant from an argumentation point of view. Threads are not in fact, discussions where different parties argue for their opinions, but rather short and quick exchanges of information. Travel reviews seem to be a more adequate source.

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Comparing Online Destination Image with Conventional Image Measurement – The Case of Tallinn

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Abstract

With the abundant availability of Blogs and reviews marketers are facing the challenge of extracting relevant knowledge from these sources as these insights can be used for marketing intelligence. However, it is uncertain if the topics and the language used in Blogs reflect what researchers traditionally investigate in conventional image studies. This paper provides an overview of a method to automatically analyze thousands of Blog entries. Furthermore, it compares the findings of a conventional image study with the content mining approach to provide insights into destination image representation in the online and offline world. The results indicate that automated content analysis reproduces the findings from image studies to a great extent. Therefore they are a valuable additional source of information for DMOs.

Keywords: text mining, destination representation, tourism Blog analysis, destination image

1 Introduction

The importance of the Internet as source of information during the travel information search process is evident (Xiang, Gretzel & Fesenmaier 2008). Through Blogs and virtual travel communities travellers increasingly provide User Generated Content (UGC) by sharing holiday experience, videos and photographs with friends and contacts (Wunsch-Vincent & Vickery, 2007). With personal information sources among the most influential in tourism (Litvin, Goldsmith, & Pan, 2008; Vogt, 1998) UGC has the potential to become a major online decision aid. Customer reviews are drawing increased attention within the text mining community as they attract more interest than vendor information (Bickart & Schindler, 2001) and have a significant impact on consumer buying decisions (Chevalier & Mayzlin, 2006). Thus, understanding User-Generated Content (UGC) at various levels of abstraction is crucial.

Researchers and destination marketers spend significant resources on destination image surveys and questionnaires to learn about the perceptions of travellers. A new additional source to gather data on perceptions are Blogs and virtual communities. However, research has not yet fully investigated the phenomenon of UGC and the abundance of relevant information it contains for management decisions.

Furthermore, it needs to be investigated which type of information can be extracted from UGC.

Therefore, the paper at hand addresses this gap in research by investigating the representation of the city tourism destination Tallinn in Blogs and conventional image studies. The project employs an advanced content mining approach and compares the findings from text mining with those from an image study. Thus, this paper contributes to literature in three ways: (i) it demonstrates how automated content analysis can provide valuable marketing intelligence by extracting relevant information from large UGC archives; (ii) it reveals the representation of the city tourism destination Tallinn reflected in UGC and iii) it contrasts the findings with a conventional customer survey, to better understand which aspects of a destination's image are represented in UGC.

2 Theoretical Background

2.1 Study Context

Since the early 1950s, researchers have demonstrated that personal conversations and informal exchange of information not only influence the purchase decisions of consumers (Arndt, 1967; Whyte, 1983), but also shape consumer expectations (Zeithaml & Bitner, 1996), pre-usage attitudes (Herr, Kardes, & Kim, 1991) and even post-usage perceptions (Bone, 1995; Burzynski & Bayer, 1977). With the emergence of the Internet it became easier for individual customers to reach a broad audience. 50 percent of internet users will become content creators by 2012, and 67 percent read a Blog entry at least once a month (Verna, 2008a, 2008b). Online platforms provide a new forum for personal exchange, where customers may create their own content, or extend and annotate the content their peers provide. Thus, they offer a broad range of often personal information that can be researched (Beer, 2008).

2.2 Extracting Knowledge from UGC

Studies on UGC often apply survey designs based on questionnaires to explicitly ask customers about their perceptions, motivations and attitudes rather than extracting knowledge from UGC. Some studies manually perform content analysis of travel Blogs (Banyai, 2010; Carson, 2008; Wenger, 2008). However, the majority of studies analyze a few hundred Blog postings or traveller reviews with the help of out of the box computer-aided text analysis (CATA) tools. Among those are CatPac, Worder and Envivo, or a combination of those (Govers & Go, 2005; Govers, Go, & Kumar, 2007; Stepchenkova, Kirilenko, & Morrison, 2009). These approaches do not exploit the full extent of customer statements available on the Internet.

The opinions expressed in UGC represent valuable sources of information for product performance, brand image, consumption experiences and the like, consequently guiding marketing decision making for product development and campaigns. With the increased availability of bandwidth, storage systems and processing capacity, mining

publicly available textual resources represent a more cost-effective and scalable approach and at the same time a more unobtrusive type of research (Jansen, 2006).

2.3 Online Destination Representation

The history of destination image research, initially addressing the country image concept dates back to the 1970s with the first scholar (Hunt, 1971) defining destination image. The extensive body of literature on destination image has been reviewed in articles by Tasci and Gartner (2007) and Cavusgil (2007). Mazanec (2009, p. 2) points out, that "this construct clearly describes a form of evaluative response of the individual to some object or stimulus". Researchers often refer to a destination's online representation as its image. Without doubt the content represented on the Internet became an established source of information, serving as an autonomous agent of image formation (Gunn, 1997). Following the notion of other researchers we define online representation or online destination image as a system of connotations co-occurring with a city's position in text with significant frequency (Mazanec, 2009).

Conventional research on destination image uses lists of attributes to detect connotations and associations with the destination (Choi, Chan, & Wu, 1999; Echtner & Ritchie, 2003; Martin & Rodriguez del Bosque, 2008). Literature review on image representation identifies studies that compare the representation of destination image across sources; e.g., studies on the impact of guide books and movies on the image of Tibet (Mercille, 2005). In an online context studies investigate local portals of Dubai tourism directories (Govers & Go, 2005; Govers et al., 2007). Tang et al. (2009) find significant differences regarding image representation of Macau in different online sources such as travel agencies, magazines or Blogs. They use CatPac II for analysis and identify the 35 most frequent words covering the categories' general description, entertainment, transportation sightseeing, food history tourism and accommodation. Pan et al. (2007) also employ CatPac II for content analysis of 40 travel Blogs and find similar categories with attractions among the dominant ones. Furthermore, this study shows a tendency for positive Blog entries. Carson (2008) manually examines 25 Blogs with a total of 76 Blog entries on Australia's Northern Territories.

Literature review shows that the majority of studies investigates a limited number of Blog entries and uses the frequency of terms as an indicator of importance of topics. This study will show a semi-automated approach that analyzes thousands of entries and also applies semantic analyses.

3 Method

The following section presents the methodological approach to analyze and compare the i) destination image (Study A) and ii) online representation (Study B) of Tallinn. The analysis is based upon a survey among tourists which was carried out to collect associations/connotations with Tallinn as a tourism destination and the semi automated analysis of 11 international travel Blogs.

3.1 Study A – Destination Image Measurement

Literature reveals various destination image measurement concepts that can be used for data collection (Choi et al., 1999; Echtner & Ritchie, 2003; Martin & Rodriguez del Bosque, 2008; Pike, 2002). This study follows the measurement approach of Echtner and Ritchie (1993), since the aim is to cover the most comprehensive destination image construct for the comparison. The online survey was conducted with the suggested combination of structured and unstructured questions, allowing for the identification of the multidimensionality of the image concept. This concept is measured along three bi-polar dimensions: i) the attribute-holistic continuum, ii) the functional-psychological continuum and iii) the common-unique continuum (Echtner & Ritchie, 1993). The questionnaire captures the holistic and unique features of the city in three open-ended questions and investigates the tangible and intangible attributes of Tallinn. The questionnaire was administered via a banner on a travel portal, sent via newsletter to 4,750 addresses from the Tallinn City Tourist Office & Convention Bureau of Tallinn and promoted via the official tourism portal www.tourism.tallinn.ee (Tsirk, 2009). The data was collected between December 8 – 31, 2008. After data cleaning the sample contains 769 completed questionnaires.

3.2 Study B – Destination Online Representation

The sample of Study B consists of documents matching the keyword Tallinn within 11 international travel communities and social travel guides (www.travelblogs.com, www.traveljournals.net, www.virtualtourist.com, www.mytripjournal.com, www.travbuddy.com, www.travelpod.com, www.travelblog.org, www.tripadvisor.com, www.realtravel.com, www.43places.com, www.igougo.com). These sources of UGC were selected based on expert sampling from tourism professionals of the Austrian National Tourist Office (ANTO | www.austria.info), as well as experts from academia conducting research in the area of IT & tourism. This study used focused crawling to compile an archive of relevant documents. The URLs of the documents to be processed were identified using the Yahoo! Search API (http://developer.yahoo.com/search/) and captured through the webLyzard suite of web mining tools (www.weblyzard.com). Due to the limitation of the Yahoo! Search API, a maximum of 1000 documents were mirrored per community from December 8 to 31 2008. After excluding documents of low relevance the document archive included 1976 documents for Tallinn.

3.3 Data Preparation and Processing

The previously explained web mining architecture delivers a number of metrics which help to understand the most important textual concepts within online documents. In the following we explain the applied approaches of i) keyword analysis (meaningful words), ii) sentiment detection and iii) category building.

3.4 Identifying Meaningful Words

Automated content analysis requires methods to capture the most essential information from gigabytes of raw textual data. Keyword analysis is a popular

example for this type of knowledge extraction. The majority of online destination image studies use the most frequent words as the most meaningful ones which definitely is a limitation (Stepchenkova et al., 2009).

This paper applies a more sophisticated approach for determining meaningful words by identifying topics associated with Tallinn. Co-occurrence analysis compares the term frequency distribution in sentences mentioning Tallinn (target corpus) with the distribution in the entire sample (reference corpus; i.e. a collection of travel blogs for various cities). The system uses a chi-square test with Yates' correction for continuity (Yates, 1934) to analyze the significance of co-occurrence. The system also applies this procedure to bi- and tri-grams (Hart & Bautin, 2007). This resulted in 351 unique meaningful keywords for Tallinn.

3.5 Sentiment Detection

Natural language processing and semantic technologies that automatically capture the meaning of thousands of documents can distinguish between positive, negative or neutral reports. Automated sentiment detection is based on the notion that there is a conceptual connection between words and their adjacent text (Giora, 1996). Sentiment towards a target term (Tallinn) within a sentence is calculated by measuring the number of co-occurrences of the target term and a pre-defined list of sentiment words known to have positive or negative sentiment (Scharl, Pollach, & Bauer, 2003; Scharl & Weichselbraun, 2008). This list was taken from the tagged dictionary of the General Inquirer containing 4,400 positive and negative sentiment words (Stone, Dunphy, Smith, & Ogilvie, 1966). The authors rely on this list of words developed by linguists and heavily used in the natural language processing community.

3.6 Category Building

In order to put those revealed keywords into context, it is necessary to build categories according to the actual meaning of the word. Keywords which do not provide any substantive contribution to explaining Tallinn or include typos and errors are omitted. The keywords were independently grouped by two researchers according to the respective part of speech and underlying concept. This categorization approach resulted in 12 main categories of meaning with a total of 102 subcategories. This categorization approach was carried out for both Study A and B. Figure 3 shows the categories for Study A and B. These categories also reflect the main domains of the tourism industry and help to decrease complexity for easier comparison of the studies.

4 Results

4.1 Online Representation and Travellers' Active Connotation

In order to compare the outcome of Study A (the conventional image study) with Study B (the findings from the text mining process), it is important to define the basis for comparison. The open ended questions from Study A, which were meant to complement the predefined tangible and intangible attributes of Tallinn, provide a comprehensive picture of Tallinn's destination image.

First of all, the answers given to the open ended questions are directly matched with the identified keywords from the co-occurrence analysis. This direct match is only feasible for comparing open ended questions such as Q3 "Please list any distinctive or unique tourist attractions that you can think of in Tallinn.", since the language used within the travel Blogs seems to differ too much to achieve a direct match of more holistic or psychological items as included in the closed-ended questions of the image study. The first part of the comparison hence focuses on distinctive or unique tourist attractions in Tallinn actively mentioned in the open-ended questions.

The respondents of Study A provide 1,095 terms resulting in 306 unique and meaningful keywords (omitting multiple occurrences). Study B identifies 30 of the 306 distinctive sights and attractions of Tallinn within the corpus of text accumulated from the travel Blogs. Figure 1 presents a match of the two studies with regards to the most frequently mentioned sights which amount at least at one percent of the overall mentioned keyword share. Overall, the comparison matches a total of 43.4 % of all keywords derived through Study A. Thus, we can conclude that the text mining procedure reproduces a high share of relevant terms that also occur in conventional image studies.

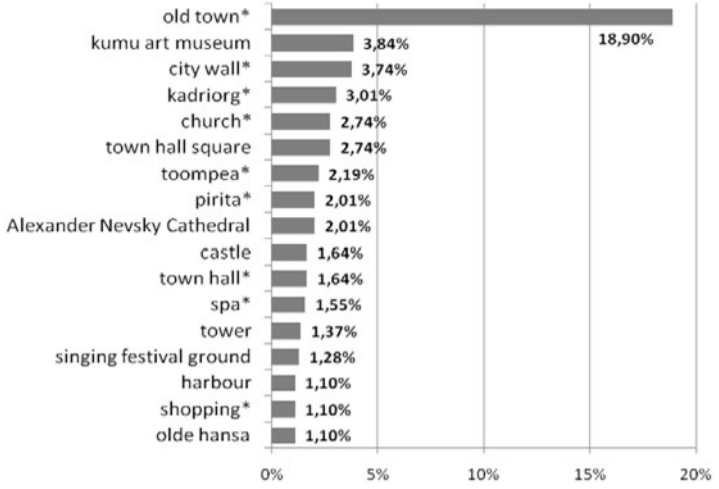

Fig. 1. Direct Keyword Match C (Sights and Attractions): Study A vs. Study B
* indicates a direct keyword match

By looking at the figure above, we can see that out of the 17 named distinctive or unique sights and attractions receiving more than one percent of the overall attention, 9 have been identified by the automated content mining approach. Whereby, the majority of matching keywords can be found within the first 50% of mentioned terms which are also the more important ones. The results indicate that automated comparisons of direct keyword matching are quite challenging, since there are numerous influencing factors. First of all, the coders had to homologize the responses from the open ended questions. The coders used the published names of sights and attractions from the DMOs website for this purpose. The Blog sample for Study B on the other hand delivered a number of terms, which had to be pre-processed in the same way to provide for comparable keyword lists independent of the survey approach. The applicability of automated content analyses following the approach of matching keywords directly is quite limited, it became evident, that there is a need to homologize and categorize keywords in order to create meaningful categories and subcategories describing certain elements of destination representation.

4.2 Comparison of Dominant Themes

A further important question addressed in this research is identifying the topics discussed in the online world and in the conventional image study. The open ended question of Study A Q1: "What images or characteristics come to mind when you think of Tallinn as a vacation destination?" serves as the pool of data for this comparison. The question aims at a general description of the destination as well as connotations with the city. The terms mentioned cover all aspects which are also reflected in the closed-ended part of the survey instrument. The second pool of data is the previously mentioned term list generated through the automated content analysis. As explained before the terms were grouped according to the previously outlined categories. This allows comparing the elements of Tallinn's destination image that are represented in the online and offline world. The following Figure 2 provides an overview of the concepts on an aggregate level.

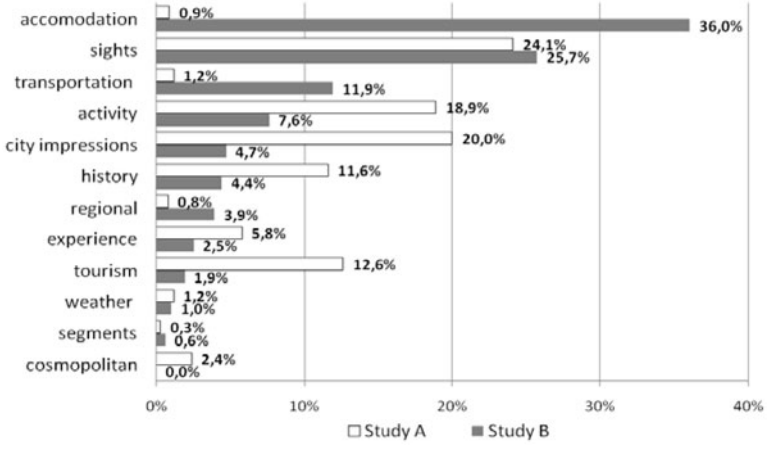

Fig. 2. Relative Importance of Dominant Themes.

It is interesting to see, that basically all but one category have been identified in both studies. The only theme which was not found in the online documents were keywords describing the cosmopolitan nature of the city break destination reflected by keywords describing Tallinn as a modern, European or diverse city. In contrast to that, there are three prevailing concepts overrepresented in the Blogs. There is a vast majority of keywords describing the accommodation as well as transportation sector and information provided about regional peculiarities. Since the sample consists of documents gathered from travel Blogs and virtual travel communities, the nature of the articles covered were assumed to have an evaluative character, a review or report of a past travel experience. Hence, the evaluation of the transportation and accommodation as well as the geographic location is evidently an integral aspect of introducing the boundaries and framework of a travel experience. However, in Study A (conventional image study) there is predominance in the categories activity, tourism, city impressions and history.

Bearing in mind the type of question of Study A which the keywords identified through content mining are compared to, the keywords were expected to focus on these areas. When looking at the connotative words expressing affect or emotions, the open ended questions provide a much richer set of keywords. Adjectives serving this purpose were found to a smaller extend in Study B. Similarly, for online search Xiang, Gretzel and Fesenmaier (2009), found that only about five percent of search terms used by online travellers conveyed affective meaning.

	Category	Study A	Study B	Match C
accomodation	hotel			
	bed&breakfast			
	hostel			
	apartment			
	unknown hotel			
sights	church			
	museum			
	old town			
	city quaters			
	unesco world heritage			
	sights			
	architecture			
	view / scenery			
	nature expierence			
	seaside			
	country parts			
	specific goods			
city impressions	small			
	old			
	tradition vs modern			
	clean			
	traditional			
	atmosphere			
	nice charming			
	cosy			
	picturesque			
	plaseant			
	romantic / dreamy			
	young			
	lively			
	hip			
	quiet			
experience	surprising			
	exciting			
	enjoy			
	relaxing			
	fun			
	interesting			
	vacation			
	happy			
	boring			
	super			
	extraodinary			
regional	baltic			
	scandinavic			
	national pride			

	Category	Study A	Study B	Match C
activity	shopping			
	food			
	events			
	nightlife			
	walking around			
	wellness			
	sports			
	culture			
	entertainment			
transportation	tram subway			
	car			
	bus			
	boat			
	plane			
	train			
segments	business			
	luxus			
	family			
tourism	cheap			
	expensive			
	affordable			
	firendly			
	beautiful people			
	mentality			
	unfriendly/bad service			
	hospitable			
	familiar			
	location			
	fame			
	functional			
	crowded			
	preserved			
	unspoild			
	safe			
	dangerous			
weather	climate & season			
cosmopolitan	modern			
	european			
	diversity			
History	local history			
	medieval			
	east			
	painfull past			
	historic			
	hanseatic			

Fig. 3. Comparing the Destination Image with the Destination Representation

Figure 3 presents the comparison of Study A and Study B on the level of subcategories. The columns indicate whether the subcategory has been identified within Study A, Study B or within both studies highlighted in Match C.

It is not surprising, that the connotations provided by the respondents of the questionnaire contain more items as extracted with the web crawler. Since the categorization approach did not take into account how frequently a word was mentioned within the conventional survey, each response has been considered as

meaningful. Consequently, Study A entails a richer variety of connotations. The most important finding is, that even though the content mining approach focused on the most relevant "meaningful words" it covers all but one category from the image study and as the previously presented results suggest (see Figure 1), those are of high quality.

Looking on the volume of connotations identified and their relative importance is just the first step. Figure 3 shows how the sub-categories are represented. As already mentioned, the categories about transportation and accommodation are represented in a more fine-grained way within Study B, whereas Study A has a larger variety when it comes to descriptive aspects of the city, tourists explaining their experiences during their trip and the performance as a tourism destination.

4.3 Positive and Negative Connotations

Looking at the identified meaningful keywords without taking into account negative and positive connotations of the terms does not reveal the associations among concepts (Weber, 1985). Therefore, our study also investigates sentiment of the keywords revealing some interesting aspects neglected in most other studies. The sentiment towards a category is defined between 1 (most positive) and -1 (most negative). What follows are the main categories, sorted by their attached sentiment value: experience (0.91), city impressions (0.76), regional (0.70), history (0.57), segments (0.53), activity (0.42), tourism (0.37), sights (0.36), weather (0.36), accommodation (0.26), and transportation (0.24). By looking at the subcategories in Figure 3, it becomes evident that the most positive categories are the ones consisting of adjectives expressing affect or emotions. Some sub categories, such as small, boring or painful past, exhibit a negative sentiment value which confirms the quality of the employed content analysis tool.

This survey aimed to cover as many aspects of the destination image as possible. Even though research suggests, that there are just limited aspects such as the affective components of destination image which influence decision making, it is imperative to first evaluate the methodology used. This paper is intended to serve as a basis to further develop the presented content analysis approach to extract the essence of a destination's online representation and to provide meaningful insights for researchers as well as tourism managers.

5 Discussion and Limitations

Importantly, our findings indicate that almost all aspects of the conventional destination image study have been detected within the online environment. However, the focus differed to some extent as the online reviews put more emphasis on aspects such as accommodation, transportation and the location of the destination. In line with the assumption that this is due to the nature of reviews which provide a detailed report along the whole tourism value chain, affective aspects are not that well represented.

Future research should enrich the analyses with benchmarking a city's performance to its competition by analyzing positive vs. negative sentiment of categories. The results furthermore suggest a comprehensive description of the particular type of content, namely travel reports. Since the Internet offers an abundance of information influencing the information search process, and hence decision making of the customers. Therefore, future research should also include other information sources serving as agents of image formation i) to further evaluate the presented methodology, ii) to investigate the representation of the destination under study within different information sources.

The presented approach of measuring the online destination representation has the potential to complement rather than replace conventional image surveys. However, future research should focus more on the affective elements of the destination's representation, which have been suggested as the determining factors of destination image influencing travel decision making. It needs to be investigated if traditional surveys outperform content provided online to judge these emotional dimensions.

Apart from the insights the paper provides there are some limitations concerning this study. First, the main limitation concerning all studies in the field of content mining is, that we are missing context. Some sentiment terms might be positive for one person and negative for a different person. However, this cannot be captured by our automated approach. Furthermore, we rely on the predetermined keyword list provided by the general inquirer. Even though such approaches do not demand for the development of a measurement instrument, they require the researcher to interpret the data to create meaning and context based on the extracted keywords.

Second, there is a limitation due to the approach of convenience sampling, i.e. the researcher specifies the domain through the chosen URLs. However, exactly this approach allows predefining the total field to be covered and recognizes the role of virtual travel communities and travel Blogs as distinct sources of information among the myriad of senders in the World Wide Web. Future research will also include a comparison of different online source to learn more about the true content of Blogs.

Finally, the research project only included textual components, whereas the importance of pictorial or multimedia content has not been taken into account. Particularly in tourism the power of pictures to communicate unique features of a destination cannot be neglected. Future projects should include automated analysis of picture captions and tags. Furthermore, we need to bear in mind, that the Internet is just one source that can influence destination image and competes with traditional sources of information for attention.

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An Evaluation of a Contextual Computing Approach to Visitor Information Systems

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Abstract

Contextual computing is becoming an increasingly important research field in tourism. It is essential to have a substantial understanding of how these systems work and to measure the extent to which real visitors are ready and willing to use them. Thus, this study proposes a two level evaluation that measures the technical performance of a particular contextual computing system, named CONCERT, according to various variables on the one hand, and that assesses the extent to which visitor experience improves by using these types of services. A series of key relationships have been found between the results of the technical and user evaluations. The findings of the user evaluation provide significant insight into the role of contextual computing services in tourism to increase visitors' experience.

Keywords: Mobile Services; Technology Acceptance; Contextual Computing; User Experience.

1 Introduction

The current state of the art technology enables contextual computing services in tourism (Beer, Fuchs, Höpken, Rasinger & Werthner, 2007; Höpken, Fuchs, Zanker, Beer, Eybl, Flores, Gordea, Jessenitsching, Kerner, Linke, Rasinge & Schabl, 2006; Lamsfus, Alzua, Martín & Salvador, 2010). Typically, a visitor is a person in a visiting situation (UNWTO, 2008), who may be more or less familiar and aware of useful information that is available about the place. This kind of place unfamiliarity and lack of knowledge vary from place to place and from person to person. They therefore form an important part of the personal context of a visitor in a particular place. In addition, meaningful context information does not only rely on such kind of external data, but is also affected by other cultural, personal and social factors (Lamsfus, Alzua-Sorzabal, Martín & Salvador, 2010).

Tourists are intensive mobile device users. However, the increasing amount of (structured and unstructured) tourism information on the Internet together with the interaction difficulties posed by mobile devices due to their small screens and keyboards make it a real challenge to find useful information in an active way (search, browse and select information) at the visit time and place. On the other hand, the typical pre-loaded or compiled tourism guides offer more accessible visitor

information, at least pre-filtered by location. These can either have book format or be some sort of mobile (electronic) visitor guide. However, any of these formats require active browsing, pre-knowledge of the organisation of the content and active selection of the corresponding reading.

The widespread adoption of traditional pull communication technology-based (such as 3G, Wi-Fi and so on) download and streaming services, their problems of coverage and price (especially under roaming conditions) and the decrease in price of hard memory storage and player systems (e.g., iPod) give rise to the following questions: could particular sectors (due to their characteristics) rather use a different kind of technology that better suits their nature? For example, could digital broadcasting (push technology) be used together with personal context to better inform and support the visitor?

While there are various studies on the performance assessment of so-called context-aware applications (Wang, Zhang, Gu & Pung, 2004; Gu, Wang, Pung & Zhang, 2004), little has been published on the evaluation of the effective and practical use of these types of applications to discover the extent to which visitors in real settings are ready for and really willing to use these kinds of services. The use of a particular technology shapes what the user can get and allows them to form an idea about the usefulness of that service. However, neither are there studies that show the extent to which visitors are ready to use contextual computing services in order to automatically receive customized information, nor there are studies that establish a relationship between what is technologically feasible and what the user can get.

Thus, the objective of this paper is to analyse the CONCERT Framework-based application, a new semantic-based digital broadcasting contextual computing tourism information system (Lamsfus, Alzua-Sorzabal, Martín & Salvador, 2010) in terms of technical evaluation, i.e. technical performance according to various critical variables, and user evaluation and to find out whether there is any relationship between the technical performance and the usefulness perceived by real users while using the application. The remaining of the paper is structured as follows. Section 2 gives an insight into the research background by first presenting the related literature and then the CONCERT Framework for contextual computing in Tourism. Section 3 presents the research methods followed to conduct both evaluations. Section 4 presents the results of the evaluations and the paper finishes in Section 5 with the conclusions and implications derived from evidence of the results.

2 Research Background

2.1 Related Literature

Context-aware research falls into two categories. The first one focuses on context theory development and the second one on developing standard context models and methodologies based on ontologies. From a context theory perspective, the work carried out by researchers was basically focused on defining the theoretical and

conceptual foundations of context-awareness. They developed a number of applications in order to test their theories, however, their theoretical work was so intense that the most relevant definitions of 'context' were put forward throughout those years (Want, Hopper, Falcao & Gibbons, 1992; Schilit, Adams & Want, 1994; Dey & Abowd, 2000).

Analyses of context management methods (Strang & Linnhoff-Popien, 2004) indicate that ontologies take in adequate functionalities for context information management. Hence, several authors working on context-awareness started to use semantic technologies in order to model context and manage context information. This set the way for systems to share, integrate, exchange and re-use context information and moreover, it enabled not only checking the model's consistency, but also inferring implicit context knowledge (Chen, Finin & Joshi, 2004; Badauf, 2007).

Several mobile tourism guide surveys have already been published (Eisenhauer, Oppermann & Schmidt-Belz. 2003; Kray & Baus, 2003; Grün, Pröll, Werthner, Retschitzegger & Schwinger, 2008). The first two reviews primarily analyse early generation visitor guides and investigate specific issues, such as support for maps or mobility aspects. However, they often do not provide a comprehensive insight into the kinds of services that are supported and moreover, in depth technical aspects of how these services are delivered to the end-user are also not described. Mobile tourism guides either provide location-based information services or concentrate on delivering personalized information, i.e. they fail to provide a combination of both as a rudimentary context-aware kind of service (Grün, Pröll, Werthner, Retschitzegger & Schwinger, 2008).

There are just two examples of real context-aware mobile tourism guides (Höpken, Fuchs, Zanker, Beer, Eybl, Flores, Gordea, Jessenitschning, Kerner, Linke, Rasinger & Schnabl, 2007). Interestingly, although the CAIPS system (Beer, Fuchs, Höpken, Rasinger & Werthner, 2007) provides rule-based push information, it fails to provide a general framework to support visitors, since it is more focused on creation of rules for information delivery. Therefore, from an epistemological point of view, there is some room for research on contextual computing in tourism.

2.2 CONCERT: A New Framework for Contextual Computing in Tourism

In order to address the limitations observed in existing theory and applications, the CONCERT Framework has two main research objectives. First, from a theoretical point of view, it aims to develop a theoretical framework to model context in tourism without the use of external sensors. Secondly, from a practical point of view, the goal is to develop an application based on the new framework to determine the extent to which digital broadcast tourism information can be contextualized so as to provide (relevant) context-based information to visitors (Lamsfus, Alzua-Sorzabal, Martin & Salvador, 2010).

Thus, CONCERT proposes a double degree interoperability schema as shown in Figure 1a and Figure 1b:

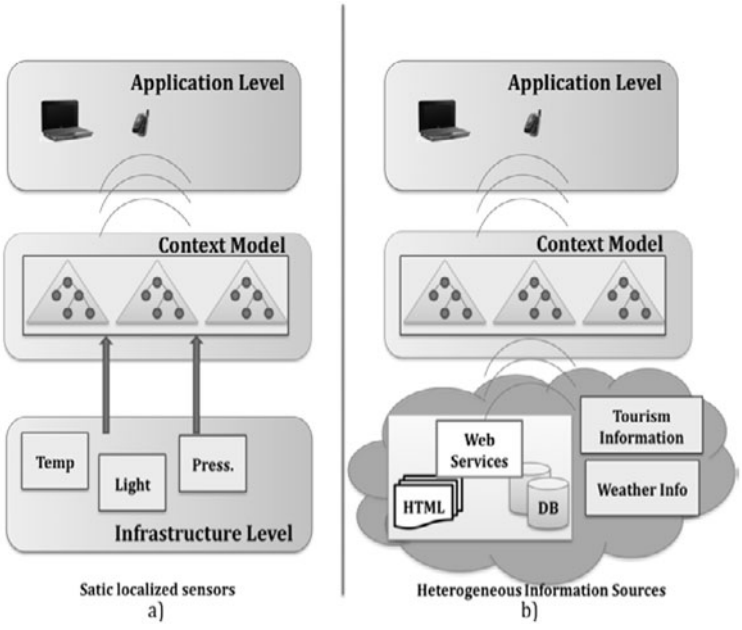

Fig.1a. & Fig. 1b.
The double interoperability level provided by CONCERT

The first level of interoperability is provided at the infrastructure level and is achieved by not using sensors (Figure 1a) to gather contextual information. Both contextual and tourism information will be gathered from Internet information sources (Figure 1b) and will be complemented with mobile embedded sensors (e.g., GPS) as well as with data provided by visitors themselves. This way, the use of a CONCERT-based application will not be restricted to areas (previously) populated with sensors, as is the case in existing approaches.

The second level of interoperability is provided at the model level and is reached by using semantic technologies to enhance data interoperability, share and re-use. In addition, the semantic-based context model will enable checking the model's consistency and to infer higher-level context information. The context model will be built on a network of ontologies (Barta, Feilmayr, Pröll, Grün & Werthner, 2009; Haase, Rudolph, Wang, Brockmans, Palma, Euzenat & d'Aquin, 2006) in an attempt to provide a higher degree of interoperability, scalability, modularity and interoperability. This network of ontologies, called ContOlogy (Lamsfus, Alzua-Sorzabal, Martín, Salvador & Usandizaga, 2009), incorporates the requirements identified in the field of human mobility by the tourism scientific community (UNWTO, 2008).

A rule-based information engine built on top of the ContOlogy network filters the incoming broadcast tourism information with respect to certain context factors at a

given time and place. These factors represent the situation of a visitor, i.e. his/her preferences, current weather condition and location.

```
[kindOfTourismServiceOfferedToVisitorRule: (?v rdf:type dcl:Visitor),
(?v dcl:usesDevice ?d), (?d dcl:isConnectedToNetwork ?n), (?n
dcl:hasLocation ?l), (?l dcl:hasEnvironment ?e), (?e
dcl:offersKindOfTourismConcepts ?s) -> print (?s,
dcl:isTourismServiceOfferedToVisitor, ?v)]

[hasFoodPreferencesRule: (v? rdf:type dcl:Visitor), (?v
dcl:hasPreferences ?p), (?p rdf:type
dcl:FoodPreferencesDemographics), (?v dcl:usesDevice ?d), (?d
dcl:isConnectedToNetwork ?n), (?n dcl:hasLocation ?l), (?l
dcl:hasEnvironment ?e), (?e dcl:offersKindOfTourismConcepts ?s), (?s
dcl:isRestaurantOfTypeVegetarian ?r) -> print(?r
dcl:isTourismServiceOfferedToVisitor ?v)]
```

Fig. 2. Rules defined in the CONCERT Framework

For instance, the second rule depicted in Figure 2 takes into consideration the food preferences of a particular visitor. Given the visitor's location, environment, preferences, time of the day and so on, a number of restaurants are offered to the user that are in his/her surroundings and match his/her context.

3 Methodology

The evaluation of the CONCERT Framework was conducted from December 2009 to March 2010. This section describes the methodology used for the technical and user evaluations.

3.1 Technical Evaluation

The objective of the technical evaluation is to study and analyse the performance of the CONCERT Framework-based application according to various critical variables, such as number of rules, processing time, compilation time, heap memory and CPU usage. It is necessary to evaluate the scalability of the CONCERT Framework for applications where the amount of memory required for reasoning is not a restriction as well as a starting point to reduce the size of the ontology for less powerful devices, such as Smartphones. The importance of these kinds of evaluations is not merely to analyse current performance, but also, to be able to predict the system's performance in future potential scenarios.

It is important to bear in mind that the CONCERT Framework-based application only runs on regular laptops, for digital broadcasting receivers for mobile telephones are

not yet available. Thus, the experiments have been run in a MacBook Pro, an HP EliteBook Mobile and a Toshiba NB100-125. This has allowed the prototype to use a relatively large ontology taking advantage of its reasoning potential, without specially worrying about memory consumption on ontology rule-based reasoning. This is one crucial point of the technical experimentation for two reasons: the first one, for it allows to find out whether digital broadcasting is a valid communication technology for context-aware services in tourism, and second, if it is really a valid technology, for it permits to use the results of the observation on experiments to find the way to design a reduced version of the original ontology.

The performance experiments were carried out populating the network of ontologies with a more or less constant number of instances, and running each time a larger number of increasingly more complex rules on it. Experience shows that the more number of instances within a class, the more time it takes the ontology to perform the established reasoning and the more time it takes to query it (Wang, Zhang, Gu and Pung, 2004; Gu, Wang, Pung, Zhang, 2004). Therefore, the CONCERT context manager (Lamsfus, Alzua, Martín & Salvador, 2010) runs as a background process to always check the existence of instances in the classes of the ontology before introducing a new one. Consequently, the number of instances has not been considered critical and the evaluation has rather focused on the number of rules executed in each of the experiments, while maintaining the order of magnitude of the triples (0.7k – 1.2k). The reasoning tasks performed in the ontology (apart from consistency checking) correspond to checking whether a number of statements are true in order to execute a certain command.

3.2 User Evaluation

User testing was conducted in a controlled laboratory environment. First of all, the users were briefly introduced to the CONCERT Framework, to the application and to the experiment's objectives. They were instructed on how to interact with the CONCERT Framework-based application and before starting with the experience, they were given an example on how to manipulate the application. In addition to that, participants were given a number of scenarios (Lamsfus, 2010), in which they had to be virtually immersed and try the application's various functionalities. After having received the instructions, participants were left on their own in order to accomplish the experiment.

There have been altogether 30 participants in the experience, 56% of which were males. 40% of the participants were younger than 36 and in total 92% were younger than 50. The participants have been chosen from a random group of people, trying to have as different backgrounds as possible and different experience in using technology-based information systems.

The experiment consisted of seven scenarios; each of them recreated different contexts or situations and therefore, ought to provide different tourism context-based recommendations. After having completed the user experience, each user had to fill

out a questionnaire. On average, the whole experiment took about 15 minutes to be completed. The simulation was carried out with the HP laptop.

Participants were given a questionnaire they had to fill in once they had finished their experience with the CONCERT Framework-based application. Due to the importance of concepts such as PU or PEOU, from a methodological perspective the used survey was designed on the TAM literature, and in particular, it was adapted from David's studies (Davids, 1989; Davids, Bagozzi & Warshaw 1992). The measurement for behavioural intention and background level were adapted from another experiment work performed by Chesney (Chesney, 2006) and Abdalla (Abdalla, 2007).

4 Results

4.1 Technical Evaluation Results

The observations show that, despite the fact that ontologies are a beneficial tool for contextual computing, the information processing time when it comes to run rule-based reasoning is relatively high. Both the Mac and HP laptops maintain their processing times within acceptable ranges, less than 8 seconds in both cases. On the contrary, the processing time goes up to almost 30 seconds in the case of the Toshiba laptop, which offers a similar CPU to latest cutting edge mobile devices with 1 GHz. processors. According to these results, there is a tight relation between the processing time and the processor as well. Thus, it will be possible to decrease processing time as new more powerful processors for mobile phone-like devices come into the market, finding a balance between the size of the ontology, number of instances and number of rules. An alternative to this would be to store the ontology and the rules on databases. This would very likely reduce the amount of memory. However, it would penalize the processing time, which according to the results obtained is a critical variable on its own.

In addition, the ontology has to be refined and the reasoning process has to be made more efficient. The results and the literature indicate that the processing time is more dependent on the number of triples than on the number of rules (Wang, Zhang, Gu & Pung, 2004; Gu, Wang, Pung & Zhang, 2004). Hence, there is a need to decrease the size of the ontology, which will consequently produce lower processing times.

The heap memory is more or less similar in all three machines, and it goes up to an average of 45 MB. It is high, therefore the size of the ontology needs to be reduced for this reason as well, so that the number of triples are decreased and thus, so are the use of memory and processing time. This value being approximately similar in all three devices suggests that it is not dependant on the hardware, but on the ontology and programme itself. Therefore, efforts have to concentrate on working on reducing the size of the ontology in terms of number of triples and in terms of guaranteeing the lowest number of instances at the same time, as the prototype developed for the purpose of this experiments actually does. An alternative to this would be working on

new computing methods for ontologies, since the greatest consumption of memory has been observed when loading the ontology onto the Java model.

It is surprising that the CPU usage is so low, an average of 14%, primarily in the Mac and HP machines. The usage of the CPU increases notably in the case of the Toshiba machine, going up to an average of 34%, very likely due to the low power of the processor and the low size of the RAM memory, just 1MB. However, it would be desirable to work on increasing the usage of the CPU, since it would on the one hand reduce the processing time and on the other, the heap memory use would make the performance of the CONCERT Framework-based application more efficient.

4.2 User Evaluation Results

Looking at the results provided by the data processing just from a descriptive point of view, it could be said that people find the application useful to support their mobility. Evidence shows that the CONCERT Framework-based application improves user satisfaction.

The user evaluation endorses the importance of the perceived utility of the system while trying to get precise information on the move. More than half of the participants (56%) "Strongly Agreed" on the fact that the CONCERT Framework-based application supported them on the move, whereas 44% only "Agreed" on that same matter. Seven out of ten (68%) participants expressed that the CONCERT Framework-based application would improve their tourism experience, whereas only 4% argued that it would not have impact on it whatsoever. These data make it possible to confirm that people find the application supportive when en route.

The Perceived Utility of the CONCERT Framework-based application has also been highly supported. The application allowed 60% of the participants to move more efficiently around and over three quarters (76%) of them indicated that the application made it easier for them to find what they needed. 68% of the participants "Strongly Agreed" on the fact that learning how to use the application was easy and 44% "Agreed" on that same matter. Interestingly, almost three quarters of the participants "Strongly Agree" on the fact that it is easy to get information from the CONCERT Framework- based application.

According to the Interface Usability, more than half of the participants confirmed that the interaction with the application is clear (52%) and almost 40% stated that they liked using CONCERT. In addition to those facts, 57.1% of the users "Agree" on the attractiveness of the UI and the same percentage indicates that using the application is fun.

In order to better understand the underlying unobservable constructs or operational concepts such us the perceived utility or usability of the systems, a Factor Analysis has been carried out. Factor Analysis is a method of data reduction. It does this by seeking underlying unobservable (latent) variables that are reflected in the observed variables (manifest variables).

The determination of the number of factors to extract has been guided by theory, but also informed by running the analysis over the sample extracting different numbers of factors and seeing which number of them yields the most interpretable results. Four factors have been identified and supported by Eigen values (Table 2). The results obtained suggest that the extracted factors are significant to assess the perceived utility and supportive performance while using CONCERT Framework-based applications. The factors have been labelled as follows: Interface Usability, Perceived Utility, Supportive Performance and Background Knowledge.

Table 1. Factor Analysis: Total Variance Explained and Eigen Values

Total Variance Explained				
Factors/Items	**Interface Usability**	**Utility**	**Supportive Performance**	**Background Knowledge**
Total Variance	3.6	2.438	1.432	1.031
Eigen Value	2.916	2.153	2.082	1.351
% of variance explained	24.298	42.238	59.590	70.847

The correlation matrix and the factor loads also indicate that there can be some sort of relation between the Background Knowledge and the Perceived Utility.

Table 2. Total Variance Explained

Items	**Interface Usability**	**Utility**	**Supportive Performance**	**Background Knowledge**
Using is fun	0.836			
Attractive UI	0.817			
Like using	0.749			
Clear Interaction	0.717			
Getting info easy		0.849		
Learning to use		0.738		
Support on the move		0.651	0.508	
Move more efficiently			0.903	
Improve Experience			0.847	
Prior Knowledge				0.775
Become skilful	0.463			-0.583
Often use technology				0.500

In addition, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy has been conducted. This measure varies between 0 and 1, and values closer to 1 evidence a better fit. A value of .6 is a suggested as a minimum and in this case, a value of .668 has been obtained. The cumulative explanatory power of this model is 70.847%, which together with the stated results, bring in, at least, partial support to the hypothesis put forward at the beginning of the paper, i.e. the contextual computing

application built increases user satisfaction and people are willing to use these kinds of services.

5 Conclusions and Implications

Digital broadcasting presents various advantages for contextual computing in tourism with respect to traditional approaches to these kinds of applications. The review of the literature shows that tourism information can be broadcast and then filtered by means of a semantic-based context model to provide visitors with information that is relevant to them. Therefore, this new broadcast/filter paradigm relieves visitors from having to actively browse information on the web, following the most widespread search/select paradigm and makes it more convenient to consume tourism information while en route, through mobile devices.

While there are various studies that focus on the technical performance of ontology-based applications, little has been done to assess how ready visitors are to use contextual computing services in order to automatically receive contextualised information.

The functionalities implemented in CONCERT's filtering engine guarantee the following: First, the context manager checks the consistency of the context model for the given value of the context parameters and then, "once and if and only if" the current model is formally consistent with the original conception of the network of ontologies, the rule-based reasoning filters tourism information according to the context parameters and produces the contextualised information. This approach has provided evidence that indeed, incoming broadcast information can be further manipulated by semantic technologies to reduce the amount of information to display on the screen of a mobile device. In addition to that, the results obtained for the performance according to the critical variables (processing time, heap memory, CPU usage and number of rules) show that performance is within the parameters that could be expected from an ontology-based system and provides future research lines to improve the technical behaviour of semantic-based contextual computing applications.

One of the most important objectives pursued by the CONCERT Framework is to make contextual computing applications universally usable and accessible. Therefore, it was necessary to test the application with real users. These kinds of statistical observations usually require fairly large samples. However, the objective of this experiment was to have a first usability response, to find out whether the application was efficient or not and if it was working the way it had been designed. This justifies the size of the sample, since the experiment is not seeking to perform a typical user evaluation, but a first response to the particular functionality implemented in the CONCERT Framework-based application, i.e. the objective was to have an understanding of how users deal with the system, how they used it.

The perceived utility factor has been considered an equivalent indicator with the technical performance, establishing the link between what is technically feasible, i.e. what visitors can get, and how useful they find the application. Therefore, according to the results of the user evaluation, evidence was found that participants would support these kinds of contextual computing services in tourism, through the utilization of the adequate tools, i.e. mobile devices. Additionally, evidence was also found that these kinds of systems would increase the user experience. Summing up, this work could be considered as a first step towards future research on contextual computing in tourism.

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A Contextual Geofencing Mobile Tourism Service

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Abstract

Tourists have become active mobile technology users while on route. They request information anytime, anywhere, so it has to be personalized to better satisfy their needs. This paper presents a Contextual Geofencing Mobile Tourism Service that proactively sends push based notifications to visitors´ mobile devices according to their context. These notifications are linked to concrete areas and to specific context conditions. This way, if a visitor is inside an area that contains a notification and her context values match the defined conditions, the system will send that notification to the visitor. The service is composed of a mobile client, where visitors receive and manage notifications and a web client, where tourism entities (e.g., tourism offices, restaurants) can define virtual areas, create notifications and configure the context conditions that trigger the notification sending process. The implemented architecture and some user experiences are also described.

Keywords: Tourism Guide, Context-Aware, Mobile Service, Recommender System.

1 Introduction

Mobile technologies have been greatly improved in recent years (e.g., GPS, accelerometer, Internet access everywhere, touch screen) enabling the emergence of new mobile services. Moreover, tourists have become active technology users while on route, having Internet access anywhere through their mobile devices. This tourism scenario is favourable in order to deploy new tourism mobile services that assist visitors on the move, like location based services (Steiniger, Neun, & Edwardes, 2006), which provide information about points of interest based on the visitor´s location, whenever and wherever they are.

The mobile environment is quite different from the desktop environment so the requested information has to be customized in order to increase visitors´ satisfaction and fulfil their needs on the move. One of the key aspects for this personalization concerns data about people, objects and their surroundings (location, user preferences, temperature, etc.) which are known as context data (Dey, Abowd, & Salber, 2001).

The development of services that manage context data is quite complex and involve several new challenges that have to be faced in order to provide the correct architectures to support them. Context data coming from different sources has to be acquired. These sources are usually distributed and provide heterogeneous data. Acquired context raw data has no meaning for a computer so a data model is needed

to represent it and manage it. Furthermore, a context information process is needed to infer visitor´s high level context. Finally, all processed data has to be delivered to applications in order to provide personalized information according to the visitor´s situation. All these complex tasks require new types of software architectures. Most of the existing commercial mobile guides make use of the visitor´s location and user profile as the main context parameters (Grün, Werthner, Pröll, Retschitzegger, & Schwinger, 2008). The usage of more context parameters could improve the personalization process and increase visitor´s satisfaction.

In this paper a Contextual Geofencing Mobile Tourism Service called liveCities is presented. Geofencing is the next natural step of location based services. A geofence is a virtual area defined by a set of boundaries, like a leisure centre area or neighbourhood boundaries. This way, liveCities takes into account *geo-context*, which refers to the context that is relevant to a particular area. The motivation of this work is to explore the *geo-context* approach implementing a proactive context aware tourism notification service, which uses a wide range of context parameters in order to determine the visitor´s situation in a concrete area. In so doing, when a visitor is inside a particular area and her context values match the ones defined for that area, the device receives a notification with information on that area. The system is composed of a mobile client in order to receive and manage notifications on the move and a notification manager, which is a web client that helps to manage areas, notifications and context conditions.

The rest of the paper is organized as follows. In section 2, the related work is discussed. Section 3 contains the description of the system. Section 4 describes the architecture and components of liveCities. Section 5 presents some implemented use cases and user experience analysis. In section 6, the benefits of the system are discussed. Section 7 concludes the paper with brief concluding remarks.

2 Related Work

There are several research projects in the tourism domain that use context parameters in order to customize information according to the visitor´s situation (Schwinger, Grün, Pröll, Retschitzegger, & Schauerhuber, 2005). LoL@ (Umlauft, Pospischil, Niklfeld, & Michlmayr, 2003) and MobiDENK (Krosche, Baldzer, & Boll, 2004) approaches make use of location context in order to customize requested information. COMPASS (Setten, Pokraev, & Koolwaaij, 2004) provides tourists with context-aware recommendations using external map services. Both pull and push based information retrieval is supported. The system uses location, user profile and time in order to customize requested information. CRUMPET (Poslad et al., 2001) is a tourism guide that provides information about points of interest. The system can also provide proactive tips when a visitor approaches a concrete point of interest. In this case, location, device, network and user profile are considered. Guilliver´s Genie (O'Grady & O'Hare, 2004) is also a map service that uses location, device and user profile in order to provide information about nearby points of interest. m-To-Guide (Kamar, 2003) approach uses location, network and user preferences as context

parameters and supports pull and push based information retrieval. CAIPS (Beer, Rasinger, Höpken, & Fuchs, 2007) considers location, user profile, weather, time and date in order to push messages via SMS or e-mail.

Also, some of the more relevant architectures to support context-aware services have been reviewed. One of the first implemented approaches is the Context Toolkit (Dey, 2000). This framework presents an innovative architecture composed of different functional modules in order to acquire, aggregate and interpret context information. It uses key/value pairs in order to model context data. Other approaches like CASS (Fahy & Clarke, 2002) propose a layered middleware architecture that uses a relational data model to represent context data. JCAF (Bardram, 2005) is a framework and a runtime environment to develop and deploy contextual computing applications. It uses an object oriented model to represent context data. These three approaches use interpreters to convert acquired raw data into higher level context data, but these transformations cannot be very complex because there is no inference mechanism. SOCAM (Gu, Pung, & Zhang, 2005) is also a framework based on three different layers, namely a sensing layer, a middleware layer and an application layer.

Mobile frameworks have also been developed in order to create applications that are executed in mobile devices (Hofer, Schwinger, Pichler, Leonhartsberger, & Altmann, 2002). These are designed to acquire mobile device information as context data (e.g., location, battery level, noise).

3 Description of the System

liveCities is a push notification service that sends personalized information to visitors´ mobile devices according to their context on a defined area. The content of these notifications can be plain text, audio, video, HTML or a link to an external web site. There are three types of notifications: information, suggestion and offer. Thus, an information notification can contain a description about a nearby point of interest, a suggestion notification can propose things to do according to the visitor´s context and finally, an offer notification can inform about special offers and discounts in real time. Each notification is linked to a concrete area (defined by its boundary coordinates) and some context conditions. This way, if a visitor is inside a predefined area (virtual fence) and the context values match the ones defined in the system for that area, the information is pushed to the visitor´s mobile client.

The system is composed of two main modules: the Mobile Client where visitors receive notifications in real time and the Notification Manager web client that helps registered tourism entities (e.g., tourism offices, restaurants, museums) to create and configure areas, notifications and context conditions.

3.1 Mobile Client

The Mobile Client is an Android native application where visitors receive push notifications according to their context on a certain area. As shown in Figure 1, the

visitor has to configure a profile where some static context parameters are required: username, age, gender and nationality. Also, the visitor can configure her social context by scanning nearby devices using Bluetooth technology. Once the mobile technology finds nearby devices, the visitor can set the role of each one of them: family, friend, workmate or couple. This social context is stored in the mobile device. Also, location and moving mode of the visitor (none, walking or transportation) are automatically acquired by the Mobile Client.

Once the visitor profile is configured, the Mobile Client starts to publish data to the Notification Manager with all the gathered context information: user profile, location, moving mode and social context. These messages are sent every time a context parameter value changes. If the Notification Manager finds any notification that matches with the visitor´s context values, the notification is sent to the mobile device. When a new notification is received, the mobile device vibrates. Figure 1 presents an example of a received notification.

Fig. 1. User´s profile configuration screen and a notification example.

3.2 Notification Manager

The Notification Manager is a web application where all the registered tourism entities can create and configure notifications to be sent to the visitors´ mobile devices according to their context. It has a map service where tourism entities can create virtual areas and link them with notifications that are relevant to these areas with certain context conditions. Figure 2 shows a notification creation wizard. When a new notification is created, area, title, content and type (Information, Suggestion or Offer) have to be defined. Also, the tourism entity has to define the context parameters and values that are relevant to that area.

Besides the context values provided by visitors´ mobile devices, any other external context provider can be plugged into the system. For instance, a weather context provider has been implemented in order to get the temperature value from a weather web service. This way, any tourism entity is also able to create its proprietary context data provider and send context data to the system. As is seen in the following

sections, a Restaurant Provider has also been implemented in order to send occupation rates to the system. This way, the restaurant can use this parameter along with other context values in order to configure the conditions of the notification delivering.

Fig. 2. Notification creation wizard.

The following table summarizes all the context parameters that can be used by tourism entities in order to configure context conditions.

Table 1. Available context parameters and their descriptions.

Context parameter	Description
Username	This parameter is used to register the user in the system with a unique identifier.
Age	Visitor´s age.
Gender	Male or female.
Nationality	Visitor´s nationality.
Location	Mobile device coordinates (latitude and longitude). If this coordinates are inside a registered area, they are translated to that logical area name.
Social context	Family, Friend, Workmate or Couple. This is used to infer social context by scanning nearby devices using Bluetooth technology. A role can be assigned to every detected device.
Moving Mode	None, Walking or Transportation. This value is inferred from the speed value provided by the GPS of the mobile device.
Temperature	This value is acquired from Yahoo Weather.
Date	This value is gathered from the system.
Time	This value is gathered from the system.
Third party context providers	Any tourism entity can provide context data to the system.

4 Architecture Description

The components defined in the previous section have several modules in order to provide the desired functionality. As shown in Figure 3, the architecture is divided into several interconnected components that are distributed. The overall system is implemented in Java. The main modules of this architecture are the Mobile Client, the Notification Manager, the Context Manager and the Context Providers. Their detailed descriptions are as follows.

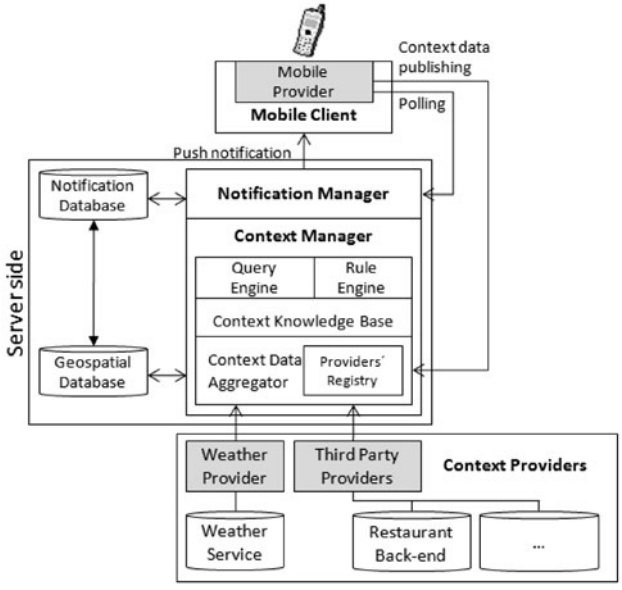

Fig. 3. Architecture of liveCities system.

4.1 Context Providers

A Context Provider extracts context data from the identified context data sources. These sources can be distributed and provide heterogeneous data (e.g., web services, data bases, hardware sensors). Any third party entity can also provide context data to the system by implementing the communication interface of the Context Provider. In this case, two providers have been implemented. A provider that gathers the number of people inside a restaurant from a simulated restaurant back-end system and a weather provider that gets temperature value from a web service.

Context Providers periodically access the selected sources and asynchronously send gathered data to the Context Data Aggregator in order to be processed. This data is provided in the form of key/value pairs and later it is transformed into the object oriented context model. This way, providers abstract the context gathering process for the upper layers, so any change in the context sources does not affect the rest of the

architecture. There is a special provider that is encapsulated in the Mobile Client that is later described in detail.

4.2 Notification Manager

This manager is responsible for managing all the notifications configured by tourism entities. It contains a web client that facilitates such a management. All the notifications are stored in a relational data base that is linked to a Geospatial Database. This way, every notification is related to its corresponding area.

4.3 Context Manager

This module is the core component of the system. It manages context data life cycle, which involves conversion of gathered data into the context model, inference of high level context, management of the current context data and the notification assignment process by the use of rules. Also, this layer is aware of all the registered context providers. The main modules of the Context Manager are the following.

Context Data Aggregator. This component aggregates and transforms key/value pairs into Java Bean object type instances that represent different context entities (e.g., Visitor, Restaurant, Museum). It then updates the Context Knowledge Base with up-to-date data that is encapsulated in these context entities. Also, it can have access to an external relational database in order to obtain static context data. This way, the aggregator translates dynamic location coordinates into a logic area, accessing a Geospatial Database where all the predefined areas are stored.

Providers´ Registry. This registry manages the providers´ life cycle. A communication protocol is used in order to register/unregister a provider. Moreover, it periodically sends messages to the registered providers in order to get a status message from them. If there is no response, it unregisters the provider and deletes all its context data from the Context Knowledge Base.

Context Knowledge Base. This component stores in memory context entities containing dynamic context data. The system uses Drools rule engine (http://jboss.org/drools) in order to infer high level context. This rule engine is also used in order to send notifications according to the context data values stored in the Knowledge Base. Furthermore, a Query Engine is provided in order to access context data using the query language offered by Drools. Below, is represented a simple rule example that sends a notification to a visitor that is waiting at the bus station with an estimate of the remaining time for the bus to arrive.

```
rule "Bus Station"
        when
                v: Visitor(a : area, area!=null, area.type=="Bus_Station",
                        moving_mode=="MOVING_MODE_NONE")
        then
                sendNotification(v.getId(), a.getId(), getRemainingTime(a.getId()));
end
```

4.4 Mobile Client

The Mobile Client is composed of the notification client, where the visitor can manage the user profile and receive notifications, and the Mobile Provider, the core component of the client system.

Mobile Provider. The mobile provider acquires location and speed context values from the GPS of the mobile device. Location coordinates are used in order to know if the visitor is inside a registered area and the speed is used to infer the visitor´s moving mode. Also, the provider performs periodical scans in order to get nearby devices and automatically infer the visitor´s role according to the internal social context database. The gathered context data is automatically published in order to be processed by the Context Manager. The push notification service is implemented by a polling technique. This way, the provider makes periodical requests to the Notification Manager in order to check available notifications. If new notifications are available to a visitor, the Notification Manager sends them in the polling response.

5 Tourist Scenarios and User Experience

In order to validate the system, some scenarios have been designed and tested with users. In these scenarios several tourism entities have been simulated: a restaurant, a bus company and a tourism office. Notifications of different types have been configured using several context conditions in order to make the customization process. The next two sections describe these use cases and the user experience results.

5.1 Proposed Scenarios

Point of Interest Information Notifications. These notifications are configured by the tourism office. Several virtual fences have been created and linked to notifications with information about the points of interest that are inside those areas. If a visitor enters one of these areas, the notification is pushed to the visitor´s mobile device. The main context parameter that has been used is the visitor´s location.

Transportation Information Notifications. These notifications are provided by the bus company. Several areas have been created around bus stations. This way, if a visitor is waiting for the bus, the system pushes a notification with an estimate of the remaining time for the bus to arrive. The context parameters that have been used are the visitor´s location and the moving mode. The system will infer that visitors are waiting for the bus if they are inside a bus station area and they are not moving.

Restaurant Suggestion Notification. This is a suggestion notification configured by a luxury restaurant. This use case is used to suggest restaurants to visitors with a defined business role having a walk around a restaurant area at lunch time. A luxury restaurant can participate in this so that the notification provides information about the menu. In order to send this notification, several context parameters have been

used: location, moving mode (walking), age (>30), time (from 11 a.m. to 14 p.m.), social context (the visitor has to be with some workmates to be considered as in business role) and date (from Monday to Friday).

Restaurant Offer Notification. This is an offer notification provided by a fast food restaurant with an outdoor terrace. The notification is configured in order to offer a discount to visitors that are having a walk around the restaurant area at lunch time. This discount is offered because there are not many people having lunch at the terrace. This way, if the weather is nice, the notification informs visitors that they can have lunch in the terrace with a 10% discount. This use case, utilises the following context parameters: location, simulated restaurant back-end (number of people at the terrace having lunch), moving mode (walking), time (from 13 p.m. to 14 p.m.), age (<30) and temperature (>20 °C).

5.2 User Experience and Results

The above mentioned scenarios where implemented in a real area of San Sebastian (Spain). The users had to take a tour through the different areas of the described scenarios.

Table 2. User experience results.

	Strongly disagree				**Strongly Agree**		
	1	**2**	**3**	**4**	**5**	**Average**	**St. Dev.**
Like the system	0%	0%	6.6%	26.7%	66.7%	4.6	0,70
Proactivity of the system is useful	0%	0%	6.6%	40%	53.4%	4.5	0,71
Useful for tourists	0%	0%	0%	46.7%	53.3%	4.6	0,52
Useful for tourism entities	0%	0%	0%	33.3%	66.7%	4.7	0,48
Added value over other known systems	0%	0%	0%	60%	40%	4.5	0,53
Would use the system again	0%	0%	13.3	33.3%	53.4%	4.7	0,48
Easy to use	0%	0%	13.3	33.3%	53.4%	4.6	0,70

First of all, the users were informed about the system and were introduced to the experiment's objectives. A total number of 15 people completed the tour, consisting of 4 females and 11 males. The participants ranged in age from 20 till 50 and were active technology users. After having completed the experience, each user had to fill out a questionnaire.

The results on Table 2 show that most of the users consider that the system is useful for tourists (53.3%) and for tourism entities (66.7%). They like liveCities (66.7%) and they find it easy to use (53.4%). Also, the proactiveness of liveCities is helpful for them (53.4%) and it offers an added value over other known tourism mobile services (40%). What is more, more than half of the users (53.4%) would use the system again. The average rating is between 4 and 5 and none of the participants disagreed with any of the questions, so liveCities can be considered as a promising system in order to assist tourists on the move and help tourism entities.

There are several comments made by participants about the system as well. These comments are about adding new functionalities related to the received notifications. For instance, some users state that it would be useful to rate notifications and filter them. Also, some users point out that a bidirectional communication would be interesting in order to provide functionalities to make reservations, buy tickets, etc. All these suggestions are going to be considered for future versions of liveCities.

6 Discussion

Reviewed research works consider location, user profile and network as the main context parameters. However, there are more context parameters that could be used in order to provide a better personalization. For instance, weather information is a relevant parameter because visitors´ activities can be both indoors and outdoors. Also, the social dimension of tourism is relevant because people often enjoy sightseeing in groups with very different roles (e.g., friends, family) (Buriano, 2006).

Table. 3. Used context parameters by reviewed systems.

	Location	User profile	Social Context	Network	Device	Weather	Moving Mode	Date	Time	Third Party Providers
COMPASS	X	X							X	
CRUMPET	X	X		X	X					
LoL@	X									
mobiDENK	X									
Guilliver´s Genie	X	X			X					
m-To-Guide	X	X		X						
CAIPS	X	X				X		X	X	
liveCities	X	X	X		X	X	X	X	X	X

As shown in Table 3, liveCities explores the usage of more context parameters than the ones mentioned before. In addition, with liveCities, context conditions can be linked to virtual areas. This approach is more precise than using a general context for anywhere, and the effectiveness of the notification delivering is higher, providing a better service to the visitor. The system is also opened to external context providers, so any tourism entity can be a context data provider. This way, they can use its own context values with the ones gathered by the system in order to provide a better service.

Related systems only acquire location value from the GPS of the mobile device automatically. However, liveCities is also able to acquire moving mode, social context, weather, time, date and any context value provided by external entities in an autonomous manner. The interaction of the visitor with the system is also reduced because of the push based service offered by liveCities. The visitor only has to provide some user parameters in order to configure a profile and start the system, which proactively will send notifications to the mobile client. This offers a better usability of the system because it reduces the effort for gathering information.

7 Conclusions

This paper has presented liveCities, a Contextual Geofencing Mobile Tourism Service. This service sends push based notifications with tourism information to visitors´ mobile devices, according to their context inside a determined area. Related works have been reviewed and some sample scenarios have been described.

This work explores the usage of a great number of context parameters in order to customize information in a mobile scenario. The usage of more context values has an impact on the customization process, where more context conditions can be used in order to provide a more accurate personalization. These systems improve usability, given that they minimize the user interaction with the mobile device and help to get a better user satisfaction.

As future work, a real deployment of the system is planned, making it available for download by real tourists, and enabling the system to be accessed by tourism entities in order to configure real notifications. This way better user tests and feedback will be obtained. Furthermore, an analysis of the gathered context data is planned. Objective understanding about tourist mobility, behaviour and satisfaction, obtained in route, has long been awaited by destination management organisations. The fact that liveCities allows the information to be gathered when tourist are in situ, embodies an extremely essential added value to be used as a tool for efficient holistic management strategies.

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A Mobile Advertising Platform for eTourism

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Abstract

Nowadays, tourism entities seek to promote their regions in a more aggressive strategy, offering a large diversity of services delivering personalized solutions in order to comply with a broader range of tourists. Furthermore, mobile computing offers new capabilities that facilitate the development of new services based on the location of the user and the users' profile. Thus, mobile computing systems are undergoing changes to support tasks related to advertising and marketing of goods and services. This paper presents a generic solution for the delivery of new services, advertising and marketing for the tourism sector to take advantage of the spatial context of the user - Mobile Advertising. The practical implementation of the suggested methodology is focused on the Tourism Region of Douro, in Portugal.

Keywords: Mobile Advertising; Location Based Services; Geospatial Applications; User profile; Mobile Computing; Tourism

1 Introduction

In Portugal, as in many other countries, the contribution of tourism to the national economy is very important. For example, the weight of tourism to the portuguese Gross Domestic Product (GDP) is around in 14.4% and the World Travel Tourism Council (WTTC) predicts that in 2010 this value will be 16.9%. Furthermore, the tourism is responsible for 18.8% of national employment (www.wttc.org [Sept. 20, 2010]) and the Portuguese national technology plan (Ministério da Economia e da Inovação, 2006) includes several strategies for using new technologies to create added value. Some of these national guidelines define what is necessary for tourism entities to support their activities on strategic parameters, such as more aggressive and direct marketing, innovation in marketing, intensification of personal contacts to promote services and technologies for promoting the approach of the various parties. The importance of these policies for the development of services and innovative platform may enable the tourism sector growth and boost their capital gains. Mobile Advertising is the result of the principles proposed by the concepts of Advertising, Marketing and Geomarketing, and as the name suggests a way to communicate or advertise through mobile devices. The main potential of Mobile Advertising is the ability to promote the campaigns with direct access to the user or group of users in situ. Therefore, this paper addresses the design of a generic platform to provide new services for advertising and marketing touristic regions, by taking advantage of the spatial context of the user. In this paper we present a practical implementation of this platform focused on the Tourism Region of Douro, in Portugal.

2 Related Work

Pospischil, Umlauft and Michlmayr (2002), Kenteris, Gavalas and Economou (2009), Echtibi, Zemerly and Berri (2009) present various systems designed to assist tourists. These works provide interesting solutions, such as maps, localization, routing functionality, speaker-independent speech input and even user preferences. Werthner and Ricci (2004) explore the aspects related to the travel and tourism e-commerce and how this definition may change the structure of this industry and the process of creating new business opportunities. Although not directly connected to mobile devices, Mu, Yi, Xiaohong and Junyong (2009), Yu and Chang (2009), Kabassi (2010) present studies on information technology and services for recommendations on tourism. Lee, Kim and Jo (2006) presents a suggestions system for restaurants, taking into account the local context, personal context and user preferences. Vaz (2009) concerns the delivery of push services and targeted services based on location and the work of Cardoso (2008) specifies the ability to create mobile advertising tailored to the user. The Geotumba (Silva & Freitas, 2005) is a geographic search engine for mobile devices and the authors describe the main challenges in designing interfaces for these services on mobile devices and, in addition, they provide methods for defining, retrieving and viewing information in geographic context. Amundson (2006) deals with the development of a new mechanism for selection of geo-referenced information. The presented solution ensures that the selected information takes into account the guidance, direction, angle and field of view of the user. For example, this approach can perform queries like: *What are the restaurants in this direction?* Hinze and Malik (2006) explore some ideas on how to create a platform that models, observe, evaluates and explores a good sense of context. The Webpark (Gonçalves, Rodrigues & Dias, 2010) was a project funded by the European Union, which provided mobile solutions and applications to access geographic information relevant to visitors of parks or protected areas. The Terrestrica (Mobycon, 2010) is an application that uses the geographic location (using GPS) to manipulate multimedia content (photos and videos) in order to integrate it to social networks. For those who want to advertise content through the portal Terrestrica, they can select some points of interest where they want to see advertising done, however these points of interest have to coincide with the same points previously entered by users. The insertion of advertising content is not free.

By reviewing the state of the art we can observe several works that apply mobile technology to tourism. However, there is no integral solution for the implementation of mobile advertising to touristic areas and eTourism in general.

3 Platform for eTourism

Mobile Advertising provides opportunities for new services. Given the limitations of currently available solutions, we present a new platform for dissemination of services related to regional tourism. The methodology developed may include business processes or any communication with the users, always with the purpose of advertising goods and services in touristic areas.

3.1 Concept

As can be seen in Figure 1, this platform is not ”publicity radar" (suffocating the user with publicity) but instead is a solution which encourages tourists to explore the region and allows local entities to promote the best the region has to offer, limiting interference in the activities of the users.

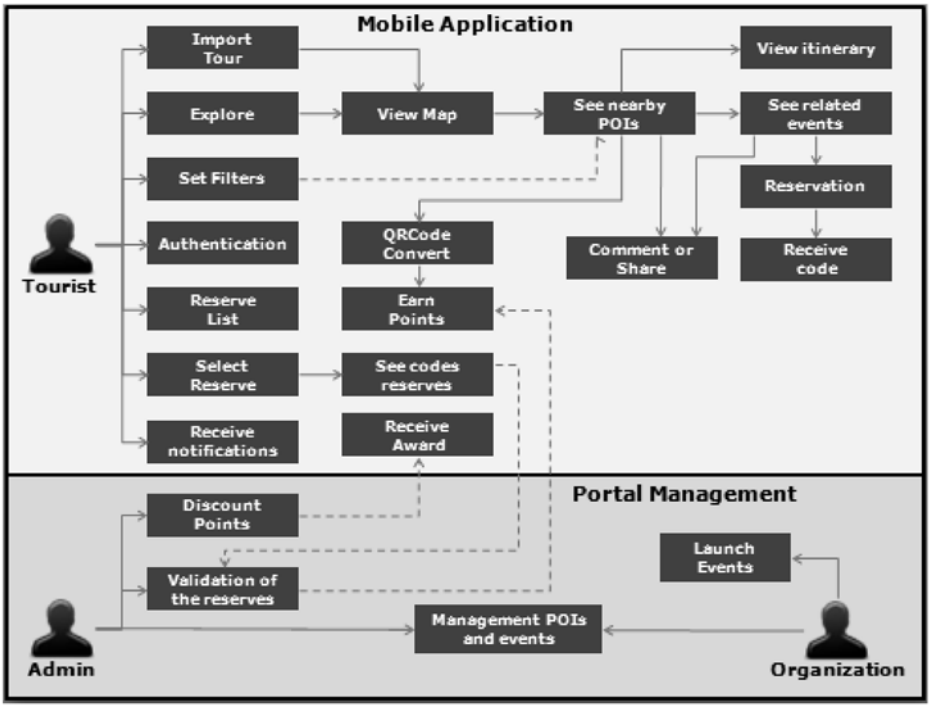

Fig. 1. Sample of the concept

Each organization has local points of interest (POI), which may be associated with events of various kinds. These events are advertised through a management portal. In addition, each tourist can use the mobile application to navigate and search for directions, performed over an interactive map of the region. This map identifies all points of interest, according to the profile defined by each user, and displays all the relevant information according to defined characteristics. In addition, it provides functionalities that allow users to view the itineraries make early reservations or comment on these sites through the technologies associated with existing social networks. Each reservation is assigned a user code, which must be provided to the organization that regards published advertise. The validation of this code allows organizations to establish the reservation of events posted. Additionally, each service that is enabled by a pre-booking allows users to accumulate points for participation, which can later be converted into awards and which is associated with a certain amount of points accumulated. There is also another way to ensure the accumulation of points, which is accomplished through the navigation system, marking various

locations on the map where there is a geo-referenced QR Code available to be decoded and that ensures that after his conversion a certain number of points is accumulated again. The allocation of points is not homogeneous, and their unit value depends on the administration's policy, which takes into account several factors, mostly highlighting the business potential and influence the organization. For example, if a local organization receives 250 monthly bookings through the platform, the regional government can restrict the use of the application, or conversely, may agree with this organization, a contract that gives them access to, for instance, 1% of the monetary values charged to the tourists that booked using the system. The usefulness of these codes is associated with the validation of the reserves and prizes and it ensures the increment of tourism in the region. There is also another way for organizations to publicize their activities, which runs through notifications that are received whenever the user is close enough to sponsored events - Location-Based Services. These notifications are always under the user profile and can be received in any condition from which the user has authorized the execution. This approach can be combined with the conversion mechanism of QR Codes, providing organizations with the promotion of various points of interest and events, which allow users to accumulate points for participation and where, later in the vicinity, are associated with proximity alerts to launch notifications of upcoming events. As mentioned in the introduction of the platform, in addition to the mechanisms geared towards the implementation of Mobile Advertising in touristic areas, users must have several features that serve as touristic guide, ensuring direct benefits from its usage. The authentication of users in this platform is only mandatory when performing operations that require direct association with a person, such as when making reservations or when accumulating points.

3.2 Structure

To implement the business logic described above, it was decided to structure the platform on three main components. As can be seen in Figure 2, there is a Public Portal, a Portal Management module and a Mobile Application. Each of these modules has specific functions, and the Management Portal module is not publicly accessible, being provided only to management of the platform and the various local organizations in the region, while the Public Portal and the Mobile Application will be available to potential tourists. The Portal Management module contains the functionality for content management present in the Public Portal administration of user accounts, setting the points of interest and associated events, as well as all the features related to the option of booking. The Public Portal is generally available. Being the core of the platform, it allows several amenities such as access to multimedia and alphanumeric information, and whenever possible, geo-referenced (e.g., news and advertising of events or services), and manipulation of geographic applications that allow the user to interact with the content and the ability to geo schedule trips or walks in the touristic region. The Mobile Application can be seen as an extension of the portal platform that channels the portal information to the user according to his location. This component provides various services for Mobile Advertising, already mentioned in the previous paragraph, as well as other facilities that create added value in the deck section. Briefly, the features not directly related to

Mobile Advertising allows users to navigate a region through easier geographic visualization and location of points near his location, as well as allowing users to insert comments, using social networks or portal accounts itself. The inclusion of comments from users can also be seen as indirect advertising, conducted by the tourists themselves who pass on their beliefs to their social network. The comments can only add on sights and events associated with pre-selected points of interest by the user. Thus is always guaranteed that these are placed in real time by people whose location is close enough to the event commented.

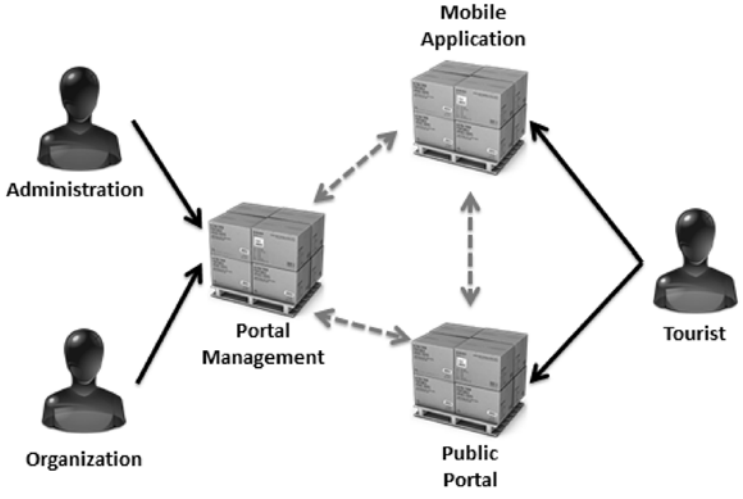

Fig. 2. Platform structure

3.3 Architecture

The platform's architecture consists of components that enable the implementation of services related to Mobile Advertising (see Figure 3). Furthermore it is necessary to introduce other components that facilitate the development and integration of additional functionality to the primary objectives of the overall system. Thus, this platform includes a server that has a spatial database containing alphanumeric and geographic information. This database is accessible by the various components through a Web Service that allows the manipulation and access to information that exists there. This server provides the necessary interfaces to implement the portal management module and the public portal, accessible via the Internet through any browser. Both portals have interactive maps for presentation and manipulation of geo-referenced information, so it is necessary to have a map server. After some tests, it was decided that the best approach would be to use an external map server, for saving development time and reducing costs, since they are mostly free to use. Another advantage linked to external map servers is that they typically include powerful API's and which are constantly updated, allowing for optimal performance and excellent usability. The map server technology selected for the implementation of this methodology was the Google Maps API V3. However, if a given implementation requires the use of other maps external server, for example on grounds of established

protocols, its replacement will not be critical, since each component is developed in the most abstract way possible with the technology used by other components.

To increase the potential of the application, it was decided to incorporate some features offered by social networks. Thus, all mechanisms in this area use Facebook and its API, since, this is one of the most important social networks. In this architecture there is still room for the mobile component, essential for the implementation of the concepts related to Mobile Advertising and Location-Based Services. This model can be applied to any mobile operating system, but in this work the implementation has been developed for Android, to benefit from the advantages offered by this system, such as the mechanisms related to geographic visualization and geo-location. The mobile device has a SQLite database, which is installed from scratch with the Android platform and will be used to store all information that is required to maintain locally. The location of the device is done via GPS, so does not requires a connection to the Internet.

Fig. 3. Platform's Architecture

3.4 Data Model

A good data model is essential for any type of application. When dealing with applications that handle large amounts of spatial data this condition is even more relevant. Figure 4 illustrates the data model proposed for this platform. It is composed by several tables with geographic attributes. Apart from this necessity, due to the use of location-based services, we also have other special needs which relate to the classification of points of interest. Thus, this model includes a table called POI that holds all information concerning the points of interest. Each of this POI belongs to a local organization of the region, being of a certain Type, which in turn belongs to a particular category. Each POI can have several characteristics specific to the type it belongs to. For example, point of interest "chapel" belongs to the category "heritage",

whose type is "religion". The characteristic of this point and what is inherited from the characteristics of its type is "Catholic." This type of modeling allows the user to inquire about their preferences for each category and what will later be useful for determining the degree of interest. Finally, it should be noted also that this model should be extended to every case study, provided only basic services for the design of Mobile Advertising and not the full model that takes into account the needs that are specific to each touristic region.

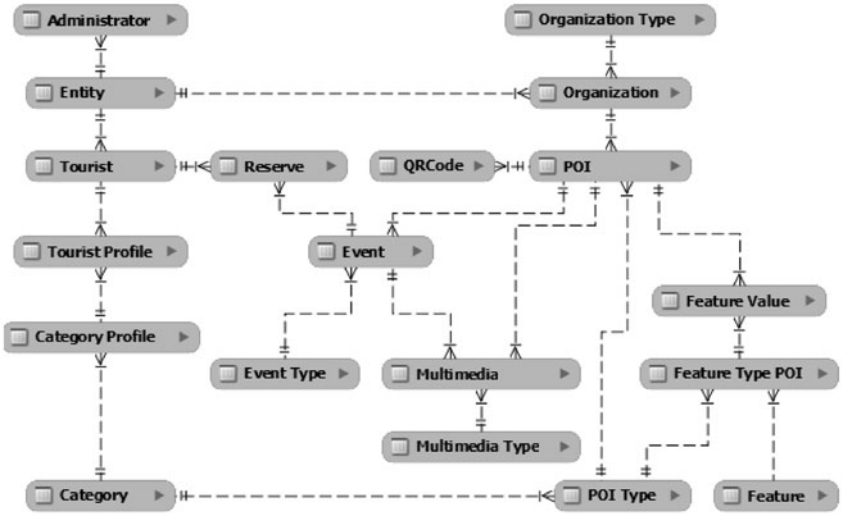

Fig. 4. Platform's Data Model

3.5 Framework

A specific framework was developed in order to implement the proposed platform. This framework is composed of several implementation methodologies that together are an asset for the design of the various services available. The basis of this framework is the spatial location of the user, whose determination is done via GPS. Whenever the user moves 50 meters or 60 seconds have passed since the last update of data, the user's current position is sent to the server so that the alphanumeric and spatial contents are updated. In the future, this module can contemplate the distinction of various forms of displacement, taking into account the velocity of the user. Since this is a regional platform, where there are much heterogeneous content, we developed a tool that brings together the information provided by these entities, allowing an uniform access to data. The information from the region that will be stored in a database platform can be derived from external databases or XML files. The main data stored refers to points of interest in the region and associated events.

Because we wanted a solution that notifies the user according to his profile, the determination of the interest level is essential and has five main factors: the actual position of the tourist, the range defined, the points of interest, the weight of the

relevance of each factor and the points of interest for each category defined by the user. One of the possible improvements of this methodology can count on the analysis of the usage done by the user, a journey that has been done, or even compare users with similar profiles. Whenever any event fits with the user profile, proximity alerts are issued. In the future, recognizing the kind of journey covered can be an asset. For example, if the user is conducting a religious journey, the user should not receive information from disparate events of this category. More yet, in future, mechanisms may also be implemented to compare events, with simultaneous receptions. The Framework also contemplates an authentication module that ensures universal access to public components: Mobile and Portal. It also ensures a quick registration via the information obtained from social networks, authorized by users. This framework allows to quickly implementing the proposed platform in any touristic region, thus resulting in a generic solution adaptable to any region, taking advantage of new advertising and marketing services for tourism in general, which takes advantage of spatial context and user profile.

4 Case Study – The Douro Valley

As a proof of concept, we have developed a prototype platform for the Douro Valley. The Douro region, between Barqueiros and the border of Portugal is one of the largest and most beautiful regions in Portugal, being the result of nature and human endeavor. Because of its unique features, the great commitment of the region passes through the strong focus on tourism as the main factor of economic exploration. Currently part of the region was declared a UNESCO world heritage site.

4.1 Management Portal

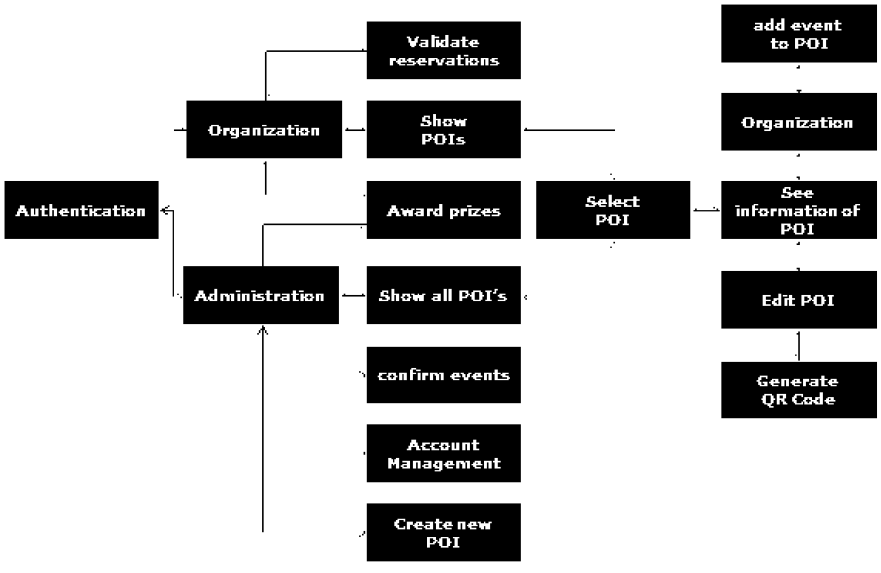

Fig. 5. Flow chart of Management Portal

Figure 5 illustrates briefly the interaction that is possible in the management module. For this module, it was specified that only authenticated users can access its functionality. After authentication, an organization has available a panel of functionality providing services to manage all points of interest, validating the reserves and define the awards. In the management option an organization can see the information associated to each point of interest selected. After the selection, organizations can also see all the events associated with it, and they can add new events to be advertised through notifications. It is still possible, from the points of interest, to set up the information on these and generate QR Codes that may be at their physical location. If the user has administrator privileges, he can perform virtually the same tasks as the organizations, and can handle all the points of interest present in the Douro region. In addition, entities can also access panels to confirm the events, the management of user accounts and the creation of new points of interest.

4.2 Mobile Application

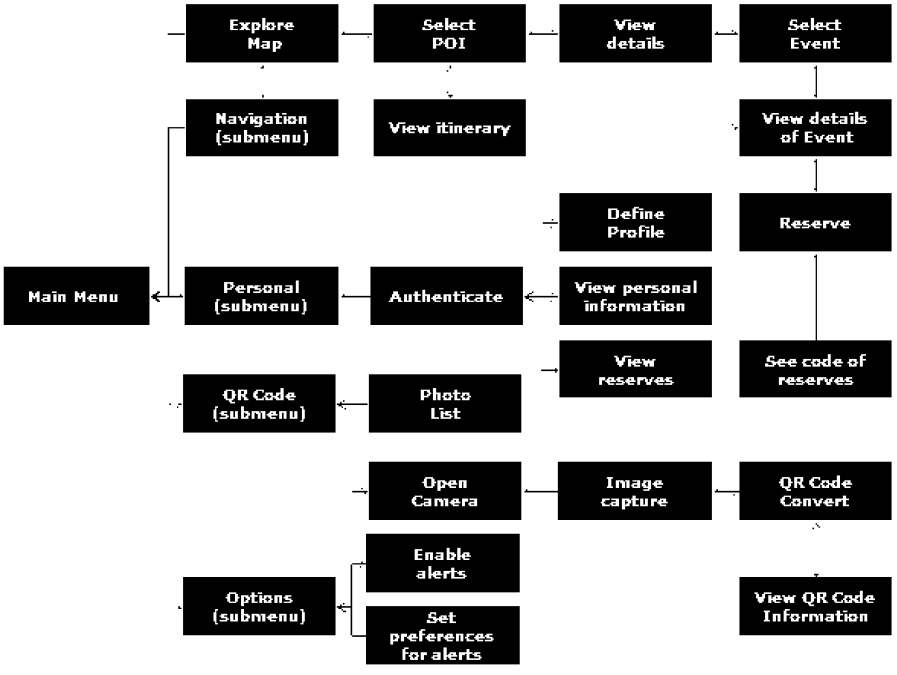

Fig. 6. Flow chart of Mobile Application

As seen in figure 6, the first interface that the user has access is the main menu. From this menu, it has access to four submenus: "Navigation", "Personal", "QR Code" and "Options". In the menu "Navigation" he has access to a range of features that allows him to manipulate the dynamic map of the Douro region that displays the selected points of interest. For each of these points, the tourist can see the shortest route. For

each point of interest he can still see the detailed information concerning it and can associate it to several events. Eventually, some events may be subject to a reservation, and so there is an option that allows users to make this mark and get the code to further validate the reservation with the relevant authorities. Whenever the user receives a notification of proximity, to confirm he wants to view the details. In the item "Personal", the user can authenticate himself, accessing the most relevant personal information, highlighting in particular the participation points earned. In addition, you can set your own search preferences, which indicates what type of information you want to receive. From this item you can still access the reservations made by it and can visualize in detail the mark you made, as well as the code that validate the markup. In the submenu "QR Code", the user has access to the list of photographs that have been captured with the application. After each capture, if the picture has an associated QR Code, you can convert the image to view the information that is encrypted in the QR Code and thus, accumulate points. Finally, in the submenu "Options", the application can be configured for the activities and types of alerts.

Fig. 7. Interfaces of Mobile Application (Portuguese version)

Figure 7 presents some of the interfaces developed for the case study of the Douro Region, implemented in the working prototype of the mobile application, called MOBIDouro, which implements the model and business flow offered by the mobile advertising platform.

5 Conclusions and Future Work

At this point, it is premature to present an overall evaluation of the platform, since its practical implementation in the Douro region has not yet been completed. However, after the work done, it is considered that the proposed platform addresses the initial goals. Developed as a generic solution, adaptable to any touristic region the platform allows for added value services, provided according to user location and having

regard to his user profile. For the method to work it requires that in the region there is an organizational structure similar to the proposal, e.g., well defined points of interest pertaining to a particular organization. In addition, there must be a specification of the privileges of each organization, as well as the skills and policies of the administration of the platform. The mobile application only will only be useful if enough geo-referenced in available in the database.

For future work, we must note the fact that some of the features implemented are still in a testing phase and is therefore necessary to develop testing standards covering the evaluation of the solution in terms of performance, sustainability load and interaction with users. It is also necessary to create mechanisms for optimization with regard to updating the information on points of interest that are provided by external entities to serve as a complement to existing data. In the medium term, the objectives will go through the implementation of mechanisms related to augmented reality, which may replace the QR Code technology or develop new services that create added value. Usability and accessibility of the mobile application can also be improved by implementing features for voice recognition and speech synthesis. Using the latest technology Google Goggles can also become an asset in the creation of new tourism services for Mobile Advertising.

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Virtualisation of Customer Cards with 2D Codes

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Abstract

Customer loyalty is one of the most important strategies in managing customer relationships and customer cards are an important mean of customer relationship management. Especially in tourism diversity of collaborating retailers and high investments for hardware display the largest barriers for their implementation. In the last years, mobile phones have reached a rising importance in everyday life and techniques like mobile tagging or 2D Codes enable better integration of mobile services into a real physical environment. This paper presents the approach of a virtual customer card using 2D optical coding techniques, to provide its functionality through mobile devices. The usability and usefulness of the presented approach is evaluated in a test user study showing satisfaction acceptance levels for all typical usage scenarios.

Keywords: 2D Code, customer loyalty, customer card, mobile couponing

1 Introduction

Customer relationship management by addressing specific customer groups in the form of customer clubs has firstly been realized in tourism at ski hut villages (Hönig, 1990). With an increased market transparency and decreasing customer loyalty, loyalty programs received a growing attention (Handelsblatt, 2001). Achieved stimulations for customers (Butscher, 2001) are mainly a monetary discount and a preferential access to special services. Additionally, social prestige, private entertainment or the need for communication are benefits of customer loyalty programs. But also for retailers loyalty programs can create positive effects, e.g. increased attractiveness of products and services and information about customer's consumption behaviour. In tourism different referential applications proved the success of customer card systems. Since the initiation of the *Zell am See-Kaprun card* (Stärz, 2010), with more than 130 accommodation partner facilities, the region Zell am See-Kaprun reached an increase of about 23 per cent in reservations. The card provides free usage of popular offers, e.g. the mountain railways, lidos and indoor

swimming pools. Within the first week the card was handed out up to 10.000 times and counts now over 43.000 participating customers. For the regions Innsbruck and Tiroler Oberland the *Freizeitticket Tirol* (Schroll, 2010) enables a combined ticket for different ski and leisure facilities including 12 mountain railways, 7 ice rinks, 3 indoor swimming pools, 4 open air pools or swimming lakes and 2 museums. The *Gold- and Silver-Card* at the *Mieminger Plateau* (Lampe, 2010) offers numerous benefits, e.g. free or discounted entrance to several sport, cultural or event programs. According to reference, the card program caused a clearly positive customer reaction and increased attractiveness of participating retailers and the whole region Obsteig. Largest barriers from customer's perspective are related to data security and privacy threats. For retailers customer card systems cause increasing organisational effort and high initial and running costs, with two-third of total costs being caused by the required hardware at the point of sale and their connection to the card system (Wittbrodt, 1995). With the wide spread of mobile devices, their increasing capabilities, Internet connections and usability (BVDW & J&S, 2008, Nielsen, 2009), more and more services are offered in the form of mobile applications. In this context *Mobile Tagging* offers techniques for the integration of mobile services into a physical environment using mobile codes, mainly 2D codes, and common mobile phones to connect mobile content to a physical environment. As a specific form of 2D Codes, QR Codes are especially suited for recognition with common mobile devices. The paper investigates the application of QR Codes within a mobile customer card as a comparatively more usable and economical alternative with minimal hardware and maintenance costs. Based on a prototypical implementation of typical customer card scenarios, the usability and usefulness of the presented approach, both from a users and retailers perspective, are evaluated in a test user study. The paper is structured as follows. Section 2 gives an overview of the fundamental background of loyalty programs and customer card systems as well as a brief introduction to mobile tagging and the usage of 2D codes exemplary focused on QR Codes. Section 3 describes the theoretical concept of mobile customer cards, its integration into the technical and organisational infrastructure and displays application scenarios for different types of loyalty programs with a prototypical implementation. Section 4 presents the results of a test user study, evaluating the different customer card scenarios. The final section gives a conclusion and outlook on possible future research activities.

2 Background

2.1 Customer cards in loyalty programs

When using customer cards in loyalty programs, customer cards are, in contrast to all-purpose cards, limited to one or a group of providers (Schweitzer, 2003). Customer cards (Mohme, 1993) are a mean for identification, generally in plastic form, provided to customers by a company. Through its integration of the customer card concept into hardware and software components for recording, transfer and handling of data a customer card system emerges. As one of the most common used instruments in customer loyalty (Schweitzer, 2003) customer cards are mainly used for communication and pricing purpose (Kunze, 2000) to intensify the dialogue with customers, increase their satisfaction and foster brand loyalty (Homburg & Bruhn,

2000). Thus major goals (Schweitzer, 2003) are to increase customer loyalty for regular customers, to gain new customers, to create a communication channel between company and customer, and to acquire customer data regarding the customer's buying behaviour. Further effects are the intensification of service presence, the increase of the purchase frequency and a positive image effect.

To reach these objectives customer cards offer two basic functionalities (Schweitzer, 2003): (a) *Identification and authentication* of an individual customer in order to receive special benefits like boni and discounts or gain access to restricted areas or products (e.g. ticketing service) and (b) *payment*, based on internal credit, bank debit or credit card payment. Primarily, the cashless payment functionality is becoming more important as a marketing instrument (Schwarz, 1991).

Depending on the service offered to the customer, three types of customer cards can be distinguished (Mohme, 1993):

- *Discount and coupon cards* for repeat purchase, direct discount or anonymous point systems
- *Bonus and club cards* with special benefit for registered customers
- *Customer payment cards*, so-called co-branding or affinity cards

The procedural structure of common customer card systems can be split into four major process steps:

- *Registration and distribution* to assign the card to an individual customer and gain customer data for later analysis
- *Authentication and verification* in daily usage
- *Purchase of products* to which the loyalty program is attached
- *Documentation* of purchase details, e.g. point of sale, date and time, purchased products and services and price

2.2 Mobile Couponing and 2D Codes

With the intention to create medial convergence by enriching static information with interactivity the Physical World Connection (PWC) describes the idea of building a connection between physical objects and virtual content. To create such a connection *mobile tagging* (Pixelpark, 2007) defines the technique of attaching data, encoded as barcodes, usually two-dimensional codes (2D codes), to physical objects and places and using common mobile device cameras for their recognition. These 2D codes, in this context typically called *mobile codes,* contain standardised information for a direct interaction, e.g. via SMS, E-mail, phone number and contact information, or an indirect connection to online content via hyperlinks.

A specific form of mobile tagging is *mobile couponing* (Ivancsits, 2006). Similar to the goals of loyalty programs m-Couponing describes the distribution and conversion of coupons by mobile devices offering discounted or gratis purchase of products and services to customers as well as information about customers' purchase behaviour to

retailers. Possible mobile coupon types are dialogue, discount, loyalty and bonus coupons.

Generally, all types of barcode (1D, 2D, etc.) serve the purpose of proving encoded information for authentication or linking physical objects with virtual content, but significantly differ in application-relevant characteristics, e.g. readability, data capacity, etc. Two-dimensional codes (*2D codes*) are qualified especially for mobile couponing because of their cost-efficient creation and licence-free usage. Compared to common one-dimensional barcodes (*1D codes*) 2D codes allow enlarged data capacity and reduced image size. Further advancements are *3D codes* with the additional dimension *colour-depth* (Lenk, 2003) and *4D codes* with multi-sequential display (Langlotz & Bimber, 2007). 2D Codes can be classified into four groups, *composite codes*, *stacked codes*, *dot codes* and *matrix codes*. As a variation of matrix codes *QR codes* reached a high degree of standardisation, likely because of a balanced mix of high data capacity while at the same time small symbol size and robust readability.

The QR code structure (see Fig. 1.) consists of reserved areas for position detection, alignment, timing, version and format as well as the payload or data area (Cheolho, et al., 2007).

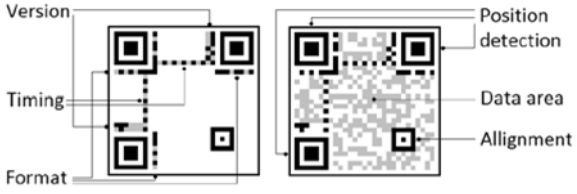

Fig. 1. QR code structure

Depending on the type of data to be encoded, the capacity varies between 2,531 characters (8 bit binary data) and 7,098 characters (numeric data). Specific pattern for position detection and alignment enable 360° readability and resistance to nonlinear view, e.g. due to uneven surface (Soon, 2008). In addition, an error checking and correction (ECC) algorithms, based for example on the Reed-Solomon-Code (ten Hompel, 2008) allow to identify and recover unreadable data blocks in case of partial damage or contamination (Lenk, 2002). The format areas contain the variable matrix structure size.

QR codes can be created following defined encoding instructions, offering options regarding symbol size, data type and volume, data conversion and error correction level. Usually, the encoding algorithm is implemented as standardised code generator software. QR codes can be displayed in various ways, e.g. as print, engraved or digitally on TV, PC/laptops or mobile phones. The contained information can be captured with handheld scanners, fix-placed charge couple device (CCD) terminals or any mobile device including a camera for optical recognition and implemented reader software for decoding the QR codes logical structure. QR code generators and reader

software for different mobile devices are available for free while specific devices for reading QR codes, e.g. smaller CCD handhelds, cause only limited additional costs.

3 Conceptualization of a mobile customer card

The virtualisation of customer cards affects basic elements of the customer card mechanism and additional concepts are necessary especially regarding its architectural integration and required interfaces. A combination of the basic process steps described above is used to consider specific requirements of different types of customer cards.

3.1 Development of the basic process model

The basic concept of mobile customer cards is geared to the basic processes steps (see 2.1) *registration/distribution*, *authentication/verification* and *documentation*, disregarding the unaffected product purchase itself. Fig. 1 describes the proposed procedural structure of a customer card mechanism using QR codes and mobile devices.

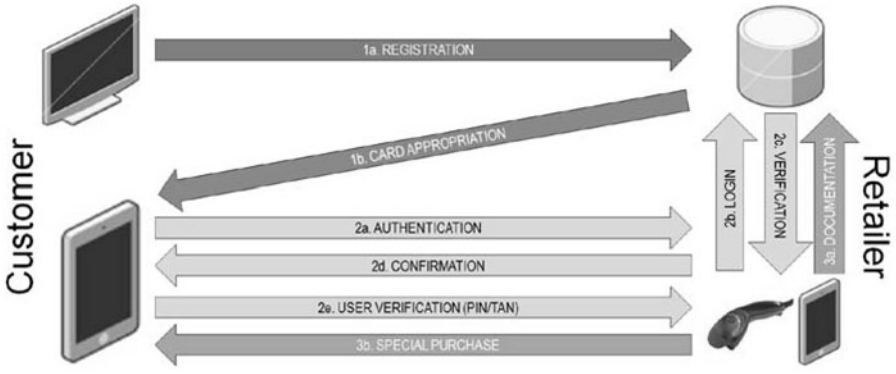

Fig. 2. Procedural structure of mobile customer card mechanism

The *registration* is executed once and can be implemented in various ways, e.g. via PC/laptop or mobile phone. Implemented separately or integrated into an existing web-environment, the registrations major function is to collect customer data for authentication and documentation purpose. Typical customer data includes information about gender, name and address, date of birth and contact information. Also the assignment of an individual customer number (ID) and the definition of a personal identification number (PIN) are part of the registration process. All information is stored within an individual unique customer profile. In contrast to common plastic cards the mobile customer card is created by encoding a hyperlink in form of a QR code, leading to the individual customer profile. Depending on the way the customer registered there are different methods for *distributing* the customer cards. The registration via mobile phone implies a connection with the Internet and thus enables a direct download of the QR code image. The download via PC requires

an additional synchronisation with the mobile phone, e.g. by a cable connection, Bluetooth, etc. A simple solution requiring no internet connection or synchronization with a PC is the provision via MMS (Multimedia Messaging Service). *Authentication* consists of displaying the QR code on the customers' mobile phone and *verifying* the QR Code by a successful scan. The customer's identity is verified by comparing personal characteristics with information from the customer profile accessed via the hyperlink encoded in the QR code, e.g. profile picture or customer ID. An additional authentication mechanism is provided by entering a personal identification code (PIN). The retailer is identified by a simple login mechanism to the central customer card system, in order to gain access to customer profile information and transfer transaction data during documentation. The *documentation* includes information about the customer, the retailer and the purchased products or services. Optionally, the mobile customer card can include *payment* functionality, either integrated into the card system itself (internal credit) or using external payment services (e.g. bank debit, credit card payment; Hu, et al., 2005). Payment by internal credit requires a profile-based credit account in form of prepaid credits representing a monetary value.

3.2 Technical architecture of mobile customer card system

Based on the process described above, the technical architecture of the mobile customer card system is presented in this chapter. Fig. 3 describes the basic components of the customer card system architecture and its organisational structure.

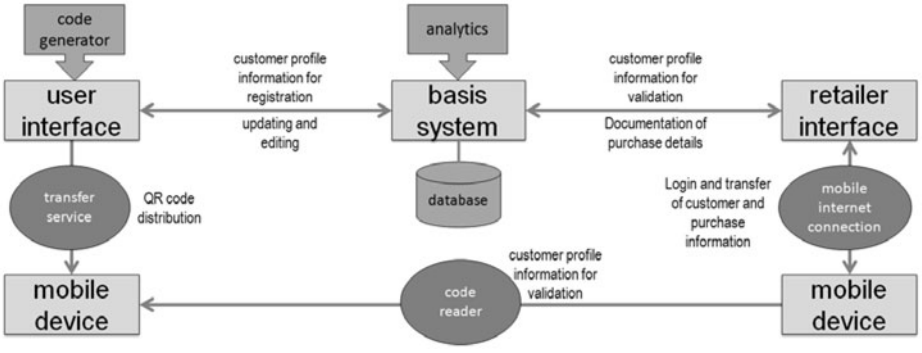

Fig. 3. Architecture of the customer card system

The *basis system* provides central components and combines all connected applications, e.g. data storage and analytics. A *database* stores and provides customer profiles and transaction data. As major benefit for retailers (see 2.1), a separate *analytics* software allows detailed analyses of customers purchase behaviour. The *user interface* mainly handles and additional user interaction like editing user-profiles or uploading credit for payment purpose and implements code generation. The user interface can be implemented not only for PCs, but also for mobile devices. The implementation of the *transfer service* for distributing the QR Code to the customer's mobile device depends on the type of user interface and can be designed as direct download, PC-synchronization, MMS-distribution or alternatively as print-out. The user's *mobile device* is not expected to meet any further requirement but the ability to

display the QR code image. If applicable, a separate mobile application can offer additional services, e.g. handling of multiple customer cards. The *QR code reader* software builds the connection between users' and retailers' mobile devices. The retailer's *mobile device* can be both, a mobile phone or an alternative capturing device, e.g. CCD, for an easier handling in daily usage. The *retailer's interface*, e.g. reached through a mobile internet connection, builds the connection back to the basis system, to provide data transfer for authentication and verification and for documentation purpose. Depending on the type of point of sale, this functionality can also be integrated into existing applications, e.g. an inventory management or booking system.

3.3 Prototypical implementation of customer card application scenarios

In order to evaluate the overall approach of mobile customer cards using QR codes, three application scenarios for typical types of loyalty programs via customer cards have been prototypically implemented. These application scenarios are:

- Simple discount and coupon cards,
- Bonus and club cards with detailed user profiles and
- Customer cards with payment functionality ensuring a maximal security level.

The main differences in implementing the application scenarios above are affecting either reduced processes to increase usability or additional security mechanisms. The process steps purchase and documentation are consistent over all three scenarios.

Discount and coupon cards. To implement typical characteristic of coupon cards, offering quick and simple usability and impersonalised discount without the need of specific security elements, discount and coupon cards contain only the basic process steps of QR code distribution, authentication and verification. Disclaiming individual customer data puts a registration process aside so that the distribution of QR codes can be directly integrated in any platform, e.g. destination websites, booking platforms, etc. As an adequate mechanism for security only the codes validity is verified by a unique design and data content.

Bonus and club cards. Due to the individual assignment to a unique customer bonus and club cards enlarge the basic process by a registration and additional authentication and verification elements. The registration collects customer data for creating a customer profile and personalizing the customer card. The unique validity of the code is enhanced by the authentication using the customer's profile picture.

Customer payment cards. As an integral part of the purchase process, payment is handled by the mobile customer card, lowering the burden for product purchase by obviating physical money transactions. To fulfil high security requirements, customer payment cards enlarge the existing model of bonus and club cards by a PIN-request to authorize the payment of products and services through virtual money from the profile's credit account.

4 Evaluation

According to the widely used technology acceptance model (TAM) (Davis, 2003), the formation of positive attitudes, thus, the intention to use an innovative technology, is determined by perceived benefits (i.e. usefulness) and the ease of use (i.e. usability). The presented evaluation has combined methods of focus group interviews and usability tests (Creswell, 2009). Thus, quantitative and qualitative data of a small group of test persons was collected in August 2010. The aim of the subsequent evaluation is twofold: 1) to gain first indications for users' intention to use customer cards in the context of mobile devices and 2) to estimate it's practicability for retailers in daily usage. The general benefit of customer cards itself is not questioned in the presented study and the evaluation did not cover acceptance of customer loyalty programs in general (Hoffmann, 2008).

4.1 Experimental setup

The evaluation combined a practical test setup including a prototypical implementation and two mobile devices. To ensure a most realistic impression of the processes the setup was implemented as a web-based prototype including three scenarios giving the test persons the opportunity to act from both a customer and a retailer perspective. A detailed introduction in the concepts, their basic course of actions, the imaginable practical field of application and the handling of mobile devices (e.g. necessary reader software) is described in the previous chapter. Data gathering was accomplished by a questionnaire consisting of standardized and open questions focussing on aspects of usability and usefulness (Diekmann, 2007). Additionally, the test activities were documented by neutral observers. Finally, a focus group dialogue allowed the discussion of obtained impressions by the test users (Creswell, 2009). The small test sample (n = 15) consists of test users differing with respect to age, gender, profession and experience-level in handling mobile services. In order to gain additional information about hardware specificities regarding display and handling, test users could use their own mobile devices. The only requirement was the option to display code pictures, and for retailers an optical camera and an installed QR code reader software.

4.2 Results

The evaluation took place over three test periods in August 2010 with a group composed by students from various faculties of the University of Applied Sciences Ravensburg-Weingarten and the Stuttgart Media University (HdM), as well as by ICT specialists from the Internet division of Mercedes-Benz. Table 1 displays the sample composition showing a total of 15 test persons (i.e. 3 female and 12 male) being between 21 and 37 years old with a rather balanced technology affinity towards mobile services and devices (i.e. 3.2 points of 5). The test users' mobile devices were, with one exception, smart phones or PDAs, thus, allowing relatively easy handling of mobile content, and even for the most testers (i.e. 11 of 15) offering already pre-installed reader software for 1D and 2D codes. This observed widespread ability to read 2D codes proves the limited need for hardware investments for retailers.

However, with respect to usability, some devices caused difficulties due to light reflections complicating code recognition from the display as well as content interaction within model-specific browser types. Interestingly enough, no significant influence of the type of mobile device on the evaluation results could be noticed. Table 2 displays the aggregated evaluation results. All closed questions are scaled from 1 (‘not agree‘) to 5 (‘fully agree‘).

Table 1. Test sample structure

	Age	Affinity to mobile services (scaled)	Actual customer card participations
Minimum	21	1	0
Maximum	37	5	10
Average	**27.6**	**3.2**	**2.07**

Table 2. Summary of results

Focus	Perspec-tive	Focal point	Ø	Max	Min
Usability of…	Customer	Registration	3.40	5	1
		Distribution of QR code to the mobile device	4.87	5	**4**
		Display of QR code for authentication purpose	4.13	5	1
	Retailer	Accessing QR code reader software	4.60	5	**3**
		Handling QR Code scanner (verification)	4.00	5	1
		Login for verification purpose	3.47	5	1
		Handling the retailer dialogue	3.67	5	1
		Handling the retailer dialogue with PIN	3.87	5	1
Usefulness in terms of…	Customer	Mobile cards as an alternative to plastic cards	3.80	5	2
		Concern to enter private data for registration	**2.20**	3	1
		Increased security with PIN mechanism	3.27	5	1
		Concern to enter PIN into an external device	**1.53**	5	1
		Documentation of personal purchase details	3.67	5	1
	Retailer	Validation of coupons	3.87	5	1
		Authentication by customer profile information	4.13	5	1
		Security of virtual money (mobile payment)	**2.73**	5	1
		Useful alternative for simplified mobile payment	3.27	5	1
		Mobile as an alternative to common card system	3.33	5	1
Intention to use…	Customer	Coupons on mobile devices	4.53	5	3
		Customer cards on mobile devices	3.53	5	2
		Upload virtual money for payment purpose	3.20	5	2
		mobile customer cards in future (participation)	3.73	5	1

To sum up, test users judged the mobile discount and coupon cards, such as mobile bonus and club cards, as relatively practicable approaches, while the mobile customer payment card was seen rather critically, mainly because of concerns regarding data security and privacy.

Regarding *usability* from a customer's perspective, registration (3.40) was seen as a common process although causing difficulties when inserting personal information using mobile devices. Receiving the customer card (4.87) was consistently (min. 4) possible. Its displaying (4.13) for authentication at the point of sale could be easily managed. From a retailer's perspective testers accessing the QR code reader software (4.60) didn't cause notable difficulties (min. 3), while scanning the customers' QR code (4.00) required some experience in adjusting an optimal distance between the camera and the displayed QR code. Gaining access to the retailer interface via login (3.47) was slowing the purchase process but could be managed easier by the standard functionality for remembering login-information, which wasn't supported within all mobile browser types (e.g. on iPhones). Interestingly, the retailer dialogue was judged as more usable for the scenario of customer payment cards with an integrated PIN-validation (3.87) than for bonus and club cards with less security mechanisms (3.67). Usability mainly decreased because of the partly too small displaying of customer profile information, e.g. on iPhones, which had to be amplified additionally. Regarding documentation, users mentioned the implemented manual handling of larger purchases as potentially critical. Finally, some test users identified the simplicity of the prototype as a major reason for a reduced usability. Separate applications with automated handling of the basic processes, mainly authentication and verification, were mentioned as possible improvements.

Concerning *usefulness* from customers' perspective, the mobile customer card was judged as a useful alternative to common plastic cards (3.80). Test users mainly mentioned the benefit regarding the easier handling of numerous customer cards within the mobile phone. The need of inserting personal information for registration purpose was judged as relatively concerning (2.20). The additional PIN-validation by customers was realized as a proper mechanism (3.27) to increase the security-level for customer payment cards. Most critically judged (1.53) was the input of a PIN within an external device, i.e. in the implemented prototype using the retailers' mobile phone, but, interestingly, not by all test users (max. 5). In this case the test users mentioned complex security procedures, e.g. OTP (One-time PIN) or TAN (Transaction number) as more trustful. The documentation of information regarding the purchase behavior didn't notably concern the test users (3.67). From a retailers' perspective the test users comparably proved (3.87) the usefulness of a validation of coupons using mobile phones. The authentication by entering customer profile information was judged as a proper mechanism (4.13) for validation of customers' identity. Regarding the security level, test users judged the prototypically implemented mobile payment as relatively critical (2.73). Even though, from a retailers' perspective, mobile payment using virtual money was realized as a proper simplification (3.27) for the purchase process. To sum up, mobile customer cards are judged as a relatively useful alternative (3.33) to common customer card systems.

The test users' *intention to use* mobile phones for displaying coupons was almost fully approved (4.53), and also positively proved in case of customer cards (3.53). Moreover, the upload of virtual money for payment purpose is imaginable (3.2). Generally, the majority of test users could imagine a future participation (3.73) in mobile customer card programs.

Enhancing the test users' statements regarding usability, the *neutral observation* proved the handling of complex interactions on mobile devices as generally hindered. The input of information for registration purpose was more difficult using mobile phones. Also, some device-specific mobile browsers didn't allow interactivity, e.g. of buttons, within the web-based prototype. Furthermore, the test users' showed a generally sceptical approach towards the mainly unknown technique of QR codes. Even though, authentication by displaying the QR codes was manageable without difficulties. Their recognition by retailers required experience but surprised the test users regarding its easiness. Regarding the application model the partly explained process flow wasn't always understood intuitively by the untrained test users. For the scenario of customer payment cards the simulated upload of credits was hard to imagine because of the missing context of a realistic purchase.

Finally, the *focus group interview* attested the simplicity of the prototype as a reason for reduced usability. Test users mentioned automated "apps" as an alternative compared to web-based applications. To sum up, payment with mobile devices and the input of a PIN, most notably at external devices, was judged as most critical. Moreover, the test users proved their sceptic approach towards the technique of QR codes and mentioned alternate technologies, e.g. Wireless LAN or Near Field Recognition. Regarding usefulness of mobile customer cards the test users judged mobile customer cards as a comfortable alternative for customers compared to common plastic cards, mainly because of the availability at any time. Moreover, easier registration could be achieved by embedding into social networks, e.g. facebook. For older people an alternate printed customer card should be available. As a key aspect for retailers the duration of the process decides the application's usefulness, also depending on the particular environment of the POS. Fix installed reader devices could ease the recognition of customer cards. Also the manual documentation of products and services was recognized as a potential problem for large purchases.

5 Conclusion and Future Work

The paper presented a basic concept for the virtualisation of common customer card systems by using mobile phones and 2D codes as a technique for transferring data at the point of sale. The concept was applied to three typical variations of loyalty programs offering simple coupons, personalised club cards and customer payment cards. For evaluation purpose these application scenarios were implemented as web-based prototypes. Compared to existing card systems the concept realized the card systems architecture with decreased costs for installation and hardware by using QR codes and mobile phones instead of plastic cards and special reader hardware. Especially for touristic regions, significantly reduced costs will specifically enable the participation of smaller autonomous retailers, e.g. accommodation facilities and smaller points of sale, in contrast to existing approaches for customer loyalty programs. The evaluation clearly proved a positive acceptance of the approach for discount and coupon cards and bonus and club cards, but also showed a general concern regarding the security of mobile payment via customer payment cards. For retailers a key aspect regarding usability is the complexity of the basic process in the

real context. This indicates a potential need to use fix installed hardware for code recognition instead of already existing common mobile phones in certain application scenarios. Although, difficulties in usability were partly caused by the simple prototypical web-based implementation of the scenarios, the results demonstrate the need for a maximal automation of the processes especially for retailers. In contrast to the prototypical test setting, retailers would be trained in handling reader software and the retailer's dialogue in a real context and could provide support for customers at the POS, which will positively influence the overall usability. Nevertheless, from users' perspective, a minimum of necessary interaction via the mobile phone was indicated as key aspect for user acceptance.

Further improvements of the concept of mobile customer cards have to focus on a more complex implementation within a more realistic environment considering gained conclusions regarding usability but also on an improved promotion to increase users' existing intention to use the loyalty programs offers. A possibility to increase users' awareness could be to identify additional means to promote the customer card system, e.g. by connecting to social media and social networks, offering clear benefits through dynamic communities. Also users' handling of customer cards with mobile devices and the connection to an individual point of sale could be optimized by implementing authentication and verification processes, e.g. in the form of downloadable mobile applications (midlets), combined with alternative location based interface techniques, e.g. Wireless Local Area Network (WLAN) or Near Field Recognition (NFC).

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Adopting Web 2.0 technologies on chain and independent hotel websites: A case study of hotels in Hong Kong

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Abstract

With the unprecedented ability to empower travellers in producing and consuming travel information, Web 2.0 is fundamentally changing the way of traveller's information search behaviour and affecting subsequent decision making. As such, many researchers asserted that more hotel companies have integrated the technology into their websites to enhance customers' travel information searching experience. However, no prior studies were conducted on this phenomenon in the hotel context. This study purposes to explore Web 2.0 technology adoption among Hong Kong hotels. The factors influencing the adoption of Web 2.0 technologies are also identified and discussed. A content analysis of hotel websites and interviews with the hotel managers identified the difference in adoption rate between chain and independent hotels. The discrepancy is mainly attributed to the top managements' perceived benefit of Web 2.0.

Keywords: Web 2.0; Technology adoption; Brand affiliation; Hotel websites; Hong Kong.

1 Introduction

Over the past 30 years, information technology has been serving as an essential source of, and for, sustainable competitive advantages (Lam, Cho & Qu, 2007) and a key success factor for effective lodging industry operations (Winston, 1997). Particularly, the emergence and prevalence of the Internet in the late 1990s has transformed the industry dramatically (Buhalis, 2003). With the benefits received from the Internet such as high-speed global information dissemination (Lee, Lee & Morrison, 2010), low distribution costs (O'Connor, 2003), high levels of interaction (Chung & Law, 2003), and links to computerized reservation and database system regardless of geography, time zone or computer system (Chung & Law, 2003), hotel managers have been fascinated with the distinct advantages that the Internet technologies can bring to their business, and most, whatever chain or independent, hotels have established their own websites for the promotion and sales of their products and services (Buhalis & Law, 2008).

Though hoteliers expect that their own websites can be served as an effective marketing tool that helps them disseminate product information, promote sales and attract customer (Buhalis, 2003), findings from recently conducted studies have shown that Internet users tend to trust contents created by users, or user-generate-

content (UGC) more than advertising created by marketing departments or advertising agencies (Kardon, 2007). Park, Lee, and Han (2007) stated that the contents generated by the marketer tend to disguise negative aspects; whereas UGC reflects honest evaluation of a product and service. In tourism, as travellers now prefer informal and personal communication to formal and organisational sources (Bansal & Voyer, 2000), Internet technologies known collectively as Web 2.0 or social media becomes an influential form of travel information which have spread widely among consumers in the last five years (Pan, MacLaurin & Crotts, 2007). A recent report from PhoCusWright (2008) revealed that more than 80% of leisure travel consumers harnessed travel related UGC on Web 2.0 during trip planning and travel decision making. In response to the popularity of Web 2.0 among travellers, many travel-related companies started to integrate these functions into their websites to enhance customers' travel information searching experience. However, while previous researchers asserted that the use and diffusion of Web 2.0 in the tourism and hotel industry has been proliferating rapidly (Fuchs, Scholochov & Hopken, 2009; Sigala, 2010), no empirical studies were conducted on this phenomenon in the hotel context. The types of social media which are commonly used by the hotel industry, remains unexplored.

While information technology undoubtedly presents opportunities and benefits for hotel companies, the outcome largely depends on hotels' adoption and implementation of new technology (Nyheim, McFadden & Connolly, 2004). However, technology adoption and implementation in hospitality organisations are sophisticated (Wang & Qualls, 2007). Among different factors affecting the technology adoption decision, the hotel brand affiliation (i.e. chain or independent) plays a tremendous role on the hotel's inclination towards IT adoption (Siguaw, Enz & Namasivayam, 2000). Au Yeung and Law (2004) also found that the difference in financial and technical support between chain and independent hotels is attributed to the discrepancies in their website usability performance. In view of the increasing importance of Web 2.0 on hotel websites, it would be useful in exploring the association of hotel brand affiliation with orientation towards adoption and implementation of Web 2.0 technologies, where researchers today have not explored. Hence, this study purposes to examine the adoption of Web 2.0 technologies on the chain and independent hotel websites in Hong Kong, a leading tourist destination in Asia with many international hotels. Besides, the factors influencing the adoption of Web 2.0 technologies by these two groups are identified and discussed. This study employs a case study methodology that integrates observations of hotel websites and interviews with managers and IT professionals of chain and independent hotels in Hong Kong, a major tourism destination in Asia with many world-class hotels.

In the following sections, the paper firstly reviews the literature that is pertinent to Web 2.0 applications and technology adoption in the hospitality industry, followed by a description of the methodology used in this study. Analysis and discussion of the findings are then presented while ending with limitations and conclusions.

2 Literature review

2.1 Web 2.0 in tourism and hospitality

Web 2.0, also known as people-centric Web, participative web, or social media, is a concept originally coined during a conference brainstorming session between O'Reilly and MediaLive International in 2004 (O'Reilly, 2007). It refers to the second generation of web-based services that have gained massive popularity by letting people collaborate and share information in previously unavailable ways (Reactive, 2007). The key difference between the tradition web (Web 1.0) and Web 2.0 is that Web 1.0 has limited content creators with the vast majority of content for consumers; whereas Web 2.0 shifts its users from being passive viewers to being active creators (Cormode & Krishnamur, 2008). Web 2.0 in tourism, also referred as Travel 2.0, describes a new generation of travel websites with new technologies to encourage and facilitate a higher level of social interaction among travellers. By giving travellers the ability to share travel information and experience, Web 2.0 allows susceptible travellers to share their first-hand experience with fellow consumers and consider this information credible and useful to anticipate their possible future experience (Casalo, Flavian & Guinaliu, 2010). At the same time, Web 2.0 provides tourism companies with unprecedented opportunities to understand a market's reaction to their offering and subsequently feed this information in their product development and quality control process (Dellarocas, 2003). For instance, by analyzing the comments on Tripadvisor.com, one of the most prominent online travel review platforms (Zehrer, Crotts & Magnini, 2010), hotels are able to better understand what their guests like and dislike about them and even their competitors.

In view of the rapidly growing trend and potential benefits Web 2.0 offers, more hotel businesses are adopting and benefiting from Web 2.0 applications (Fuchs*et al*., 2009). Of all types of Web 2.0 applications, blogs in particular have proliferated rapidly for travel-related businesses as a medium to promote their products and to build customer relationships. Blogging is a non-traditional way that helps define the image of a company and keeps in touch with consumers. Marriott International harnesses their company blog (http://www.blogs.marriott.com) to create lively and credible content on the website and to facilitate continuous contact with their customers. Schmollgruber (2007) also claimed that blogs can help increase traffic to their website and improve search engine rankings. Social networking sites also offer dynamic ways to inform and entertain consumers (TIME, 2007). As a result, many hotels have an account on social networking sites like MySpace.com and Facebook.com to help increase their web presence and establish high value links back to their homepages (Ettestad, 2008). Moreover, hotels can leverage the sites to connect their customers as well as to produce and market tourism packages according to members' demand (Sigala, 2008). In additional to blogging and social networking sites, Sigala (2008) analyzed another six major applications of Web 2.0 technologies commonly used in the tourism and hospitality industries with their impact on both tourism demand and supply.

Although researchers commonly acknowledged the potential benefits and claimed that the number of tourism and hotel companies leveraging Web 2.0 has been increasing (Conrady, 2007; Ham, Kim & Jeong, 2005), no empirical evidence was provided to verify this phenomenon. In addition, in spite of the presence of numerous Web 2.0 applications adaptive to the hospitality industry, the effort on examining the most commonly adopted Web 2.0 applications in the hotel sector is still limited. This study would thus contribute to both hospitality researchers and practitioners with a better understanding about the diffusion of Web 2.0 applications in the hotel industry.

2.2 Technology adoption in the hospitality industry

In a highly competitive hospitality business environment, technology becomes essential and ubiquitous. Technology adoption in the hospitality industry is attributed to the rapid development in information technology, fear of lagging behind the competitors as well as the increasing demands of customers, who look forward to flexible, specialised, accessible and interactive products and communication with principals (Buhalis, 1998; Srinivasan, Lilien & Rangaswamy, 2002). Prior studies have acknowledged that the hotel industry implements the technologies to improve the operating efficiencies (Bacheldor, 1999), refine customer service (Sweat & Hibbard, 1990), increase revenues, and minimize cost (Huo, 1998). In view of the benefits that IT provides to the hospitality industry, the active adoption of technology appears to be inevitable (Ham*et al*., 2005; Siguaw*et al*., 2000).

In view of the growing appreciation of the role of technology in enhancing a company's competitive advantages and contributing to business success, many studies on technology adoption have been conducted by academic researchers and industrial practitioners in hospitality. Of all prior studies that are pertinent to technology adoption in hospitality, Davis' (1989) Technology Acceptance Model (TAM) has been used extensively to explain and predict individual's willingness to adopt new technology (Kim, Lee & Law, 2008). Technology Acceptance Model (TAM) suggests that an individual's intention to adopt technology is dependent on its perceived usefulness and perceived ease of use. Subsequent researchers modified and extended the TAM by adding different moderating and mediating variables to increase its power to explain adoption behaviour (Shih, 2004; Venkatesh & Davis, 2000). Since adoption and diffusion of technologies are a complex process which is affected by a number of internal and external factors, Wang and Qualls (2007) summarized the factors derived from previous studies and developed a theoretical model describing the hotel technology adoption process. As emphasized by the researchers, one of the internal factors dictating a hotel's technology adoption and diffusion is the brand affiliation. With the significant financial and human resources from which they can draw, chain or affiliated hotels generally have a longer history of technology adoption than non-affiliated or independent hotels (Scaglione, Schegg, Steiner & Murphy, 2005). By analyzing almost 3,000 Swiss hotels, Scaglione*et al*. (2005) found larger, affiliated and luxury hotels adopted the domain name earlier than their smaller, budget and non-affiliated competitors. Similar findings were also identified in Siguaw*et al*.'s (2000) study. Drawing on the findings from these studies, hotel brand affiliation is likely to directly affect a hotel's inclination towards IT adoption and

chain hotels generally have a longer history of technology adoption than independent hotels.

While empirical studies have been conducted on hotel adoption of information technology by comparing chain and independent hotels, limited, if any, empirical studies have examined Web 2.0 technologies adoption by comparing chain and independent hotels. Moreover, the influential factors on Web 2.0 technologies have not been highlighted by academic researchers at the time of this writing. Hence, this study would present a clear picture of how different chain and independent hotels are in making a decision on technology adoption.

3 Research Method

To recap, one of the research objectives of this study is to explore the adoption of Web 2.0 technologies on chain and independent hotel websites in Hong Kong. This study employed the case study methodology that integrates observation of hotel websites and interviews with key decision makers of hotel IT adoption. One of the benefits from the case study approach is to determine any underlying patterns and uncover unexpected opportunities (Smith & Albaum, 2005). Also, the case study approach is more suitable for exploration and when the focus is on contemporary events (Benbasat, Goldstein & Mead, 1987). In addition, its prominent applicability has been demonstrated by Kothari, Hu, and Roehl (2007) in a study on the adoption and implementation of e-Procurement by a chain hotel. The websites of all hotels in Hong Kong which are members of the Hong Kong Hotels Association were chosen for analysis. During the data collection period, two hotels were newly opened and three in the original list were closed. To retain the data analysis consistency, these five hotels were excluded for further analysis and a total of 109 hotel websites were analyzed in this study. Content analysis was conducted to identify Web 2.0 technologies adopted by each hotel. All hotel websites, including both homepage and all sub-pages, were reviewed. Every Web 2.0 application adopted by each hotel was coded based on a written instruction (1 = adopted; 0 = not adopted) and recorded in a data file. All data were monitored and cross-verified by different researchers to ensure their validity. In order to examine the trend of hotels adopting Web 2.0 technologies, data were collected once every quarter starting from February 2010 to August 2010. During the data analysis, data were divided into two subgroups based on brand affiliation (i.e. chain and independent), and frequency analysis was carried out to examine the adoption of Web 2.0 applications by chain and independent hotel websites, respectively. Moreover, longitudinal analysis was employed to verify the proliferation of hotel adopting Web 2.0 applications as stated in previous studies (Fuchs, Scholochov & Hopken, 2009).

Another research objective of this study is to examine the factors, which influence Web 2.0 technology adoption among chain and independent hotels. As indicated by Yin (1984), one of the most important sources of case study information is through interviews. In order to accomplish this objective, four semi-structured interviews with hotel IT, public relations, and revenue managers were conducted using a series of

open-ended questions around a set of key themes. In addition to the structured questions, follow-up questions were formulated during the interviews. The follow-up questions not only provided an opportunity to customize each interview based on the interviewee's knowledge and responsibility, but also allowed the interviewer to pursue interesting and unexpected directions that arose during the interview. Mikkelsen (1995) claimed that interviewees who have special knowledge on a given topic are characterized as key informants providing insightful implications. In this study, all interviewees were identified as the key persons in the adoption, design and implementation of information technology in their respective companies. Two interviews were conducted with a revenue manager of a chain property (*Manager A*) and an IT Manager of an independent hotel (*Manager B*) whose websites adopt Web 2.0 technologies. Another two interviews were with a public relations manager from a chain hotel (*Manager C*) and an IT Specialist from an independent hotel (*Manager D*) which did not adopt Web 2.0 technologies on their websites. Each interview lasted for 40 to 60 minutes. Knowledge about Web 2.0 technologies that managers have was measured with a general question (e.g. To your knowledge, what is Web 2.0 technologies?). For those managers who are affiliated with hotels adopting Web 2.0, the interviews mainly focused on the influential factors as well as benefits of adopting Web 2.0 technologies. Findings of the interviews are summarized and the discussions are presented in the following section.

4 Research findings

4.1 Adoption of Web 2.0 by chain and independent hotels in Hong Kong

Drawing on the findings of a content analysis on the websites of the included hotels in Hong Kong, which included 87 chain hotels and 22 independent hotels, the trend of more hotels adopting Web 2.0 technologies was identified. As shown in Table 1, the percentage of hotels adopting Web 2.0 applications has continuously increased over the last three quarters. Despite relatively few hotels are operated independently in Hong Kong, the increasing adoption rate of Web 2.0 applications was identified among them. By February 2010, only 27% of all 22 independent hotels integrated Web 2.0 applications. However, the corresponding number increased to 36% and 41% in the following two quarters, respectively. Similarly, of the 87 chain hotels, the adoption rate increased from 29% in February 2010 to 32% in May 2010. In August 2010, more than a half of them (51%) were found to enrich their websites by integrating at least one Web 2.0 application. These figures clearly revealed the increasing trend of Web 2.0 technology adoption among the hotels in Hong Kong. Though the trend of adoption was found on both chain and independent hotel websites in Hong Kong, the adoption rate varied between the groups. Specifically, the adoption rate of chain hotels was mostly higher than that of independent hotels in the studying period (Please refer to the "Total" row in Table 1). Besides, in a comparison of the average number of Web 2.0 applications used by the chain and independent hotels, chain hotels were found to adopt more Web 2.0 applications. In August 2010, chain hotels adopted an average of 2.1 Web 2.0 applications; whereas independent hotels adopted an average of 1.4 applications. Furthermore, chain hotels implemented nearly all Web 2.0 applications except "Guest Comment"; whereas independent hotels

implemented five applications. These findings imply that brand affiliation is associated with Web 2.0 technology adoption, and the adoption rate of chain hotels is relatively higher.

Table 1. Adoption of Web 2.0 technologies by chain and independent hotels

	Facebook	Twitter	RSS	Tripadvisor	Company Blog	Flickr	Guest Comment	Bookmark	Google buzz	Google Map	Youtube	Total	Mean
Independent Hotels (N=22)													
February	23%	9%	0%	5%	0%	0%	5%	0%	0%	0%	0%	27%	1.5
May	23%	9%	0%	5%	0%	0%	14%	0%	0%	0%	0%	36%	1.4
August	27%	9%	0%	5%	0%	0%	14%	5%	0%	0%	0%	41%	1.4
Chain Hotels (N=87)													
February	17%	14%	7%	5%	5%	0%	0%	0%	0%	0%	1%	29%	1.6
May	22%	16%	8%	5%	5%	2%	0%	7%	3%	0%	2%	32%	2.2
August	25%	16%	6%	8%	8%	2%	0%	11%	3%	21%	6%	51%	2.1
All Hotels													
February	18%	13%	6%	5%	4%	0%	1%	0%	0%	0%	1%	28%	1.6
May	22%	15%	6%	5%	4%	2%	3%	6%	3%	0%	2%	33%	2.0
August	26%	15%	5%	7%	6%	2%	3%	10%	3%	17%	5%	49%	2.0

Note. Mean refers to the average number of Web 2.0 applications adopted by hotels.

Regarding the types of Web 2.0 applications adopted, 11 application types were identified from all hotels websites in Hong Kong. Chain hotels generally integrated more Web 2.0 applications onto their websites than independent hotels did. Social networking sites, particularly Facebook, were the mostly used Web 2.0 application on both chain and independent hotels websites. More than one-fourth of chain and independent properties had a Facebook for promoting their offerings and networking with their in-group members. Microblogging like Twitter was the second mostly found Web 2.0 application on the websites of both hotel groups. Hotels usually posted the latest promotional messages to their Twitter pages linked to company websites. Apart from these two commonly used Web 2.0 applications, Google Map was another mostly adopted Web 2.0 application which was found on chain hotel websites only.

4.2 Factors influencing Web 2.0 adoption

Knowledge of Web 2.0 by chain and independent hotel managers

As Wober and Gretzel (2000) suggested, managers who have better knowledge in the subject field would have fewer cognitive barriers in adopting new technology, the primary question of the interviews was about the managers' knowledge on Web 2.0 technologies. *Manager A* from a chain hotel adopting Web 2.0 replied that Web 2.0 is "a series of online platforms for all Internet users to group together and share anything about themselves". In another interview, *Manager C* from another chain

hotel not adopting Web 2.0 answered, "Web 2.0 represents Facebook, YouTube, and other tools allowing Internet users to convey their thoughts and share comments on specific issues". Although the technology adoptions by these two chain hotels were different, the chain hotel managers had similar ideas of what Web 2.0 is.

Manager B from an independent hotel adopting Web 2.0 defined Web 2.0 as "a digital space for sharing personal thoughts and knowledge"; whereas *Manager D* from another independent hotel answered, "Web 2.0 is a place that can group people with similar interests together for sharing". Regardless of whether they work for chain or independent hotels and whether the hotels adopted Web 2.0, the managers had a similar understanding about Web 2.0 technologies.

Motivators and inhibitors of adopting Web 2.0

To examine the motivators of adopting Web 2.0, the question "What factor(s) motivate your hotel to adopt and integrate Web 2.0 technologies on your website?" was asked to the managers from a chain (*Manager A*) and an independent hotel (*Manager B*) adopting Web 2.0 applications. *Manager A* replied that the factors were the top management perception on Web 2.0 and the potential benefits of Web 2.0. The senior management at the headquarters with which *Manager A* is affiliated believe that Web 2.0 is "an effective channel to retain existing customers and approach new customers with insignificant cost". Besides, *Manager A* claimed that Web 2.0 provides "informal channels" for them to understand what his hotel does well and bad. It is because the content created by customers on these media was unfiltered and realistic. Through analyzing the contents on these media, hotels could not only realise their performance but they could also "better understand the customers' needs and subsequently customized the offerings". In view of the positive belief the top management held, the corporate headquarters require all their affiliated properties to implement certain Web 2.0 applications and provide technical support. From the independent hotel manager's viewpoint, *Manager B* replied that "the trend of using social media by competitors" led to their adoption. Given the popularity of Web 2.0 among customers, the top management of *Manager B*'s hotel acknowledged the potential of Web 2.0 as a new marketing channel to promote their products and service. Moreover, as its competitor hotels have already existed in these media, the top management thought that they should follow this approach otherwise they would lag behind the others.

The managers from a chain (*Manager C*) and an independent hotel (*Manager D*) which did not adopt Web 2.0 applications commonly said that they are going to integrate these technologies into their websites. In order to understand the impediments affecting their original decision, a follow-up question of "What factor(s) inhibit your hotel's original decision on adoption Web 2.0 technologies?" was asked. The interviewees thought that the limited financial resources on IT development and the perceived usefulness of Web 2.0 on revenue generation by their top management inhibited their inclination to adoption. *Manager C* claimed that their top management originally "thought that the function of Web 2.0 applications was similar to their website as a medium to provide customer with information" and the top management "did not recognize what additional benefit Web 2.0 could bring to them". *Manager D*

shared the same view that their top management "disbelieved the ability of Web 2.0 in generating revenue or other benefits to the hotel". However, ever since the adoption of Web 2.0 were getting common in the hotel industry, the top management started recognizing its potential benefits and proposed to integrate them as another Internet marketing strategy. Similar to the managers from hotels adopting Web 2.0 applications, *Managers C* and *D* suggested that "having the top management to realise the benefits of Web 2.0" and "getting their agreement to adoption" were the determinants of this new technology's adoption. The findings from the interviews imply that the perceived benefits of Web 2.0 in perspective of the top management directly affect a hotel's inclination towards adopting Web 2.0 technologies.

5 Discussion and Conclusion

Findings of this study have contributed to better understand the use and diffusion of Web 2.0 applications in the hotel industry. Based on a content analysis of 109 hotel websites in Hong Kong, a trend of increasing adoption of Web 2.0 applications was identified among the hotels in Hong Kong. The difference in adoption rate of Web 2.0 technologies was found between chain and independent hotels. As shown by the percentage of adopted hotels and the average of applications they used, chain hotels in Hong Kong generally have a higher inclination towards the adoption of Web 2.0 applications than independent hotels. Managers, regardless of whether they work for chain or independent hotels and whether the hotels adopted Web 2.0, had a similar understanding about Web 2.0 technologies. Hence, the difference in adoption decision could not be explained by the discrepancy of hotel managers' knowledge on technology. In addition, interviews with the hotel managers revealed that the difference in Web 2.0 adoption between chain and independent hotels is not attributed to the discrepancy in their financial resources (Au Yeung & Law, 2004). While research has shown that technology projects were usually constrained by resources available to the organisation, especially the budget to support the adoption (Wang & Qualls, 2007), the adoption of Web 2.0 technologies was not the case. In a study on the applicability of Web 2.0 on learning and research, Ullrich, Borau, and Luo (2008) demonstrated that costs associated with introducing and adding Web 2.0 applications into the existing channels are insignificant to the company. In the hotel context, a hotel can open an account on Facebook.com for connecting with their customers without paying fee. Therefore, the scarce financial resources were not the critical inhibitor.

On the other hand, Lefebvre, Mason, and Lefebvre (1997) suggested that top management plays an important role in the decision-making process for technology adoption and resources allocation. Their attitude and perception towards the technology are critical in dictating the company's tendency towards technology adoption. Although the interviewed hotel managers did or planned to adopt Web 2.0 technologies, findings from the interviews revealed that the top managements of chain and independent hotels hold different views on the perceived benefits of Web 2.0. Phillips, Calantone, and Lee (1994) suggested that the more benefits organisations can foresee from using the technology, the more likely they are to adopt the technology given sufficient support and facilitation. However, as stated by *Manager B* and

Manager D, the top management of independent hotels merely perceived Web 2.0 as a defensive mechanism which should not to be left behind (e.g. follow the trend of using social media). In contrast, the top management of two chain hotels interviewed perceived Web 2.0 applications as strategic tools for marketing, customer understanding and customer retaining. Hence, with more benefits which chain hotels can perceive, these hotels are more likely to adopt this technology.

Lincoln (2009) concluded her book by stating that the sooner a business adopts Web 2.0, the better outcome it could get from Web 2.0. In this study, while there is a proliferation of hotels in Hong Kong adopting Web 2.0 technologies, there is still around a half of hotels in Hong Kong, regardless of its brand affiliation, did not yet exploit the potential of this technology. In light of the interviews with four hotel managers, all interviewees agreed that Web 2.0 technologies offer unprecedented ability and potential benefits to hotel companies in several aspects. In view of the important role of top management's perceived benefits on technology adoption as suggested by the interviewees, hotel managers should strike to provide their top management with adequate information about how Web 2.0 can help improve their business and competitive advantage.

This study has several limitations. As content analysis was employed and it relies on subjective judgments in coding, personal bias might exist. Human errors may also have arisen as this study, which did not make use of computerized content analysis. Besides, as only four hotel managers were interviewed and the job nature of the interviewees was different, these might mistakenly affect their responses. Moreover, only hotels in Hong Kong were consulted and the data collected from February to August 2010 were analyzed, the generalizability of this study's findings may be limited. Future research can be extended to hotels in other countries and more hotel managers should be interviewed to gain more insightful implications along with quantitative research approaches. This will certainly benefit researchers and practitioners to realise the trend and rationales of Web 2.0 adoption.

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Hotel Websites and Booking Engines: A Challenging Relationship

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Abstract

This study analyses the relationship between corporate hotel websites and corporate hotel booking engines. These two systems are critical in the hospitality sector: the hotel website is an important means for online hospitality marketing, while the hotel booking engine represents the possibility of conversion without intermediation fees for the hoteliers. In light of a case study of one of the major Italian hotel chains, this paper explores a possible way to analyze the activities performed on the two systems by exploring different possible correlations to assess the importance of inter-system communication. The case study shows, on one hand, that the more visits a hotel website receive, the more bookings are made on the corporate booking engine. Conversely, the time spent on the website does not have any influence on actual bookings.

Keywords: Hotel websites, booking engines, log files analysis

1 Introduction

The eCommerce market is acquiring more and more importance on the internet; actually, as stated by Hotel Marketing (2007), the web is becoming the best travel agent. Clearly, besides the big Online Travel Agents (such as Expedia.com and Booking.com), there is a very active market which is the one represented by the hotels (or hotel chains) websites and booking engines. Some studies in the past focused either on the online communication strategies of the hotels' websites (e.g. Chung & Law, 2003) or on the booking experience of the end user (e.g. Ivanov, 2008). Few of them really concentrated on the relationship between the hotel (or hotel chain) website and its booking engine.

This is also due to the fact that often (as it is the case of this study) the two systems are sold separately: one vendor usually takes care of the website while the other usually takes care of the booking engines. So that hotel managers need to constantly check two different systems to understand if their marketing or product campaigns

achieve the expected results. Nowadays, due to systems interoperability problems, it is not possible to determine which kinds of website behaviours lead to conversions in the booking engine.

This paper represents a first step towards a general understanding of the challenging relationship between hotel websites and booking engines because it tries to make sense out of the huge amount of data generated by the two systems in order to find relevant hints both on marketing side (i.e. how to build an effective hotel website) and on a sales side (i.e. how to maximise conversions).

2 Literature

The recent advent of new technologies in the travel and tourism field radically changed and reshaped the industry (Buhalis, 2003). The accelerating and synergistic interaction between technology and tourism in recent times has brought fundamental changes in the industry and on our perceptions of its nature (Buhalis & Law, 2008). Given that travel and tourism is an information intensive domain (Sheldon, 1997), where information gathering and processing is essential for day-to-day life (Poon, 1993), the importance of new technologies, and especially the importance of the Internet, at different levels is crucial (Buhalis, 2003).

Tourism marketing and promotion managers found in new technologies means to market and present tourism products (Sheldon, 1997; Buhalis, 2003), and to manage particular internal information flows: travel and tourism managers are increasingly relying on this channel of understanding that if well managed, the internet can generate tremendous added value for the tourism products themselves (Inversini et al, 2009). Conversely, the importance of new technologies in the tourism industry is due to the purchase process (Werthner & Klein, 1999). One example is that of flight companies (Buhalis 2004) and hotels (O'Connor & Frew, 2004); these two sectors have been most influenced by the advent of internet-based technologies which reshaped their business models and revenue systems. Travelers are interested in this process as well since, as stated by Buhalis and Law (2008), new, experienced, sophisticated, and demanding travellers required to interact with suppliers to satisfy their own specific needs and wishes (Buhalis & Law, 2008).

Furthermore, as underlined by Bomke and Kromker (1998:9) "The immaterial character of the product 'travel', the problem of filling capacities in an environment of missing capability of storage and the evident importance of information as factor of production make tourism an ideal area for electronic commerce." Hence, electronic commerce together with online marketing and promotion is dramatically influencing the hospitality sector: if online marketing and promotion mainly refers to the hotel website (i.e. drive traffic on the hotel website to promote specific products or rate), electronic commerce refers to the online booking engine (i.e. hotel private owned booking engines and online travel agents). Hospitality distribution channels can be categorized into company websites (i.e. websites and often hotel-owned booking engines) and online agencies: in general, the company website is owned and managed

directly by hotel chains, while online agencies are third-party intermediaries between hotels and customers (Choi & Kimes, 2002).

2.1 Hotel websites

In general terms, it is possible to argue that a company can use the internet in three different ways (Cantoni & Di Blas, 2002): (i) to be there, establishing a connection between the virtual and real world; (ii) to operate, letting the consumer do something useful for its business online; (iii) to integrate, partially or totally, business units or business intelligence. Hotel website are not different: they can (i) have a simple shopping-window website with prices, location and pictures; (ii) let users interact with a booking engine (either personally owned or administrated by a third party); (iii) integrate business processes such as eCustomer Relationship Marketing (eCRM). Chung and Law (2003) developed an information quality evaluation model for measuring the performance of hotel websites. The model is developed on the basis of a conceptual framework which consists of the five major hotel website dimensions: (i) facilities information, (ii) customer contact information, (iii) reservation information, (iv) surrounding area information, and (v) management of websites. The exploratory studies presented by Law and Hsu (2005) and Rong, Li and Law (2009) applied this evaluation model, investigating the perceived importance of dimensions and attributes on hotel websites from the perspective of travellers, and studied the different perceptions of specific hotel website attributes between online purchasers and browsers – users who did not make hotel reservations on hotel website in the 12 months before of the survey – respectively. Since the travel product is characterized by its intangible and complex nature, the internet can be a means for suppliers to provide customers with greater detail on features of products using a wide array of tools (Beldona, Morrison, & O'Leary, 2005). Internet technologies can help customers in their expectation creation about a certain product: the experience within a computer-mediated environment can simulate real visits and virtual experiences can provide almost real-life experiences (Buhalis, & Law, 2008). If prospective customers are informed about (intangible) products, risks in buying those products decrease: it is presumable that this can increase willingness to purchase.

2.2 Hotel Booking Engines

Online booking is acquiring tremendous importance within the hospitality sector: a recent study by *Hospitality eBusiness Strategy* announced that in 2009, 54.2% of the bookings for the top 30 hotel brands came from online channels, which constituted a remarkable increase of 6.6% with respect to 2008. These figures and trends increasingly convince hotel and tourism managers to invest and exploit this lucrative online business, constantly trying to enhance their competitive advantages by focusing their resources on the virtual business environment (Bai, Law & Wen, 2008). Following Ivanov (2008:7-8) it is possible to draw a definition of booking engines: "Online booking engines [are] tools to store, publish and update the dynamic data availability and prices, and additionally provide the users with a regular reservation process. A specific characteristic of the OHRS [online hotel reservation systems] is that users can make and see the changes in reservation status online". Some studies

reveal that the information about the reservation is considered the most important dimension of a hotel website by travellers (e.g. Rong et al., 2009); indeed it can affect visitors' online reservation decision: if a hotel provides a well-designed and convenient online reservation service, there could be a greater chance that more customers will make reservations through its website because users are focused on the information about the hotel and its services, rather than on technical website issues (Rong, Li, & Law, 2009). Besides, as highlighted by Wong and Law (2005) there are some dimensions that can influence and enhance the intention of travellers to make purchases on hotel websites: (i) information quality, (ii) time, and (iii) sensitivity content. Among these dimensions, information quality is perceived as the most significant dimension motivating the intention to purchase. Hence, it is important that hotels ensure their online reservation forms are simple and easy to complete. Also, good virtual links and easy browsing facilities should be provided to attract travellers to purchase online. Shao and Gretzel (2010) analyses clickstream sequences to explore how Chinese online travel agency visitors book hotel products. The study explores the transaction sequence patterns and the frequent abandonment points of users inside a specific online travel agency website. The study demonstrates that among the most relevant reason include: 1. Meeting a malfunction as payment is being processed; 2. Not getting an acknowledgement after an order has been placed; 3. Changing mind and discarding cart contents; 4. Comparison shopping or browsing; 5. Checkout process is too long; 6. Unavailability of products at checkout time; 7. Checkout requires too much personal information; 8. Poor site navigation and log download time; 9. Lack of contact information; 10. Checkout process is confusing; 11. Site requires registration before purchase; and, 12. No gift certificates (Shao & Gretzel, 2010). Furthermore, according to Wolfe, Hsu, and Kang (2004), the reasons of consumers not purchasing travel products online are the lack of personal service, security issues, lack of experience, and time constraints. The iPerceptions Hospitality Industry Report (2009) identifies the frequent barriers to task completion when making a hotel reservation. Reasons indicated by users as the first two predominant ones are booking/reservation problems (21%), and navigation/technical issues (20%); among other reasons to be found were more hotel room info (5%), and bad customer service (4%). These results can be compared to the ones obtained by MediaPost, presented in Shao and Gretzel (2010): meeting a malfunction, booking/reservation problems and navigation/technical issues may be considered the same user concern; the same can be said for lack of information contact and poor customer service, the former being an expression of the latter. Website owners should, therefore, pay more attention on making customers feel comfortable and secure to complete their reservations and to increase trust in the online environment (Bauernfeind & Zins, 2006; Chen, 2007).

3 Research Design

The goal of this study is to understand if there is any relationship between hotel websites usages and booking engines owned by the same hotel. This objective comes from a real market need where hotel websites and booking engines are usually provided by different web agencies, and there is no possibility of analyzing the interaction between the two due to their different architecture, hosting system and even programming language.

In order to do such an analysis, a field study approach has been adopted: an Italian based hotel chain (34 hotels, 3133 rooms) was selected. The hotel chain has a good online distribution strategy: 72% online travel agents, 28% internal booking engine. Furthermore, this chain is trying to dis-intermediate, increasing the importance of the chain website with respect to the online travel agents websites in order to avoid the intermediation costs on the parity rate.

The research hypotheses are:

Hp1: there is a positive correlation between the unique visits to the website and the booking conversion.

Hp2: there is a positive correlation between the average time spent on the website and the booking conversion

In order to investigate the above research questions, the log files of the hotel website and of the hotel booking engine were analyzed. The timeframe for the analysis was 1 year (20.10.2008 – 19.10.2009). Log files can be understood as traces left by users while navigating the website (Inversini & Cantoni, 2009), and may contain useful technical hints about users' behaviors (Atterer et al., 2006). They can also be used at a communication level: data such as entry and exit pages, navigation patterns and traffic source can really help communication managers to orient and develop online communication strategies (Cantoni & Ceriani, 2007). At the communication level, on the website, the main goal is to understand the path of the users (Pitkow, 1997), from their arrival on the website to their final booking. The hotel website was hosted on an external web server, while the booking engine was provided externally as a service from another vendor.

On one hand, an analysis of the usages of the hotel website, through access to Google Analytics, was performed. In particular, the following data were analyzed: (i) sources of traffic; (ii) countries of origin; (iii) most visited web pages; (iv) landing pages (v) visit trends (i.e. the analysis of the number of visits and their average length in different days of the week).

On the other hand, a study on booking data was conducted. Technically it was not possible for researchers to "follow" a given user from the website to the booking engine due to two main reasons: (i) first of all, the website and the booking engine were installed onto two different servers, managed by different companies. (ii) Secondly there was no possibility of passing users' parameters (such as an id) from the website to the booking engine. Moreover, log filed data of the website were available, while log data of the booking engine were not made available by the service provider of the booking engine. Thus, thanks to tight collaboration with the hotel chain's management, it was possible to analyze data about the bookings: (i) daily number of bookings and (ii) clients' expenses.

However, for the purpose of the study, the set of data available allowed researchers to analyze the correlations between the number of visits and the length of the visits and the actual bookings and expenses, as declared in the hypotheses.

In particular, the analysis is based on following data: (i) the number of visits on the website (source: Google Analytics); (ii) the number of the absolute unique visitors on the website (source: Google Analytics); (iii) the number of visits on the website divided in the three sources of traffic: direct traffic, search engines and referral sites (source: Google Analytics); (iv) the number of bookings (the number of bookings done in a certain day, not the bookings reserved for that day), (source: booking engine back office); (v) the total expense paid by customers (source: booking engine back office).

Using the above mentioned set of data, the case study aims at verifying whether the following correlations exist:

- the number of visits to the website - the number of bookings
- the number of absolute unique visitors - the number of bookings
- the number of visits to the website - the total expense of the customers
- the number of absolute unique visitors - the total expense of the customers
- the number of bookings - the total expense of the customers
- the average time on site spent by visitors - the number of bookings
- the average time on site spent by visitors - total expenses of the customers

4 Results

In order to better understand the objects of this study, an overview of the website (structure and usages) and of the booking engine is here presented.

Website structure

In the central frame, images show the hotels of the chain and continuously change. The top menu shows the following sections: Hotels, Meetings and events, Sport and Wellness, Promotions, Newsletter, Hotel idea, Blog. The current website was renovated in 2007. The menu at the bottom presents some links to pages which regard the single hotel: its history, contacts, news and press room, work with us section, development and franchising, group and B2B, and partnership presentation. On each page, the reservation box and the free phone tool are displayed. Moreover, the subsection of the single hotel is structured as follows: Hotel, Services, Rooms, Restaurants, Café, Promotions, Concierge, Map & weather forecast, Photo gallery. Additional labels linked to particular features/services relevant for a single hotel are present, such as “Fairs”, “Golf” and “Club House” among others.

The website is realised with a hotel specific content management system, written by a company specialised in software solutions for tourism businesses. Therefore the website is updated dynamically on the content of the database.

Website Usages Analysis

As described in the research design, the period considered for the case study is 20.10.2008 – 19.10.2009. Data is taken from the Google Analytics tool and are automatically filtered by the company to exclude visits coming from the company's intranet. In the considered period the website had: 1'071'138 visits by 700'734 unique visitors, which made 5'094'325 visualizations of pages. On average, 4.37 pages were displayed per visit, with an average time of 00:02:38 spent on the site. The bounce rate is 41.47%, while 58.53% are new visits. Traffic sources were different: direct traffic (28.36%), search engines (53.53%) and referral sites (18.01%). The main search engine from which visits were directed was Google, which constitutes 92% of visits. In the ranking it is followed by several other search engines, representing 7.5% of visits to the website: Yahoo, Virgilio, Bing/Msn/Live, Search and Alice. Regarding the referral sites, they are mainly partner of the hotel (such transportation services or OTA). The country that provided more traffic was the country where the hotels were located (i.e. Italy - 61.30% of visits). Other countries reflect approximately the hotel's market, but the second most important country provides only 6% of traffic. The most visited page was the homepage (14.6%), while among the first ten most visited pages hotel presentation and promotion page could be found. Looking at the trend of visits to the website, some visits attitudes were noticed. First of all the number of visits on the websites changed according to the days of the week. The average number of daily visits to the website during the weekdays was 3.353, while the average during weekends was 1.883. The average time visitors spend on the websites during weekends is 2.5772, which is 00:00:16 higher than the average time spent during weekdays (2.4141).

Booking Engine structure

The booking engine is provided by Fastbooking, a specialised software house. After the booking request, in the so called "quick reserve box" accessible from every page of the website, the booking engine opens in a new window and provides a list of different tariffs. Selecting one of the options, the visitor arrives at the actual booking engine and can start the booking process. The first step is the availability check: the visitor inputs the actual date and needs (how many rooms, how many guests per room) and her/his personal data. Further steps review the booking data and ask for confirmation.

Bookings Analysis

The analysis of the booking data for the Italian chain revealed that in 2008 electronic channels have produced 89'378 room nights (increasing 10% from 2007), increasing also the revenue by 7.5%; on the total revenue of 2008, the incidence of the booking engine channel, accessible via the corporate hotel website, was 24'887 room nights, equal to 28% of the entire electronic channel selling. In 2008, the direct bookings from the website have increased its production by 2.75%, while bookings through the intermediaries on commission and by merchant model have decreased by 0.42% and 0.59% respectively. The present analysis considered one year period 20.10.2008 – 19.10.2009 data: in this time frame the minimum number of bookings per day was 17, while the maximum was 201, with an average of 52.8. For each booking, the average number of nights booked was 2.277 and the average number of rooms 1.112.

4.1 Hypotheses testing

Correlation between visits and bookings

The Pearson correlation test between the variables has been performed. The test results demonstrate that the following correlations exist. Starting from the correlation between the number of bookings and the total expenses (with the Pearson Correlation value of 0.813) the following correlations have been tested.

- A high positive correlation between **visits** to the website and the number of **bookings**. Pearson Correlation value: 0.823

Figure 1 shows the monthly distribution of booking and visits month per month; the relation between visits to the websites and booking, month per month.

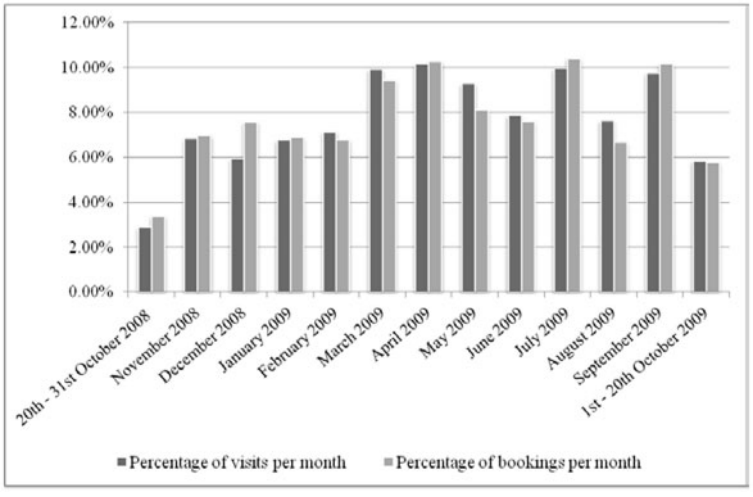

Fig. 1. Distribution of visits and booking percentage weigh for each month compared to the whole year

For every month, it has been calculated how much the monthly visits perceptually weigh on the total. The same has been done for bookings. For example, in the month of November, visits to the websites weighed 6.8% on the total number of visits, while bookings weighed 7% on the total number of bookings.

This way, a positive relation between the two sets of data is demonstrated.

- A high positive correlation between **absolute unique visitors** and number of **bookings**. Pearson Correlation value: 0.813

The results presented above suggest that a higher number of absolute unique visitors to the websites have contributed to a higher number of bookings. This result could give an input to hotel chains to invest resources in the websites since a higher number of visits could bring an increase in bookings. To invest in websites may mean to

invest in positioning, in improvement of contents delivered and in navigational structure of the website, among others.

- A high positive correlation between visits to the websites and the total expenses. Pearson Correlation value: 0.727

- A high positive correlation between absolute unique visitors and the total expenses. Pearson Correlation value: 0.710

In the present analysis, a higher number of absolute unique visitors have resulted in an increase in the total expense of customers. The correlation is demonstrated, even with a lower Pearson Correlation value. This result can be seen as linked to the previous ones: a higher number of bookings have resulted in higher expenses, as the figure below demonstrates. For all the results presented above, the significance of the test is 0.000. Accordingly all the null Hypotheses are rejected and the correlations are demonstrated.

Correlation between time on the website and bookings

Besides this, the correlations between the independent variable, average time spent on the two websites, and the two dependent variables, number of bookings and total expenses, have been tested.

- No correlation between the average time spent on the websites and number of bookings. Pearson Correlation value: - 0.209

- No correlation between the average time spent on the websites and the total expenses. Pearson Correlation value: - 0.207

The Pearson correlation tests have a significance value of 0.000. Therefore, both Null hypotheses are confirmed: there is almost no correlation between the independent variable and the two dependent variables. According to this analysis, a longer visit on the website has not influenced either the number of bookings or the amount of expenses.

Correlation between source of traffic and bookings

Another analysis investigates the relation between the sources of traffic and the actual number of bookings received from the corporate websites. For each day of the analyzed year, the total number of visits to the website is split in three parts, meaning the three sources of traffic: search engines, direct traffic and referral sites.
For each group of visits coming from the sources, the correlation with the number of bookings has been tested.

- A high positive correlation between the visits to the websites coming from search engines and number of bookings; Pearson Correlation value: 0.800.

- A positive correlation between direct visits to the websites and number of bookings; Pearson Correlation value: 0.687.

- A positive correlation between visits to the websites coming from referral sites and number of bookings; Pearson Correlation value: 0.673.

For all the results above presented, the significance of the test is 0.000. Accordingly all the null hypotheses are rejected and the correlations are demonstrated. Concerning results of the Pearson correlation test, the correlation is higher when considering visits coming from search engines. Trends of visits coming from search engines feature a stronger relationship with the number of bookings than trends of visits coming from referral sites and direct traffic.

5 Discussion and Conclusions

Results show that at least for the given Italian hotel chain, the website and the booking engine are two totally separated systems. The possibility of reconnecting users' paths on the website together with (same users) booking is a challenging task.

The first hypothesis (i.e. there is a positive correlation between the unique visits to the website and the booking conversion) is confirmed by the positive correlations between visits and bookings, visitors and bookings, visits and expenses, visitors and expenses. It is possible to argue that an increase of website visits leads to an increase of the booking activities. This correlation highlights the fact that users' visit to the hotel website is a pre-requisite for purchasing rooms nights. Thus promotional activities of the hotel website and the booking engine should become a key issue for increasing conversion rates.

Furthermore, the time spent on the website does not have any impact on the booking engine conversion rate: the second hypothesis (i.e. there is a positive correlation between the average time spent on the website and the booking conversion) is rejected by the non-existing correlations between average time on the website and bookings, average time on the website and expenses. Thus, complex and over-populated hotel websites might not be a plus within the booking process.

Limitations can be classified into two main categories: (i) the research focused only on the website and booking engine of a single hotel chain: the bookings generated through the internal engine correspond only to the 28% of the entire electronic channel selling. A more holistic approach is needed to assess the relevance both of the website and of the booking engine with respect to the overall online market to understand possible improvements of the corporate channel. The second category regards (ii) the booking engine data: unfortunately, booking engine log files were not available for this study. An in-depth analysis of these data would have been useful for more insights on the topic. For instance, if analysts were able to track every visitor from the website to the booking engine (i.e. jumping from one system to one other) and had more information on the booking engine usage, a meaningful path from the

user's landing on the hotel website to the conversion on the booking engine (or the withdrawal) could have been defined.

Future work will focus on the possibility of reconnecting website usages and booking engine data from two different providers in order to get more insights to optimize marketing activities and product purchases. Middleware and interface solutions might be designed and tested to augment the data exchange between the systems in order to have the possibility of analyzing the most effective user paths within and between the website and the booking engine.

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Web Marketing Features of UK Rural Hospitality Businesses

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Abstract

This paper evaluates the operational environment of rural hospitality enterprises as the sector is recognised making significant contribution to the UK economy. Most enterprises in the sector are small and medium sized hospitality organisations (SMHOs) and were found in previous studies to lack the resources and relevant skills to manage web-related tasks. This study has therefore collated website features from past studies and investigated if they were employed by UK rural hospitality businesses (n=325). These were then factor analysed to reveal four key uses of website marketing by UK rural hospitality businesses': Information provision, Communications, Promotions and to enhance Transactions.

Keywords: Web marketing; rural hospitality enterprises

1 Introduction

A significant part of many rural communities' commercial landscape is about meeting the needs of visitors as consumers. According to the United Kingdom Tourism Survey (UKTS, 2005) 19% of the 136.65 million trips taken by British residents were to countryside/ village destinations, although overall domestic tourism was reported to have declined steeply towards the end of 2008 as the economic downturn deepened (VisitBritain, 2008).

While it has been recognised that quality attractions, retail and travel helps to improve visitor numbers, accommodation and catering also need to encourage visitors to spend more time in an area. Encouragingly, the Economics Impact of Recreation and Tourism in the English Countryside (1998) report noted that countryside visitor expenditure was £11,655 million in England where 63% of the figure is accounted for by hospitality businesses alone (accommodation and catering).

Although marketing and the provision of information by rural hospitality businesses have often been scrutinised, there appears to be a lack of empirical data of how these businesses could exploit the internet by raising their online profile while contributing to tourism revenue generation. Critically, a recent survey has shown that 92% of UK holiday makers plan to go online to find the best prices, believing that the best deals are found on the web (RDC, 1998). This is confirmed by Visit Britain's 2008 survey findings that the internet is the most important source of information at various stages of holiday taking (UKTS, 2005).

Information technology has frequently been demonstrated to be of supreme importance in the marketing of hospitality businesses (TravelMole, 2009; Christian, 2000; Swig, 2000; Marvel, 2000) but ironically there is an equivalent amount of lamentation (if not more) directed at the lack of strategic implementation of information technology communication by the sector (Christian, 2000; Mistilis, Agnes & Presbury, 2004). The use of the internet is often used in the marketing process (Mistilis et. al., 2004), a platform where services and value are exchanged. Technology enables the internet to initiate selling and communication, but also to conduct market research and make payments (Lim, 2009). As the use of the internet becomes more widespread, the function of the internet can be neatly classified into three categories; information provision, transactions (Gronroos, 2007), promotions and communications.

The aim of this project is therefore to 'close the loop' by exploring if these functions are similarly featured on the websites of UK rural hospitality businesses. Constructs and concepts from past studies of website evaluation in the context of tourism will underpin this research.

2 Literature Review

2.1 Hospitality businesses

Small and medium hospitality organizations (SMHOs) are increasingly recognized as important economic players as they enable the infusion of tourist expenditure at the local level. "The small firm emphasis is important given that 99 per cent of the UK's business community is small firm" (Martin, 2004:82). The UK tourism industry consist of about 127,000 businesses and 80 per cent of which have a turnover of less than £250,000 per annum and they can be classified as "small firms". Also Department for Culture Media Sport (DCMS) describe tourist industry will be continually growing which attributing 7 per cent of all employment to tourism (2.1 million people).

However in terms of their key distribution partners, SMHOs have less bargaining power when it comes to suppliers, partners or even customers. Many of these organizations have little idea of which target markets they should attract, how distribution could be executed etc. Despite the size of the sector, SMHOs are collectively extremely important to the European economy (Buhalis and Main, 1998). It has been proven to provide stable employment opportunities and therefore support the local economy particularly in peripheral areas including periods of recession. SMHOs can be defined as less than 50 rooms, employ fewer than ten people, operating in the lower levels of the market and are often placed in tertiary locations (Buhalis, 1995; Main, 1994; Moutinho, 1990, Wong, 1991).

A new rating scheme for hotels and guest accommodation in England was jointly created by the then English Tourism Council, the Automobile Association (AA), and the Royal Automobile Club (RAC). The scheme puts greater emphasis on using stars

to represent hotels and diamonds for guest accommodation including guesthouses, inns, farmhouses, and bed and breakfast. The rating represents the level of service, range of facilities and quality of customer care.

On the other hand there are different types of hospitality businesses in the UK which includes food and beverage providers such as restaurants, cafes, bistros and pubs etc. Very little or no studies have examined the food aspect of hospitality. It is not surprising that this hospitality sector is virtually ignored, as the last 15 years the budget hotel sector has been one of the greatest success stories in the UK. Deloitte and Touche (2000) found that the budget hotel sector is the fastest growing hotel sector in the UK. The UK Budget Hotel Survey also indicated that there were 847 branded budget hotels at the end of 2001 and it were to increase to 1356 hotels in (Deloitte and Touche, 2002). Surveys conducted by leading brands budget hotels in the UK (Brotherton (2004) suggested that having many critical success factors (CSFs) are the characteristics of the budget hotel.

Previous research has shown that small businesses in tourism and hospitality are increasingly aware of the importance of developing an effective website. Past studies have however shown that many small tourism and hospitality businesses were not ready to adopt e-commerce (Leong, 2000; Christian, 2000; Van Beveren & Thomson, 2002; Weiss, 2000; Ruth, 2000). The internet can be a very powerful tool for small firms in helping them overcome the obstacles of internationalization- since it can deliver information (Leong, 2000), is useful for relationship marketing purposes (Gilbert & Powell-Perry, 2000; 2002) and improving service encounters (Bitner, Brown, & Meuter, 2000). According to some marketing experts, the critical success factors for marketing on the web are attracting users, engaging users' attention, and also ensuring return of the users (Hudson & Gilbert, 2006).

2.2 Rural Businesses and internet marketing

The definition of rural was introduced by DEFRA (Department for Environment Food and Rural Affairs) in 2004 – where rural and urban were differentiated. Based on settlement type, the term 'rural' was designated for districts with more than 37,000 people or more than 26% of their population is in rural settlements. According to the Rural Advocate's report, rural businesses can potentially report earnings of between £236 billion and 347 billion per annum. Rural Advocate estimated that the growth of rural business has the potential to improve the performance of England's economy as a whole. It is therefore important that in order to boost the rural development, a strong local economy is imperative (Bosworth, 2006). Although the rural economy is a complicated concept as they tend to be in a small scale and specific location.

Keeble and Tyler (1995) suggest that companies in accessible rural areas display enterprising. Lowe and Talbot (2000) agreed these earlier findings and state that rural areas may have weaker financial and business services. Besides, Jarvis et al (2002) highlight small and medium size enterprises play an important role for a local economic development as it provides a complex picture of the characteristic of the rural area in business success.

On the other hand Deakins (2004) suggested that the market of the businesses can be extended by using the Information Communication Technology (ICT). It can lead the businesses in the form of access to information (Zinkhan, 2002), resources (Baourakis et al., 2002), networking (Smallbone et al., 2002), improved efficiency (Buhalis & Main, 1998). The use of ICTs in Scotland within rural SMEs is expanding (Mochrie et al., 2003; Deakins et al., 2003); this including the internet forums which have the capacity to impact on local businesses and communities. Internet forum can be defined as an online facility that provides local businesses with an internet portal as the unique selling point and common brand.

Thus, if the business networking facilities like "Internet forum" could develop effectively, it can provide a local oriented support and service that can be marketed by local small business (Mckain, 2003**).** The model depicts the elements which should be included in the operation of internet forum in order to create a successful internet forum with a unique identity, knowledge of locality, ICT skills etc. The model was developed based on an observation of rural case studies. Very few firms were found to be using the internet in remote rural location. A study of the agriculture-food industry in Wales (Thomas et al., 2002, p. 35) reported that "firms are often inept at implementing changes that are technologically enabled", while in the rural hospitality industry, Buhalis and Main (1998, p. 198) identify firms' "inability and reluctance to utilize information technologies". Much more recently, Irvine and Anderson (2008) found that the rural hospitality business were adopting ICT effectively to provide information but had ignored supply functions (i.e. transactions based applications).

Time and again, past studies have found that technology is an important strategic asset for hospitality organizations (Buhalis, 1998**;** Yuan & Fesenmaier, 2000). Wang and Qualls (2007) argued that there are number of internal and external factors are affecting the adoption and diffusion of technology. Based on number of literatures reveal that ours knowledge of the understanding of the technology adoption is limited. It has also been found that online booking is getting popular as the number of online travel sales rose by 24% from 2006 to 2007 representing EUR49.4 billion in the European market itself (Marcussen, 2008). Research has also found that the internet has become the most cost-effective tool in generating revenue in the hotel businesses (Crnojevas et al., 2010).

Web based marketing was found to influence the creation of new forms of interaction and transactions between consumers and marketers using the element of marketing mix (Wang and Fesenmaier, 2006). Web-based marketing has the capabilities to create a new interactive media such as (1) providing higher service and lower cost by delivering information about products and services, (2) identifyng self-selected users in order to enhance loyalty by providing value-added services, (3) a new channel to eliminate traditional intermediaries. Parets (2002) also suggests that internet marketing is not only applicable to big hotel chains and it can also work effectively in independent or small hotels as an inexpensive platform for marketing, potentially increasing their competitiveness in the marketplace (Baloglu and Pekcan, 2006). Based on a Internet Week's survey, most hospitality and tourism companies perceive internet sites as a competitive tool in the marketplace. Essawy (2007) therefore

suggests that it is essential for hospitality organizations to use the media channel effectively in order to communicate with their market as the hospitality products are essentially intangible and experiential.

Further literature reviews revealed past studies that have measured website effectiveness using various features, most of these studies were made up of numerous web attributes. A summary of these studies and the website features evaluated can be found in table 1 below.

Website features evaluated	**Reference/s**
Visibility, design, navigation, content, accessibility, interactivity, personalisation, commercial elements	Ellion and Equinos (2007)
SERVQUAL dimensions of Tangibility, Reliability, Assurance, Empathy and Responsiveness	Moraga, Calero and Piattini (2006)
Building a customer community using the reputation aggregator, blog, e-community and social networks strategy	Weber (2007)
SERVQUAL dimensions + competence, credibility, access and communication	Federoff (2009)
Content, accessibility, architecture and navigation, independent validation, blog, customer support, SEO, outbound marketing, online advertising	Potts (2007)
Facilities information, customer contact information, reservation, price information. Surrounding area information, management of the site, company information, communication	Zafiropoulos, Vrena and Paschaloudis (2005)
Language, layout & graphics, Information architecture, user interface & navigation, general	Au Yeung and Law (2006)
Website content ranking and grouping	Taylor and England (2005)
Company information, advertising online, use of multimedia tool, suitable access to contacts, speeding up online tasks, personalising website, allowing users to control information detail, aiding online shopping decisions, facilitating customer feedback, establishing multiple communications channel	Huang, Le, Li and Gandha (2006)
Position effects, behaviour, layout and copy length	Murphy, Hofacker and Racine (2006)
Measured application satisfaction by hotel function; front office, back office,	Heart, Pliskin, Schechtman and Reichel (2001)

logistics, HR and sales	
Content analysis of visitor attraction websites; features measured includes 4Ps of attraction, customer relations and technical aspects	Blum & Fallon (2002)

3 Methodology

To obtain a holistic view of the investigated phenomenon (Patton, 1980), this paper seeks to observe human behaviour from the rural businesses' terms of reference (Easterby-Smith et.al., 1991). An ontologically realist approach was selected to address concerns of measurement reliability, validity and generalizability. A list of Local Authority (LA) Classification Dataset from April 2009 was obtained from the DEFRA website where a list of 1983 districts classified as rural were extracted. A google search of accommodation and food and beverage providers in every 4th rural district were conducted. Each of these websites was evaluated against each variable and given a 0 (if feature not found) and 1 (if feature found), based on a content check list of elements obtained from literature reviews. Information such as type of business is recorded, i.e. it's a restaurant, a hotel, a B&B or other types of accommodation. A total of 325 rural hospitality businesses were examined.

Given that the research seeks to classify the types of website features employed by UK rural hospitality businesses, it was decided that a factor analysis was the most suitable tool to achieve that aim. A factor analysis was conducted to not only seek and explain but also to review collapsed variable items that correlated into factors (Tabachnik & Fidell, 2001).

4 Factor Analysis Findings and Discussion

It has been noted that the correlation coefficients tend to be less reliable when estimated from smaller samples (Tabachnik & Fidell, 2001), therefore having a sample size of 325 for this research is considered to be between good and very good (Comrey & Lee, 1992).

The use of factor analysis is to determine the main dimensional factors based on the KMO (Kaiser-Meyer-Olkin) which extracted a total of 4 factors and the amount of variance the variables account for (eigenvalue>1). A Direct Oblimin – an oblique rotational method was used in the Principle Component Analysis (PCA). The rotated component matrix is used for interpretative reasons as 'it contains information about the unique contribution of a variable to a factor' (Field, 2005: 660). It was suggested by Stevens (1992) that with a sample size greater than 300, a loading of greater than .298 can be considered significant, and in the case of this study, the lowest factor loading without any cross loading is .463 (Table 2). The factor analysis using SPSS aggregated the 20 website features (tested in various literature) into four new factors, they are assigned new labels, (1) Information where the factor loadings of the 4 variables varied between .616 and .883, (2) Promotion had 4 variables of factor

loadings ranging between .472 and .738, (3) Communication is a collapsed factor made up of 8 variables with factor loadings between .463 and .677, and (4) Transaction as a factor is made up of 3 variables with factor loadings ranging from .472 to .883.

19 website features are summarised and illustrated in table 2 below, providing a good estimation of population parameters for interactions. As shown in the table, the Rotation Sums of Squared Loadings (Eigenvalues) accounted for 63.4% of the total cumulative variance.

	Information	**Promotion**	**Comm.**	**Transaction**
Vicinity's visitor attractions	0.813			
Events in the vicinity	0.75			
Promotion of local area	0.883			
Links to above sites	0.616			
Facilities available		0.699		
Supplier information		0.472		
Special offers		0.675		
Customised package pricing		0.738		
Company info.: ownership details			0.47	
Press releases/media coverage			0.607	
Web2:			0.543	
Loyalty/newsletters subsciption			0.454	
Online guest book			0.677	
Testimonials			0.463	
Membership/ affiliations			0.499	
Awards			0.531	
Online payment/reservation				0.883
Language options				0.472
Payment security				0.877

Reliability (Cronbach's Alpha)	0.791	0.528	0.541	0.771
Eigenvalue	3.645	2.514	1.924	1.736
Cumulative % of variance	17.355	29.326	38.486	46.752

Kaiser-Meyer-Olkin Measure of Sampling Adequacy:	0.634	
Bartlett's Test of Sphericity: Approx. Chi-Square	608.378	Sig.: .000

As indicated by the reliability measure of Cronbach's Alpha, two factors of Information and Transaction were consistent and rather well defined by the variables, as the recommended value for Cronbach's Alphas is at least 0.7 (Ahire, Golhar & Waller, 1996). However, the factors of Promotion and Communication yielded relatively low Cronbach's Alphas of .528 and .541 respectively. The lowest 2 Communality values were relatively high, with a cut of .4 for inclusion of a variable in the interpretation of a factor. In relation to the hoteliers' perceptions of Internet marketing, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) is .634, an acceptable value indicating that patterns of correlation are compact, yielding distinct and reliable factors in factor analysis (Field, 2005).

Four factors were obtained from the 19 collapsed variables. These factors were determined by the way the variables had grouped together.

Factor 1- Information: Website features provided information related to the business including vicinity's visitor attractions, events in the vicinity, promotion of the local area and links to the relevant sites.

Factor 2- Promotions: Website features focused on promoting the business including the types of facilities available, whom their suppliers were, special offers and customised package pricing.

Factor 3- Communications: Website features enhanced the communication aspects between the organisation and customer including company information, press releases, the use of web 2 technology, newsletters, online guestbook, testimonials, membership and affiliations with other organisations.

Factor 4- Transactions: Website features enabling transactions including online payment/reservations, payment security and language options facilitating payment.

5 Conclusion and Limitations

Whilst George and Mallery (2003) suggested that cronbach alphas of between 0.6 and 0.5 as questionable, they had also added that the alpha value is partially dependent upon the number of items in the scale. The factor of communications has twice the number of items in its scale compared to other factors. This may have partially accounted for the questionable cronbach alpha value. The factor Promotions includes important and relevant items such as special offers, customised package pricing, supplier information and facilities available. Each of these items does reflect the promotional aspects of a business, suggesting that is Promotions is a suitable classification but warrant further refinement for future research.

The primary purpose of the paper was to explore the website features of UK rural hospitality businesses and to classify these features into manageable factors for analysis. From the original 20 website features that were obtained from various literature reviews as being relevant to the study, into a statistically manageable set of

4 factors. These 20 website features were included in the content analysis sheet as 'yes' and 'no' questions where the formation of factors derived from the factor analysis also enabled the examination of how well the findings align with previous studies. The results of the factor analysis revealed 4 grouped factors depicting the website features deployed by UK rural hospitality businesses, they were for the: (1) provision of *information*; (2) *Promotion* purposes; (3) Enhance *communications*; (4) enabling *transactions*.

Interestingly, factor 1 of Information provision and factor 4 of enabling transactions were found to have the highest factor loadings. It has often been reiterated in past studies that businesses perceive the Internet as a venue for providing information (Urban, Sultan & Qualls, 2000; Bickart & Schindler, 2001). Factor 4 of enabling transactions loading highly may be a newer phenomenon as rural hospitality businesses are becoming aware of the importance of being able to transact online. Unlike larger business organisations or retail enterprises, rural hospitality enterprises as we have discussed earlier tend to be small and medium sized where resources are limited. This finding has suggested that small and medium sized businesses are no longer 'slow' in embracing the internet transactions as suggested by many previous studies (Sparkes & Thomas, 2001; Caskey, Hunt & Browne, 2001; Jaw & Chen, 2006)

The two factors with weaker factor loadings were Factor 2 of Promotions and Factor 3 of Communications. These findings are not in line with previous studies of hospitality enterprises using the internet to promote their products and services (Sparkes & Thomas, 2001; Levy & Powell, 2003) or to enhance communication process with their customers (Vescovi, 2000; Gemino & Mackay, 2006). Whilst the factors loaded poorly, the relevant items that grouped within each factor suggests that elements of Promotion, such as facilities available, supplier information, special offers, customized package pricing were coherently and logically grouped. Similarly with factor 3 of Communication, each of the 8 items describes aspects of interactions between organisations and online customers.

To sum up, rural hospitality enterprises are likely to have small marketing budgets and even less online marketing resources. They would need to optimise what limited budget they may have on the one technological resource that they are most familiar with- and that is the internet. Past studies threw out many website features to be evaluated and examined, but none had consolidated these features into manageable measures. This study has made a first attempt at suggesting that there UK rural hospitality businesses use the website for 4 main purposes and they are: to provide information, to enhance transactions, to improve communication and for promotional purposes. Rural hospitality enterprises would benefit from ensuring that they have a checklist of these 4 factors as they evaluate/ develop the content of their website.

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The Impact of Digital Divide on Global Tourism: Strategic Implications of Overcoming Communication Gaps Caused by Digital Inequalities

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Abstract

Based on the fact that information is nowadays commonly spread by means of digital media, poor access to any kind of digital information and communication technology can provoke severe information gaps. This paper aims at evaluating the impacts of the global digital divide on the tourism industry, taking into account various definitions and presenting the hierarchical aspect of four identified multiple divides, which is put into relation with the continuum from information to knowledge gap to be then analysed in the tourism context. It will be shown that the key impact of the digital divide on global tourism is on communication between demand and supply. Communication gaps are modelled in a proposed digital communication matrix which ought to be used for education amongst digitally underdeveloped destinations to support them in overcoming the digital divide.

Keywords: Digital divide; information gap; ICTs in tourism; developing countries

1 Introduction

Information is "vital for the proper functioning of a democratic society, a crucial tool in a productive economy and in effective government, a central part of the growth and well-being of individuals" (Wilson as cited in Cawkell, 2001, p. 55). Even those disposing of the least amount of information in modern society have an information-horizon which is much wider than the one of a very highly educated and information-rich person in the 1960s (Wörther, 2004). Since tourism as an information industry needs to rely on information to attract potential customers and to convince them to purchase the tourism product, availability of and access to information in tourism is of utmost importance. It is further a given fact, that modern information creation, storage and distribution is more and more transferred to the online world – a world which, according to Article 19 of the Universal Declaration of Human Rights (UN, 1948), everyone is entitled to access; but in reality, large parts of the world are deprived of accessing information. Yet, the majority of research has been dedicated to analyse the benefits of the internet, eMarketing and eCommerce for businesses, assuming the availability of all necessary technical means and skills. Given that the world faces sever inequalities in internet and ICT distribution, there is an urgent need to address the question of the consequences to be expected for digitally excluded markets.

Countries without or with limited access to digital media or restricted usage (e.g. due to limited skills or certain attitudes) are extremely hindered in spreading relevant information to visitors from digitally savvy regions. This results in an information gap; potential tourists lack knowledge about the given destination, ultimately limiting inbound tourism to these countries. Hence, the influence of the digital divide on the knowledge gap can be considered relevant for the tourism industry. To address and assess this importance, the main research questions of this study are formulated as follows:

- What effect does the digital divide between technologically less developed countries and the modern Western world have on the access to information and what are the consequences for the tourism industry?
- What strategy can be defined and applied to reduce these consequences?

The analysis of the relation between digital, information and knowledge divide in the tourism context can ultimately lead to increased sensitivity, support understanding of the phenomenon and its importance and, contribute to the reduction of the digital divide.

2 Theoretical Background

2.1 Status Quo of the Research

The phenomenon of the digital divide has received special attention during the last ten years. The Organisation for Economic Co-Operation and Development (OECD) was the first international organisation to address the issue and to attempt measurement in numeric terms in 2001. Thereafter, the matter has mainly been scrutinised in sociologic context addressing social inequalities within industrialised nations expressed in unequal access to ICTs. Most literature is based on the evaluation of the situation in the United States highlighting differences based on ethnicity, income and education (Jackson *et al.*, 2003). Several approaches towards a homogeneous definition of this topic have been undertaken (ITU, 2009, 2010; Norris, 2001; OECD, 2001; Selwyn, 2002; van Dijk & Hacker, 2003) and most recent findings conclude that the binary distinction between haves and have-nots is not adhering to the complexity of the topic. The subject of the information and the knowledge divide received more attention since the 1970s, putting special focus on the inequalities in access to different kinds of mass media and resulting lack of information supply (Tichenor, Donohue & Olien 1970). The digital divide is most intensively addressed by the International Telecommunication Union (ITU). These research activities include several attempts of measuring the divide's dimensions and development by means of two special indicators used for global benchmarking. However, there is not yet sufficient data available to derive a developmental trend in the digital divide's evolution.

2.2 The Information Society and Information-Related Inequalities

The information society is characterised by extended social inequalities being caused by different levels of access to information. The information gap refers to unequal distribution of information amongst members of one society and on a global scale, whereby the internet has increased the complexity of this phenomenon since geographic boundaries have partly vanished, linguistic ones were added and a person's social status determines the ease of access to the information (Bonfadelli, 2002). Provided that knowledge is transformed out of information (Wörther, 2004), limited access to or availability of information ultimately leads into lack of knowledge amongst affected individuals. Bonfadelli (2002) divides the continuum from information to knowledge gap into the following five steps: gaps in information supply, gaps in access to information, gaps in use of information, gaps in processing information and gaps in receiving knowledge from this information. This distinction will be taken as a basis for the analysis of the digital divide's consequences on global tourism on a later stage.

2.3 Defining the Digital Divide

Within the last decade, several authors have attempted to precisely define the term digital divide (Hargittai, 2003; Norris, 2001; OECD, 2001; Selwyn, 2002, 2004; Shelley *et al*., 2004; van Dijk & Hacker, 2003) and have jointly come to the conclusion that the phenomenon is by far more complex than being a mere division between haves and have-nots of internet access. This simplified "yes or no" distinction is to be applied amongst developed societies only (Cawkwell, 2001); within developing countries other social, infrastructural and cultural reasons are equally important.

For the purpose of this research, the definition of digital as being all data and information spread over the internet and hence the digital divide as disparities in internet access amongst different groups is used. These groups can be defined by homogeneity in one or more demographic factors such as age, income, gender, ethnicity or nationality. Providing the overall scope, inequalities amongst different nations are the ones scrutinized.

2.4 Multiple Digital Divides in Hierarchical Order

Several definitions of the digital divide (ITU, 2009; James, 2004, 2005; Norris, 2001; OEDC, 2001; Minghetti & Buhalis, 2009; Selwyn, 2002; van Dijk & Hacker, 2003) can be clustered into four multiple divides composing the overall digital divide. The gaps delineate differences between five digital developmental stages – no ICTs, access to ICTs, usage of ICTs, digital skills and positive attitude towards ICTs – which were found to be in a loose hierarchy in the context of the global digital divide (Fig. 1).

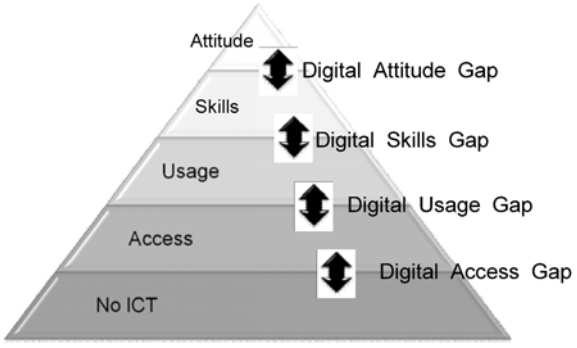

Fig. 1. Multiple Digital Divides (Own Illustration)

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- **Access** to the internet is a prerequisite for its usage, and can be divided into physical access including economic or financial (Selwyn, 2002; van Dijk & Hacker, 2003), technological (Hargittai, 2003), infrastructural (ibid) and political (Wilson as cited in Hargittai, 2003) components. Only the access gap in this context is hence addressing the mere binary distinction between haves and have-nots.

- The **usage** gap distinguishes users from non-users once access in all ways outlined above is gained, and is influenced by the autonomy of use granted to the individual, i.e. the flexibility of place, time, reasons and method of internet access (DiMaggio & Hargittai, 2001).

- The **skills** gap differentiates sophisticated from unskilled users (van Dijk & Hacker, 2003), a distinction determining the degree of benefits gained of internet usage (Hargittai, 2003; Selwyn, 2002). The distinction between sophisticated users and peripheral users is defined by different degrees of skills and includes issues of literacy, computer skills, numeracy and informacy. Since the internet's lingua franca English excludes people with lower formal education from understanding (Pfeil, 2008; Baasanjav, 2002), literacy becomes as an important contributor as computer skills (Bonfadelli, 2002), which are tightly connected to numeracy and informacy. The latter comprises digital abilities, ability to search for information and operate digital equipment as well as strategic skills, referring to a person's aptitude of strategically using acquired information to position themselves within their social networks (van Dijk & Hacker, 2003; Jackson *et al*., 2003).

- The **attitude** towards the usage of ICTs is a central part for the inequalities in access to and use of ICTs, but has not yet received much attention in the literature. What has been defined by van Dijk and Hacker (2003) as mental access, refers to a person's feelings, perceptions and attitude towards the latest technology, taking into consideration computer anxiety, perceived unattractiveness of the technology itself, lack of interest, lack of motivation or simple rejection of the technology despite of having the necessary skills,

knowledge and abilities to theoretically use it efficiently (van Dijk & Hacker, 2003; Wörther, 2004).

2.5 Reasons for the Digital Divide

Several causes of the digital divide are mentioned in the literature, with the most important ones being economic (ITU, 2010; Chinn & Fairlie, 2006; Norris, 2001), technical (Chinn & Fairlie, 2006; Ya'u, 2008), political (Chinn & Fairlie, 2006; Ya'u, 2008; Greis, 2004), demographic (Jackson *et al*. 2003; Minghetti & Buhalis, 2009; Selwyn, 2002) and cultural (Jackson *et al*., 2003; Selwyn, 2002) ones.

The global discrepancy of internet access costs is striking, with costs of fixed broadband access of 0.5 per cent of the Gross National Income (GNI) per capita in the USA or 0.94 per cent in Austria compared to 79.6 per cent in Ghana or as much as 3,891.2 per cent in the Central African Republic (ITU, 2010). Technical or infrastructural reasons include missing electricity supply (Chinn & Fairlie, 2006) as well as outdated equipment (Hargittai, 2003) and insufficient network coverage (Ya'u, 2008), whereby political causes include governmental accessibility standards (DiMaggio & Hargittai, 2001), regulations of internet use (Chinn & Fairlie, 2006), autocratic or dictatorial government combined with civil wars and political instability and missing integration of countries affected by the digital divide into global technical bodies (Greis, 2004).

To a certain extent, the global digital divide also derives from demographic differences between users and non-users. Several studies (Chinn & Fairlie, 2006; DiMaggio & Hargittai, 2001; Hargittai, 2003; Jackson *et al*., 2003) indicate race, income, educational level, kind of work, gender and rural residence to determine the degree of ICT engagement. Finally, cultural reasons for the digital divide given in the literature draw the attention to a society's general attitude towards ICTs. The less receptive a culture is to advancement in digital technology and communication, the less it embodies ICTs, the longer its population will take to adapt to these achievements and be fully able to efficiently make use of them (Wörther, 2004; Selwyn, 2002).

2.6 The Digital Divide in Tourism

Conerning the digital divide's role in global tourism is concerned, the available literature is scarce and includes mainly the framework propsed by Minghetti and Buhalis in 2009. In this framework, the demand and supply side are classified into four clusters, namely high, upper, medium and low digital access tourists and destinations. The proposed division of the global digital into multiple divides is not included. The single clusters have characteristics of all developmental stages. The high digital access cluster is defined by high intention and degree of internet use, whereby the upper digital access clusters dispose of less sophisticated skills but yet a high degree of usage. The medium clusters are typified by moderate use and skills whereby the low digital access clusters are defined as often missing physical access and having a low intention to use the internet. The quintessence of this framework lies

in the problems of communication between the different clusters, whereby information exchange amongst the upper two clusters is best, and the lower ones are falling always farther behind, resulting in an ultimate isolation of the touristic communication and movement towards the high and upper digital access clusters (Minghetti & Buhalis, 2009).

Due to the disparities in access and use of ICTs on supply and demand side, the risk for the tourism industry is a further asymmetrical development. Currently, the vast majority of touristic movement takes place between developed countries, i.e. between high access digital markets. Given that tourists from higher access markets rely on information which is provided and found online, they are less likely to uncover lower digital access destinations, and hence their touristic movement remains within high access destinations. Lower access destinations however have to rely on intermediaries and hence are missing out of the potential decrease in commission due to disintermediation, which in turn affects their income and possibilities to invest in technical development. On the other side, tourists from lower digital access regions are unable to receive information from high access destinations, providing that the majority of this information is available only online. This is another reason for the prediction that the tourist movements will remain within markets of the same level of digital access (Minghetti & Buhalis, 2009).

2.7 Consequences and Solutions

Very optimistic viewpoints indicate a medium-term closure of the divide based on the assumption that its existence is caused by the natural differences in the innovation distribution cycle (Pfeil, 2008; Deutscher Bundestag, 2002) are criticised for considering economic reasons only (van Dijk & Hacker, 2003; Greis, 2004). Sceptics counter that the digital divide will further widen and ultimately part society into an information elite and those deprived of the benefits inherited in the access to the internet and hence to information (Norris, 2001; Shelley *et al*., 2004; Ya'u, 2008).

To avoid major negative impacts of the digital divide on global society, approaches towards closure have been undertaken by various organisations. Global organisations such as the OECD and the Word Summit on Information Society (WSIS) have issued policies aimed at reducing the gap, including fostered education and access, infrastructural improvements (OECD, 2001) and appeals to all stakeholders, namely "private sector, civil society and international organisations" (WSIS, 2003) for digital solidarity and co-operation (OECD, 2001) on a national and international level.

Due to the fact that the mere provision of hardware and internet access is considered insufficient to close the gap (James, 2004; van Dijk & Hacker, 2003; Minghetti & Buhalis, 2009; Selwyn, 2004), projects are working on creating indirect beneficiaries of the internet by means of intermediaries, translating the net's content for people unable to directly access it, as for instance radio stations broadcasting how pages are navigated based on listeners' requests, post offices sending emails for the population, call-centres using the internet to answer requests from callers without internet access (James, 2003, 2004) and networking radios aiming at distributing reliable and relevant

information ready for broadcast and hence translating news for digitally less skilled radio stations (Agencia Púlsar, 2004).

3 Methodology

The methodology of this study is a combination of a hermeneutic and empiric approach. The hermeneutical part is characterised by an in-depth literature review. Even though a rather large amount of information and research results is to be found on the topic of the digital divide in general, the field of tourism research lacks such analyses. The empirical study was conducted by means of twelve expert interviews amongst experts from various fields (eight tourism experts, two economists, one psychologist and one social media consultant) with the aim to initiate an opinion forming process. The experts were selected according to their working background (e.g. UNWTO, National Tourism Organisation), country of residence (e.g. Russia, South Africa) or participation in specific projects addressing the digital divide. To describe the working background of all experts in detail would go beyond the scope of that paper, though. The interviews were conducted as semi-structured personal interviews. Considering the physical distance to some of the experts (e.g. South Africa), the second option of detailed online questionnaires was utilised. The interviews included general questions about the digital divide as well as specific questions addressing the interviewees' fields of expertise. The key issues which were addressed in the interviews are the following: the expert's understanding of the digital divide, the digital divide's influencers and reasons, the digital divide's impact on society, the digital divide's impact on tourism, possible strategies leading towards a closure of the digital divide, the relevance of the topic in the interviewee's respective field of expertise. The analysis is conducted in a comparison and discussion of the diverse viewpoints of the experts.

4 Findings and Discussion

4.1 Results of the Expert Interviews

In this chapter the outcome of the expert interviews will be summarised. Eleven out of the twelve experts were aware of the global digital divide's existence. They jointly agreed that the mere physical access to computers and the internet is not the primary reason for the digital divide. Further factors such as education, income, language barriers the country's economy and general situation and nationality were mentioned. Only moderate level of agreement could be identified with the product distribution cycle being the reason for the divide, with three experts completely disagreeing and five only agreeing to a certain extent, once their attention had explicitly been drawn to this point.

As far as the digital divide's impact on global society is concerned, different viewpoints were identified, reaching from further separation of society into haves and have-nots, over increasing the poverty gap and hence global instability and psychological stress due to feeling of exclusion.

The potential threat for developing countries of being unable to catch up to the lead of the more privileged societies and as a result the further widening of the digital divide was seen controversially amongst the interviewees. Five of them agreed to a certain extent with this theory based on the argumentation that the rapid changes require constant adaptation to the increased complexity of technical devices. One agreed partly that rising complexity does increase the digital divide on the one hand, on the other hand improving usability lowers it simultaneously. The latter argument was supported by other five interviewees stating that now excluded societies will not necessarily encounter difficulties in using new devices due to higher user friendliness,

As far as the impact of the digital divide on tourism is concerned, the assumption of the lack of relevant information spread resulting in an information and knowledge gap amongst potential clients was confirmed, since ten interviewees agreed to the digital divide resulting in some kind of information and knowledge divide. Especially amongst the eight tourism experts the awareness of the digital divide's threats for the tourism industry was high; seven of them agreed that the digital divide has impacts on tourism, with reduced information spread resulting in destinations' failure to address potential target markets. One pointed out that the digital divide is also about information control, since search engines are able to dictate what users find, and this has influences on marketing expenses of tourism businesses and tourism research. Agreement to the divide having influences on tourism was also found amongst three of the other four interviewees.

As far as tourism's importance for developing countries is concerned, the two main experts in this field agreed strongly that tourism is an important economic driver for emerging countries, and that the usage of ICTs is highly valuable. Since availability of online information is a prerequisite for attracting visitors from industrialised countries a decrease in the digital divide might lead to an increase in tourism spending and thus to an amelioration of the overall economic situation – a viewpoint which is supported by four interviewees.

4.2 Digital Divide in Tourism

The framework for the digital information and knowledge gap by Minghetti and Buhalis (2009) suggested the division of the supply and demand side into the four type of access clusters (high, upper, medium and low digital access). This paper proposes to amend this framework to suit the hierarchy of the introduced multiple divides amongst different stages of digital development and the relation between the digital and knowledge divide, and further to assess potential outcomes of this chain reaction with the purpose of ultimately developing a model of the digital divide's main impact on the tourism industry. Fig. 2 illustrates the amended framework.

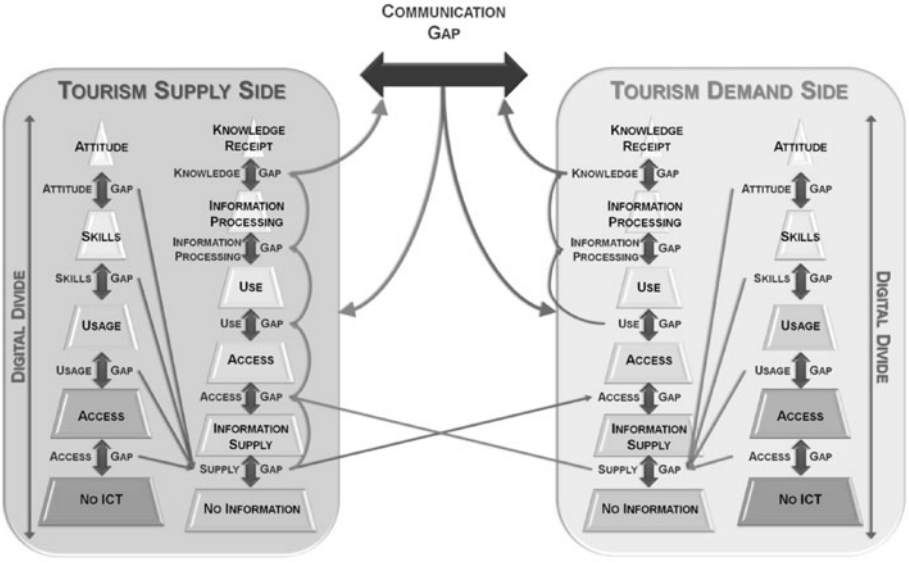

Fig. 2. The Digital Divide's Impact on Digital Interaction (Own Illustration)

As can be seen in Fig. 2 any kind of digital divide on the one side results in an information divide on the other side. For instance, a destination which is affected by any of the multiple divides is unable to spread information to a demand market. Hence the demand market is facing an information and knowledge divide about this precise destination. On the other hand, digitally less developed markets cannot communicate with digitalised destinations (again an information supply gap). In this case the latter lacks knowledge about the former. This conglomerate of divides at the end causes communication gaps which become more severe, the larger the digital and information / knowledge divide respectively are.

4.3 Digital Communication Matrix

The digital communication matrix is proposed to classify the communication's intensity and its likelihood to happen between tourism demand and tourism supply markets influenced by one or more of the multiple digital divides, based on the division of the two sides into the previously presented stages of digital development. For simplification reasons the stage of "No ICT" has not been included into the matrix, since it obviously leads to no digital interaction. The darker colour in the bottom left areas of matrix shows a large communication gap with no or hardly any communication taking place between the demand and the supply side, closing as the shading turns brighter towards the top right areas, as can be seen in Fig. 3.

Overall, sixteen different clusters have been identified. As can easily be seen in Fig. 3, communication improves parallel to the digital development of both sides. It further results, as shown by the slight incline of the shading, that digital communication is better, if the supply side is more developed than the demand side.

This is based on the fact that higher digital development, i.e. more sophisticated skills as well as more positive attitude, enhances the production of high usability web pages and implementation of search engine optimisation tools on the supply side, supporting findability of online information also amongst less skilled users. On the other hand, if the demand side is more developed compared to the supply side, sophisticated users will be frustrated if finding low quality homepages and rather search for information on sites built according to their expectance.

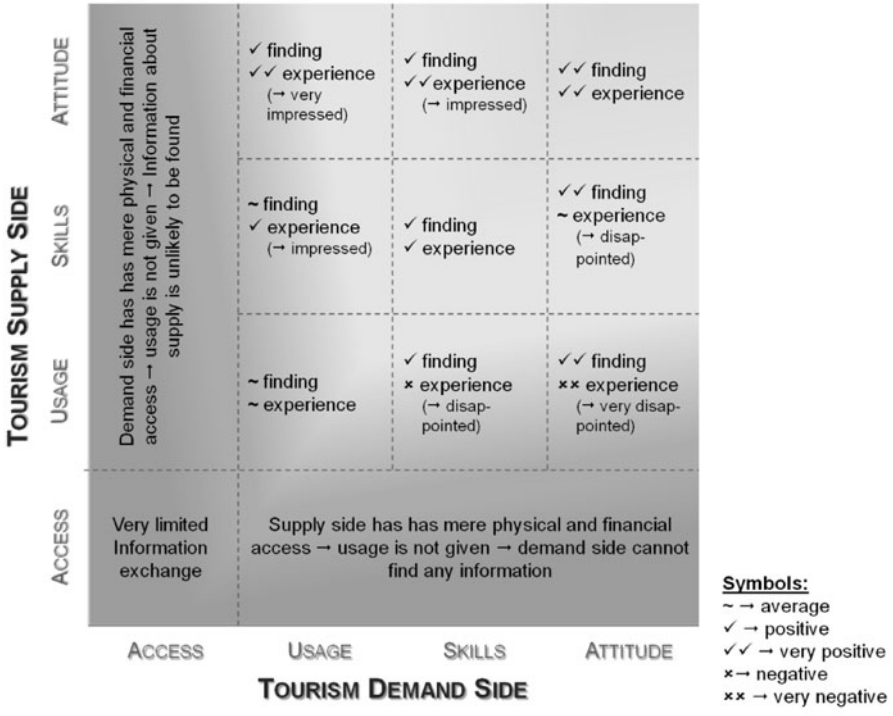

Fig. 3. Digital Communication Matrix (Own Illustration)

The digital communication matrix is suggested to be used for educational purposes on the supply side, especially targeting emerging destinations or digitally underdeveloped DMOs, to illustrate and communicate the impacts of digital exclusion and low digital access, and to convey the effects on their interaction with the demand side. It can be used to exemplify the consequences of insufficient engagement in ICTs on communication with potential clients, resulting ultimately in financial losses due to an overall smaller target market. This might reduce change resistance amongst tourism company owners and employees as well as within destinations and foster ICT distribution.

Further, the matrix can be used to develop digital communication strategies as it shows precisely in which direction a destination needs to evolve to target their desired market, reach a broader potential market and it hence supports the determination of

strategic goals for online communication and promotion. Provided that in further research benchmarks are included into the matrix, it may also be used by tourism companies and destinations to benchmark themselves amongst their competitors and support them in strategic decisions.

5 Conclusions

Based on a literature review as well as expert interviews the phenomenon of the global digital divide has been scrutinized, various reasons for the divide's existence and possible consequences have been presented. A hierarchical structure of four multiple digital divides (digital access, digital usage, digital skills and digital attitude divide) between five stages of digital development consisting the global digital divide was deduced and put into relation with the continuum from information to knowledge gap. This chain reaction of different divides was ultimately embedded into the tourism context, taking into consideration the inputs as provided by the interviewees. The analysis of the empirical and hermeneutical results lead to an extension of the currently single existing scientific framework of the digital divide in tourism as introduced by Minghetti and Buhalis in 2009, considering all of the above and showing the digital divide's consequence on digital interaction between the tourism demand and supply side. The final results of this paper are shown in the model of the digital communication matrix, which is an educational tool for digitally less developed destinations, providing them with an illustration of communication problems with potential target markets owed to their insufficient ICT engagement, leading ultimately to them failing to address any target market digitally more developed that the destination. This tool is aimed at reducing change resistance amongst digitally underdeveloped regions and companies, reaching a slow amelioration of the digital divide, which throughout the expert interviews was found to support the overcoming of economic developmental challenges in emerging countries due to rise income based on increased tourism spendings.

This paper has thoroughly analysed the global digital divide between digitally underdeveloped countries and the industrialised world; the social digital divide within a country has however not been included in the study. Therefore, the digital communication matrix is to be used in the global context only and consists of a mere indication of trends and possibilities. It is not based on quantitative research, and therefore mainly used to better understand the digital divide's impact on communication between the tourism demand and supply side. Finally, at this stage, the digital communication matrix does not include any indicators to be used by companies to position themselves precisely on the supply-axis of the matrix. It also does not define any benchmarks. For further research it is suggested to include the three indices composing the IDI, namely ICT access, ICT use and ICT skills, into the matrix and to develop a fourth calculable index for the stage of attitude, so that the matrix can be used for benchmarking destinations and companies amongst each other and even more precisely show them, in which strategic direction they need to evolve.

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The Influence of Technology on Geographic Cognition and Tourism Experience

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Abstract

Tourists today have access to retrieve voluminous geographic information about destinations while travelling as various context-aware geographic technologies have become increasingly ubiquitous. These technologies are suggested to aid tourists in the process of destination consumption to gain meaningful tourism experiences. This study found that people using different types of technologies for everyday routine perceive that these technologies help them with spatial inference to acquire geographic information; making sense of direction and orientation, and interacting with and within places. Further, within the travel context, geographic technology was found to influence the dimensions of sensory, affective and social experience, as well as the cognitive and bodily experience. The type of technology used for travel was also found to be a significant predictor of the sensory, affective, and social dimensions of tourism experience.

Keywords: geographic cognition; tourism experience; location-aware technology; geographic technology.

1 Introduction

Tourism is largely associated with spatial encounters. Tourists seek benefits from the consumption of the experiential characteristics (i.e., physical, social and cultural) of places, spaces and landscapes. Many studies on the experiential features of geography have emerged (see Tuan 1977, 1993). Most of these set the foundation to understand people's experience with geography and present an endeavour to elucidate the idea of geographical consciousness. Li (2000) argues that, despite the geographic nature of tourism, geographical consciousness has been largely overlooked in tourism research. Based on his phenomenological research, he identifies that travel is joined with other dimensions of living, "which in sum comprises an individual's geographical consciousness" (p. 874), making it an important subject for further exploration.

Today, geographic information is increasingly ubiquitous in various domains. The development of location-aware or context-aware technologies, be it software in personal computers, applications on mobile phones or handheld devices carrying global positioning systems, has opened access for tourists to various venues for retrieving geographic information before, during and after travelling. Research on the use of such technology in tourism has been limited to the areas of technology development (see Brown & Perry, 2001; O'Grady & O'Hare, 2002; Maruyama *et al.*,

2004; Burigat & Chittaro, 2007), arguing that context-aware technology aids to better navigation and programming of tourism, and those using the devices to track tourist's movements (e.g., Shoval & Isaacson, 2007). Despite the argument from the aforementioned studies that geographic technology is developed to assist tourists with ease of movement and richer context-based information, little research has been done to investigate the influence of geographic technologies on the overall tourists' experience. Modsching *et al*. (2007) organized a field study to evaluate the impacts of mobile recommender systems on tourists' experience. They uncovered that tourists using such systems were able to see four times more sights in a specific period of time compared to those who did not use the systems. Another field study on tourists' use of maps and guidebooks asserts that technology brings place and space together in activity (Brown and Perry, 2001). These studies, however, did not provide a deeper analysis into how the different types of geographic technologies influence the ways tourists experience the geography of destinations beyond the practical point of view of navigation and way-finding. Needed is a thorough analysis that involves tourists' spatial cognition and behaviour, which cannot be separated from the experience of places in the everyday life. The goal of this study is to explore the influence of the use of geographic technology on the ways people experience the geography of places and their tourism experience. This study serves as a pilot study to identify items appropriate to measure geographic cognition and behaviour.

2 Literature Review

2.1 Tourism Experience

Crouch (2005) argues that tourism is an encounter between and amongst several things: people, space, and contexts. In the early conception of tourism experience, MacCannell (1976) characterizes tourists' sites as locations of the authentic and tourists visit these places in search for the reflection of their authentic selves. This implies tourism as "sightseeing," emphasizing the notion of destinations as a package of visual materials or signs (i.e., authentic attractions). This is akin to the concept of tourist gaze (Urry, 1990, 1995), which gives an emphasis to the 'signs' as the 'objects of gaze' while highlighting the subjectivity of the gaze. Indeed, recent discussion on tourism experience tends to be more subject-centred. Uriely (2005) identifies four developments within the discourse of tourism experience. Among the four are the pluralisation of tourists, depicting the multiplicity of tourist experiences, and the shift from tourism experience as the consumption of displayed objects to the subjective interpretation and meaning. Similarly, Crouch (2005) suggests that being a tourist and encountering spaces "is essentially the process of making meaning of spaces and cultures" (p.28), which "does not equate making clear rationality, but rather working his/her way though things," spaces and relations (p.31).

Using the metaphor of tourism as a form of performance and tourist spaces as stages, Edensor (2001) understands tourism as an array of performative technique and disposition. Consequently, different tourist stages (e.g., mountains, cities, beaches, heritage sites) are often managed to provide and sustain the common sense

understanding of a particular performance or activity to take place. Similarly, from a business point of view, Pine and Gilmore (1999) use the theatre–performance metaphor, proposing the importance of staging in the production of experience. Framing these concepts in the context of geography, tourist places, spaces, and landscapes, along with the characteristics embedded in them, are the stages of experiences. Tourists' encounters with these spaces (i.e., resulting in activities, interactions, interpretations), while subjective in nature, are contextualized by the geographic features of the destination with its sensual quality. Here, the geographic cognition, and the state of geographic knowledge, comes at play as a factor influencing how tourists perform in these stages.

In her attempt to shed some lights on how tourists conceive experience, Volo (2009) asserts the complexity of experience, which is characterised by different dimensions ranging from the intensity of experience, the coupling of sensory and emotional elements, and the variability among tourists. In the area of marketing, Schmitt (2002) introduces five dimensions of experience: sensory, affective, cognitive, physical, and relational. Applying these dimensions into tourism experience, Ye, Tussyadiah and Fesenmaier (2009) identify different elements that make up the structure of experience based on the tourists' interactions with places, people and artefacts. They are the sensory experience, the cognitive and perceptive experience, the social experience, the other bodily experience, and the affective/emotional experience.

Based on the literature, it can, thus, be summarized that tourism experience is a subjective performative action contextualized by the geographical characteristics of tourist destinations, which takes form in different dimensions of sensory, cognition and perception, social, and affective/emotion as a result of interactions between tourists and spaces. In this study, the variables representing the different dimensions of experience are utilized to represent tourism experience.

2.2 Geographic Experience

The discussion of geographic experience is rooted in the fields of cognitive geography, which deals with human perception, memory, reasoning, problem solving, and communication involving earth phenomena (Montello & Freundschuh, 2005), and behavioural geography, which focuses on people's behaviour within space. Early conceptualizations of geographic cognition are dated back to the work of Lynch (1960) on images of cities, Lowenthal (1961) on environmental images, and Gould (1966) on mental maps, among others. One of the important debates in geographic experience has been on the spatial knowledge that forms people's geographical consciousness, which is the consciousness arising from the spatial and temporal bonds between people and places (Li, 2000). Geographic cognition is intertwined with people's behaviour within space, which can be detected from changes in locations over time. People need to act spatially in a bodily, sensorimotor scale to forage for food, to shop, to commute, etc. (Mark & Freundschuh, 1995). People's movement in space (e.g., commuting, travelling, recreation, and migration) are overt behaviour resulted from a cognitive process of spatial decision making (Lloyd, 1997). Mark *et al*. (1999) suggest that people extract geographical knowledge from their complex

interactions with space. According to Kuipers (1978, 1983), as people move along the paths in the geographic space, they may recognize that the paths have some points in common (i.e., places), which allows them to use inference rules to build network models of places and connections, paths and barriers, in geographic space. Kuipers (1978, 1983) calls this process *spatial knowledge acquisition*.

Golledge (2002) argues that knowledge *of* space (i.e., the declarative base of geographic knowledge) is fundamentally different from knowledge *about* space (i.e., the intellectual base of geographic knowledge). Knowledge about space involves "the recognition and elaboration among geographic primitives" and the advanced concepts derived from these primitives (p. 1). These include geographic arrangement, organization, distribution, patterns, shape, hierarchy, distance, direction, orientation, regionalization, categorization, reference frame, geographic association, etc.

In summary, geographic experience is intimately associated with geographic knowledge acquisition from people's complex interactions with and within space. It is argued in this study that tourists go through the process of geographic knowledge acquisition and representation as they move to and within the geography of a destination, and use the knowledge to gain a meaningful tourism experience. This study does not exclusively utilize the dimension of way-finding (route knowledge), but includes other dimensions of geographic knowledge use (e.g., hedonic and learning). Several research experiments suggest the dimensions to represent geographic cognition (see Tversky, 1981; Mark *et al*., 1999), such as distance judgment, sense of direction and orientation (i.e., relations amongst selves, objects, and spaces), judgment of spatial relations (i.e., connections and positions of places relative to others), and effectiveness of communication. These variables are included in this study to represent geographic experience.

2.3 Geographic Technology

Information and communication technology (ICT) has been widely believed to have a substantial geographic impact (Curry, 1998), and geographic technology (i.e., largely based on geographic information systems (GIS), global positioning systems (GPS), etc.) is increasingly available for idiosyncratic use of everyday experiences. The discussion is often coined to the concept of *time–space compression* (introduced by Harvey, 1990) or the precursor to this, the *time–space convergence* (Janelle, 1969), and the term *time–space distanciation* (Giddens, 1981). The salient point in these concepts lies in the understanding that ICT has enabled the process that Giddens (1981, 1984) describes as the expansion of interaction over space and its contraction over time. This is due to the development of GIS as a powerful means to manage voluminous geographic information and recent development in desktop and mobile computing. With the spatiotemporal nature of tourism and travel, tourists and businesses alike found these technologies relevant and important for various tourism-related purposes.

Indeed, tourism has witnessed a vast development of various geographic technologies and platforms of technology applications for tourism purposes, including navigation

systems, digital maps, portable guide and/or recommender systems created for general travel use or specific to tourism destinations (see Poslad *et al*., 2001, Brown & Perry, 2001; O'Grady & O'Hare, 2002; Maruyama *et al*., 2004; Burigat & Chittaro, 2005). These technologies emphasize the importance of location-based services for the ease of information search for travel decision making process. For example, Brown and Chalmer (2003) argue that mobile technology, with context-aware application, is useful to assist tourists in solving their problems, of which are idiosyncratic and largely related to navigation and way-finding. These travel decision making processes typically involve information search (including geographic information), processing, and use, which are akin to the aforementioned process in geographic condition. These processes have been taken for granted in tourism research; lacking is a thorough analysis to conceptualize technology influences on patterns of behaviour. Therefore, this study aims at providing a better understanding on the influences geographic technology has on people's geographic behaviour in terms of geographic knowledge acquisition and use. Further, this study also analyzes how technology influences the different dimensions of and the overall tourism experiences.

2.4 Research Propositions and Goals of the Study

Based on the literature, this study examines the following propositions:

Proposition 1: The use of geographic technology aids to geographic cognition and behaviour in a day-to-day routine and influences tourism experiences.

Proposition 2: The use of geographic technologies for travel, the purpose of use as well as the time of use influence tourism experiences.

This pilot study is a first attempt to develop a unified set of items to measure the use of geographic technologies and its influence on travellers. As such, the goal of the study is fourfold: 1) to identify the use of the different types of geographic technologies and the purposes of use of such technologies; 2) to better understand how geographic cognition and behaviour due to the use of geographic technology affect tourism experiences; 3) to better understand how the use of geographic technologies for travel affect tourism experiences; and, 4) to develop a set of items that best captures the aforementioned aspects of use of geographic technologies.

3 Methodology

Past studies on tourism and geographic experiences are typically qualitative in nature as they are based on experiment and observation. However, the increased interest in geographic technologies and their effectiveness in creating meaningful tourism experiences suggest that a standardized set of constructs and items is necessary to further develop this field of research. The development of these scales followed the procedures suggested by DeVellis (1991). Extensive evaluation of existing literature led to the development of eleven theory driven items to measure geographic cognition and geographic behaviour due to the everyday use of geographic technologies (i.e.,

distance judgment, sense of direction and orientation, judgment of spatial relations, and effectiveness of communication). Furthermore, twelve items to measure sensory, bodily, cognitive, perceptive and affective tourism experiences when travelling were developed. Where possible pre-existing constructs were used or adapted to fit the purpose of this study (Straub, 1989). These items were reviewed by two experts in the field to assess face validity. The reviewers suggested minor changes which were incorporated to finalize the items to be measured on 7-point Likert scales with Strongly Disagree/Strongly Agree anchor statements.

An online survey was administered for data collection. The survey questions consist of geographic technology use for day-to-day routine and leisure or business travel. These include patterns of use, devices used and purposes of use as well as the eleven geographic cognition and behaviour items. For their most recent travel within the past two years, respondents were also asked to identify the types, purposes and times of geographic technology use and to rate the influence of these technologies on their tourism experience. Lastly, several demographic control variables were collected. An invitation to participate in the study was initially sent in mid-August 2010 to 2,814 Americans randomly selected from a tourism email list. All recipients requested travel information about the US Midwestern states over the past 3 years. An incentive to win a $50 or one of two $25 gift cards was provided. Given our interest in travellers only those that indicated a travel of at least 50 miles away from home within the past two years (filter question at the beginning) were allowed to complete the survey. Following three reminders, 104 complete responses were collected (3.7% response rate). One reason for the low response rate could be that several addresses were added as early as three years ago and that several addresses could have been abandoned. The distribution system used for this study could not track bounce-back addresses.

4 Result and Discussion

Respondents were provided an example list of different types of geographic technologies such as car navigation system, geo/location-based applications on smart phones, geographic applications on computers, portable digital guides at museums/attractions and portable GPS devises for hiking. It was found that respondents used geographic technologies quite frequently both in everyday use and for travel for work or leisure. While the use of geographic technologies in daily routines is lower, with 16.3% of respondents indicating rarely and 3.8% indicating never, it was found that essentially every traveller did use geographic technologies, whereby one fifth of respondents always uses geographic technologies when travelling. As for the reasons why respondents use geographic technologies, Navigation and Wayfinding was the most often cited reason (87.1%). Additional reasons such as Fun and Curiosity, Itinerary Planning and Confirmation and Learning about Places were mentioned only by about one third of respondents (37.5%, 34.6%, 32.7% respectively), while another 8.0% provided Other Reasons such as geocaching or retrieving weather information.

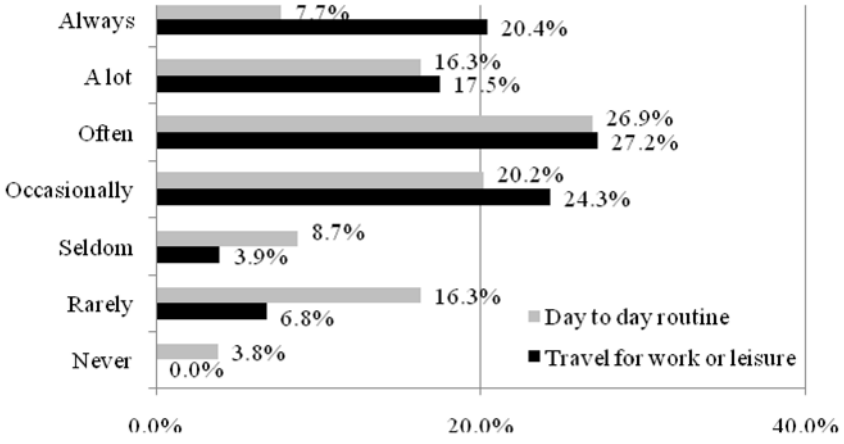

Fig. 1. Frequency of Use of Geographic Technologies

Table 1 shows a crosstab of the purposes of use and the different types of geographic technologies as well as the time of use for respondents' most recent travel within the past two years. While Navigation and Wayfinding was cited the most often when car navigation systems were used, Fun and Curiosity dominated all other types of technologies. As for the purpose of use at different stages of travel, it was found that Navigation and Wayfinding was strongly represented, particularly when travellers are on the way to the destination. At the destination, Learning about Places was only ranked second after Fun and Curiosity. The latter was also the most often mentioned reason to use geographic technology once the travellers left the destination.

Table 1. Purpose of Use by Type of Geographic Technology and Time of Use for the Most Recent Travel in the Past Two Years

N=104	Purpose of Use			
Type of Technology	**Navigation and Wayfinding**	**Itinerary Planning**	**Learning about Places**	**Fun and Curiosity**
Car Navigation Systems	**81.8%**	18.2%	0.0%	0.0%
Geo-Based Applications on Smart Phones	33.3%	0.0%	0.0%	**66.7%**
Geographic Applications on Computers	**32.6%**	11.6%	20.9%	**34.9%**
Portable GPS Devices for Hiking etc.	21.7%	7.9%	15.8%	**45.5%**
Portable Digital Guides at Museums and/or Attractions	5.6%	5.6%	11.1%	**77.8%**
Time of Use				
Before Travel	**36.8%**	15.8%	21.1%	26.3%
On the Way to the Destination	**66.7%**	13.3%	6.7%	13.3%
On-site, in the Destination	**30.0%**	5.0%	**30.0%**	**35.0%**

On the way Back from the Destination	**26.9%**	7.7%	15.4%	**50.0%**
After Travel	5.0%	8.0%	5.0%	**90.0%**

Exploratory factor analysis on each of the two dimensions of the technology influences was conducted to identify the underlying constructs (See Tables 2 and 3). Internal consistency of the identified constructs was evaluated using Cronbach's Alpha. All alpha coefficients were 0.8 or higher and thus exceed the value 0.6 as suggested for exploratory factor analysis (Hair *et al*., 1998). Furthermore, all factor loadings were above 0.5 with a substantial amount of variance explained by the items for each of the identified constructs.

As for the proposed dimensions themselves, three constructs for geographic cognition and behaviour and two constructs for tourism experience were identified. While these constructs have not been developed ex-ante they do fit within the framework of this study. A challenge for this study was that past research applied the same labels for quite different aspects of geographic and tourism experiences without exploring more subtle differences. However, it is argued that awareness of geographic positions and relations as well as borders and geographic boundaries refers to the process of Spatial Inference for knowledge acquisition, whereas awareness of movement and position reflects respondents' awareness of their positions and judgment of direction (labelled Direction & Orientation) (Mark *et al*., 1999) (See Table 2). Similarly, tourism experiences are reflected in their dimensions. In retrospect to Schmitt's (1999) dimensions of experience, the first construct consists of the dimensions of sensory, emotion and association, whereas the second construct represents the dimension of learning and action (See Table 3).

Table 2. Internal Consistency and Unidimensionality for Geographic Cognition and Behaviour

Scale Item	**Internal Consistency**	**Unidimensionality**	
		Factor Loading	**Variance Explained**
Spatial Inference	0.904		
When using geographic technologies I am ...			
COGBEH01- ...able to distinguish different places based on their characteristics.		.849	82.9%
COGBEH02- ...able to recognize from my surrounding that I enter a new area.		.822	78.4%
COGBEH03- ...aware of geographic borders, areas, and territories.		.819	76.7%
COGBEH04- ...conscious about the place where I belong to.		.773	70.4%
COGBEH05- ...able to recognize signs, landmarks and other physical cues that give me the sense of where I am.		.609	63.2%
Direction & Orientation	0.853		

When using geographic technologies I am ...			
COGBEH06-	...aware of my position in space.	.925	90.4%
COGBEH07-	...aware of my movement through space.	.894	89.0%
COGBEH08-	...conscious about how far I am from home.	.547	60.8%
Interaction		0.806	
When using geographic technologies I ...			
COGBEH09-	...better understand the unique relationships between a place and its people.	.891	85.2%
COGBEH10-	...interact more with people.	.810	69.3%
COGBEH11-	...pay more attention to places.	.749	61.7%

To capture the interrelationship between Sensory Emotion & Association and Action & Learning, MANOVA was computed. The independent variables were Spatial Inference, Direction & Orientation, and Interaction as well as categorical variables that captured the type of geographic technology used, the purpose and the time of use during the most recent travel. The analysis indicated a significant main effect for the type of geographic technology used for travel, Roy's Largest Root=.275, $F(4, 53)=3.646$, $p<.011$. From the univariate analysis, a significant effect of type of technology on Sensory Emotion & Association was found, $F(4, 53)=3.490$, $p<0.013$. No other main effect was found to be significant. The analysis also revealed a significant effect of the interaction between the type of geographic technology, time and purpose of use, Roy's Largest Root=1.083, $F(31, 53)=1.852$, $p<.024$.

Table 3. Internal Consistency and Unidimensionality for Tourism Experience for the Most Recent Travel in the Past Two Years

Scale Item		Internal Consistency	Unidimensionality	
			Factor Loading	Variance Explained
Sensory Emotion & Association		0.950		
When using geographic technologies I am ...				
EXPERIENCE01-	...able to reflect on my memories at the destination.		.869	79.9%
EXPERIENCE02-	...able to associate certain sights, smells, sounds, tastes, and textures with the destination.		.837	81.1%
EXPERIENCE03-	...able to recognize the differences of the destination from home.		.826	77.3%
EXPERIENCE04-	...able to interact with others at the destination.		.818	73.3%
EXPERIENCE05-	...able to associate certain behavior with the destination.		.807	76.5%

EXPERIENCE06-	...able to develop a certain emotional connection with the destination.	.783	77.7%
EXPERIENCE07-	...able to relate the destination to specific concepts and/or lifestyle.	.724	74.4%
EXPERIENCE08-	...able to develop like and/or dislike toward the destination.	.651	58.1%
Action & Learning		0.875	
When using geographic technologies I am ...			
EXPERIENCE09-	...aware of the different activities I could partake in the destination.	.848	79.9%
EXPERIENCE10-	...able to recognize important sights and attractions at the destination.	.814	73.6%
EXPERIENCE11-	...able to develop knowledge about the destination.	.797	71.1%
EXPERIENCE12-	...able to develop a better understanding about the destination.	.675	72.7%

The Association, $F(31, 53)=1.797$, $p<0.030$. No other interaction was found to be significant. The parameter estimates indicate that the significant effects are driven by On-site/At the Destination, Navigation/Wayfinding, and Car Navigation Systems, as well as On-site/At the Destination, Navigation/Wayfinding and Geographic Applications on Computers with B=-2.799, t=-2.192, p=.03 and B=-3.691, t=-2.085, p=.042, respectively.

5 Conclusion and Implication

This study seeks to identify the influences of different types of geographic technologies on people's experience in everyday routine and while travelling. Based on a preliminary analysis using exploratory factor analysis, it is found that geographic technology influences the everyday experience in three dimensions: the process of spatial inference to acquire geographic knowledge (i.e., geographic cognition), the process of making sense of direction and orientation (i.e., spatial relations), and interactions with and within spaces (i.e., the use of geographic technology to interact with people and space and to understand the unique relationships between a place and its people). Similarly, within the context of travel, it was found that geographic technology influences tourism experience in two distinct dimensions: 1) the sensory, affective and social experience (i.e., the ability to sense, feel and associate destinations with specific concepts) and 2) the cognitive and bodily experience (i.e., the ability to learn about and partake in activities at the destination).

While this pilot study identified significant constructs to measure the dimensions of geographic and tourism experiences affected by technologies, the interrelationships between these two were not found to be significant. This can be due to the small sample size and the unequal group memberships in the three-dimensional type, time

and purpose of use matrix at the first stage of this study. The type of technology used and the interactions between the type of technology, the time of use, and the purpose of use were found to be significant predictors of the sensory, affective and social experience. This signifies that, depending on the devices tourists use before, during and after travel, they were able to better enjoy, develop emotional connection to, and relate with the destination. It was also found that the significant effects are driven by the use of car navigation systems for navigation on site as well as the use of geographic applications on computers for navigation on site. This indicates that technology used to aid tourists with gaining route knowledge contribute to the ways tourists enjoy and connect with the destination. The findings of this pilot study suggest that ICT providers and tourism destinations need to provide information that and features that nurture sensory, affective and social as well as cognitive and bodily experiences to enhance travel experiences to the destinations. In particular it appears that information provided needs to be different throughout the travel. Geographic technologies used before the trip need to incorporate essentially all aspects of travel planning, whereas technologies used on the way are used as guides for navigation. When at the destination it appears that users receive the most benefits for their experience when geographic technologies provide information on navigation, learning as well as fun and curiosity. This suggests that destination marketing organizations need to collaborate with providers of geographic technologies to provide this information. Last, geographic technologies used on the way back and at home are used mostly to re-evaluate the trip and to augment the travel experience.

The follow-up study, thus, needs to achieve a higher response rate with about similar group sizes. Furthermore, some of the items used in this study need to be re-evaluated and adapted to better capture the underlying constructs. Lastly, future research needs to evaluate the effect of the use of the same geographic technology for everyday use and for travel. An within subject analysis is needed to identify if familiarity with certain technologies positively affects the geographic cognition when travelling.

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An analysis of research on tourism information technology: The case of ENTER proceedings

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Abstract

The International Conference on IT and Travel & Tourism (ENTER), which is organized by the International Federal of Information Technology on Travel & Tourism (IFITT), represents the world's largest annual academic and applied research conference on IT and tourism. Worldwide attendees from academia, industry, government, and other organizations, who are interested in tourism information technology, could take this opportunity to exchange their ideas and discuss the development trends for the IT in the tourism industry. By doing so, this made the proceedings being one of the most important publication channels of tourism information technology research. This study examines 17 issues (1994-2010) of ENTER conference proceedings to get an overview of research contributions on the application of information and communication technologies to travel and tourism in terms of countries/regions, individual researchers and affiliated institutes.

Keywords: Tourism; IT research; ENTER conference; Authorship analysis; Institute analysis

1 Introduction

Ever since the advent of first commercial application of information technologies to business, the tourism industry has been dramatically changed following the rapid development of technologies (Burger, 1997; Clyde & Landfried, 2005; Ma, Buhalis & Song, 2003). At the beginning, information technologies benefit companies in the ways of increasing the efficiency of the business operations, achieving the goals of saving cost and expanding sales. Nowadays, information technologies have shown a major impact on all operational, tactical, and strategic levels in the tourism industry (Egger & Buhalis, 2008). Due to the significant role of information technologies in tourism, a research field is emerging from this interface. Academic researchers have been, and will likely be, trying to understand the new technologies, discuss the

updated application and predict the future development trends (Buhalis & Law, 2008). Frew (2000) reported that only few publications about tourism and information technologies appeared before 1990. The annual ENTER conference, which serves as a venue for researchers, industry practitioners, and policy makers to exchange the latest knowledge in technologies and discuss the development trends for future technology applications in the travel and tourism industries, is the turning point for tourism IT research. The event builds and consolidates the research community and makes IT and eTourism as a key area of research (Buhalis & Law, 2008). As the world's largest annual academic and applied research conference on IT and travel & tourism, the conference in general, and the proceedings in particular, is featured by the quality research articles published by leading academic and industrial researchers. In the past 17 years, 745 articles were published in ENTER proceedings, with 1,037 contributing authors who were located in different countries in America, Europe, Asia/Pacific, Middle East, and South Africa. To a large extent, ENTER proceedings represent the leading research work on the applications of information and communication technologies in travel and tourism. This study examines the latest 17 issues of ENTER conference proceedings (1994-2010) to analyze research contributions from different countries/regions, individual researchers and affiliated institutes.

2 Literature Review

2.1 Research Productivity Analysis

The extent of the literature base and contributions to research is regarded as a measure of the maturity of a discipline (Van Doren, Koh & McCahill, 1994). Barry (1990) suggested that there are two major directions to analyze research productivity: quantity of research output and quality of research output. In the fields of tourism and hospitality, a number of previous studies focusing on the measurement of publication output from academic researchers have appeared since 1989 (Samenfink & Rutherford, 2002; Schmidgall & Woods, 1997/1998; Weaver & McCleary, 1989; Weaver, McCleary, & Farrar, 1990). In addition, different methodologies have been employed to conduct the assessments (e.g. surveys, citation analysis, content analysis, time series analysis, and modified Delphi techniques). One of the most frequently used methods for assessing research performance is authorship and institute analyses by counting the number of published articles in selected journals (Jogaratnam, Chon, McCleary, Mena & Yoo, 2005; Jogaratnam, McCleary, Mena & Yoo, 2005; Law & Chon, 2007; Malhotra & Kher, 1996; Sheldon, 1991; Weaver, McCleary & Farrar, 1990; Zhao & Ritchie, 2007). Also, many studies on research productivity analyses include the assessment of institutional contributions, as well as the contribution of individual authors that were conducted in the context of general tourism research. But, these prior studies rarely focused on the productivity analysis on specific area of tourism research such as IT in tourism.

2.2 Tourism and IT Research

Since early 1990s, many researchers have noted the potential of integrating IT into the tourism industry (Burger, 1997; Frew, 2000). After the introduction of the first ENTER conference, International Federation of Information Technology for Travel

and Tourism (IFITT) and the *Journal of Information Technology & Tourism* (JITT) were subsequently formed. Since then, research activity in this area flourished. Frew (2000) estimated that 665 refereed articles were published in the 20 years period from 1980 to 1999, representing an increase of 154% and 275% between the first and second decades during the study period. Likewise, Leung and Law (2007) reported that 4,140 IT related papers were published in the six leading tourism and hospitality research journals in the period 1986 to 2005. These figures were just including papers published in English. Although tourism and hospitality researchers have conducted numerous studies on IT applications, limited works on the progress of tourism IT research have been published (Buhalis & Law, 2008; Frew, 2000; Kirk & Pine, 1998; Kluge, 1996; Leung & Law, 2007). Kluge (1996) conducted a literature review on IT in the hospitality industry and identified that computers and information technology are the critical components. Kirk and Pine (1998) further classified IT research into six categories. However, these categories were too broad and did not cover the special technological changes. Frew (2000) reviewed the IT publications in the period mid- to late-1990's and claimed that Internet applications, including website design, were one of the fastest growing areas in research filed. However, some keywords were found to be too general. In another study, O'Connor and Murphy (2004) reviewed recent research on IT in tourism published in 12 leading tourism and hospitality journals for a period of 17 months and revealed three broad research areas. However, the study period in that research was not long enough to identify any research trends. Moreover, the research categories appeared too general. Leung and Law (2007) conducted a content analysis of IT-related and found that networking was the most popular research area. This study also included a small part of authorship analysis for the research on IT and tourism productivity assessment. It identified the most productive countries, regions, individual author contributions, individual institutional contributions, as well as the trend for single-authorship and multiple-authorship. More recently, Buhalis and Law (2008) comprehensively reviewed and analyzed the published studies on IT applications in tourism over the past 20 years with an aim to provide a general overview on technological applications in the tourism industry.

Most prior studies on reviewing IT research in tourism focused on the classifications of research categories, IT applications to the industry and managerial implications. Only few of them attempted to analyze total research productivity and institutional contributions. More importantly, in view of the rapid changing nature of IT and tourism, results of these prior studies might not be up-to-dated. Another limitation of these reviews articles on IT and tourism research was their selection of academic research journals. Therefore, an analysis of the ENTER conference proceedings, that has a wider scope for researchers, industry practitioners, and policy makers who are interested in IT and tourism, would contribute to a better understanding of the latest development and trends in the field.

3 Methodology

Published articles in Information and Communication Technologies in Tourism (1994-2010): Proceedings of the ENTER conferences were analyzed in this study. As recommended by previous researchers (Baloglu & Assante, 1999; Crawford-Welch & McCleary, 1992; Grazer & Stiff, 1987; Reid & Andereck, 1989), only full-length

papers were analyzed in this study. That is, a total of 745 full-length articles which are published in ENTER proceedings from 1994 to 2010 was identified for analysis.

This study employed the publication counting method as used by Sheldon (1991) for authorship analysis of tourism research. Two measurements were calculated as the research contributions in the analyzing process. The first one was the *Instances*, which represents the number of times an author has contributed to a research article either partially or wholly from a given institute or region. The second measurement was the *Weighted Instances*. This measurement was used to identify the partial contribution of co-authors/multi-authors. Equal weight was given to each author for multi-authorship articles in this study, although the first named author is assumed to contribute the most.

4 Findings and Discussions

4.1 Analysis by Year

During the period of 1994 to 2010, 745 full-length research papers were published in the ENTER conference proceedings, and the average number of full papers in each year was 43.8. The least productive year for full-length papers was 1996 with a total of 25 research papers, whereas the most productive year was 2004 with a total of 58 research papers. According to Table 1, the 5-year moving average of full papers published in ENTER conference proceedings obviously indicated the general trend of publications is increasing.

Table 1. Distribution and the 5-year moving average of full papers in 1994-2010

Year	No. of full papers published	5-year moving average
1994	41	
1995	38	
1996	25	
1997	35	
1998	34	*34.6*
1999	39	
2000	46	
2001	40	
2002	53	
2003	50	*45.6*
2004	58	
2005	51	
2006	40	
2007	50	
2008	51	*50.0*

2009	42
2010	52

4.2 Analysis by Country/Region

As shown by the ranking in Table 2, most of the top productive countries to ENTER proceedings were in Europe with 1,388 published papers in instances and 540 papers in weighted instances (73.48% of instances and 72.48% of weighted instances). Such a geographical dominance is likely due to the event location, which in turn, has attracted more researchers from European countries. America represented the second largest contributing region with 240 papers in instances and 97.2 papers in weighted instances (12.71% of instances and 13.05% of weighted instances). Asia/Pacific and Africa were the third and fourth most prolific regions, whereas the Middle East contributed to only 0.64% of all published research.

In a comparasion of countries in the world, there was no major difference for the top three rankings of the most productive countries measured in both ways. As the birthplace for ENTER conference, researchers from Austria represented the largest proportion of contributing authors, who had produced 341 papers in instance and 119 papers in weighted instances (18.05% of instances and 15.97% of weighted instances). The United Kingdom was the next largest contributing country with 249 papers in instances and 117 papers in weighted instances (13.18% of instances and 15.7% of weighted instances). The United States ranked the third with 207 papers in instances and 85.5 papers in weighted instances (10.96% of instances and 11.48% of weighted instances).

Table 2. Research contributions by countries and regions

Region/Country	**Instance**				**Weight Instance**			
	No	World Rank	Rank in the region	%	No	World Rank	Rank in the region	%
Europe	*1,388*	*1*		*73.48*	*540*	*1*		*72.48*
Austria	341	1	1		119	1	1	
UK	249	2	2		117	2	2	
Italy	171	4	3		60.3	5	3	
Germany	142	5	4		50.6	4	4	
Switzerland	128	16	5		45.7	16	5	
Spain	81	36	6		27.8	33	6	
Greece	68	9	7		25.2	11	7	
The Netherlands	56	28	8		19	28	9	
Norway	43	33	9		14.2	39	10	
France	23	15	10		6.91	13	12	
Sweden	17	8	11		7.42	9	11	

Finland	17	16	11		6	18	14	
Belgium	12	18	13		6.75	17	13	
Denmark	8	23	14		21.3	19	8	
Estonia	8	23	14		3	28	15	
Portugal	6	41	16		3	33	15	
Slovenia	5	25	17		2.25	26	17	
Croatia	4	28	18		2	21	18	
Yugoslavia	4	28	18		1.25	33	19	
Iceland	2	36	20		1	40	20	
Ireland	2	36	21		1	25	20	
Poland	1	12	21		0.53	12	22	
America	*240*	*2*		*12.71*	*97.2*	*3*		*13.05*
USA	207	3	1		85.5	3	1	
Canada	26	13	2		9.4	15	2	
Brazil	4	28	3		1	33	3	
Costa Rica	2	36	4		1	33	3	
Mexico	1	41	5		0.25	43	4	
Asia/Pacific	*236*	*3*		*12.49*	*97.8*	*2*		*13.13*
Australia	114	7	1		48.6	6	1	
Hong Kong	54	11	2		0.34	10	10	
New Zealand	25	10	3		9.5	8	3	
Japan	12	18	4		22.2	21	2	
China	10	20	5		2.83	24	6	
Malaysia	9	22	6		0.33	27	11	
Thailand	4	33	7		2	33	8	
Taiwan	3	6	8		5.99	7	4	
Brunei	2	36	9		1	41	9	
South Korea	2	20	9		3	20	5	
India	1	41	11		2.09	42	7	
Africa	*13*	*4*		*0.69*	*6.98*	*4*		*0.94*
South Africa	10	26	1		5.99	21	1	
Nigeria	3	14	2		0.99	14	2	
Middle East	*12*	*5*		*0.64*	*5.03*	*5*		*0.68*
Turkey	5	26	1		1.2	32	3	
Israel	4	28	2		2.33	25	1	
United Arab Emirates	3	33	3		1.5	30	2	

4.3 Contributions by Individual Authors

This section presents individual authors' contributions to the ENTER conferences in the past 17 years. Following the method adopted by Sheldon (1991) and Jogaratnam et al. (2005), authors were divided into one-time authors, moderately contributing authors (more than one and less than five absolute appearances), and intensely contributing authors (at least five absolute appearances).

As shown in Table 3, the total number of the authors was 1,037, and a majority of the articles were written by 766 one-time authors (73.87%). 208 authors were classified as moderately contributing authors (20.06%), and 63 authors were classified as intensely contributing authors (6.08%).

Table 3. Repeat contributions by authors

Total Number of Authors	One-Time Authors		Moderately Contributing Authors		Intensely Contributing Authors	
	Number	%	Number	%	Number	%
1,037	766	73.87	208	20.06	63	6.08

This study also reports the names of intensely contributing authors. Due to the limited length of this paper, authors who have made at least seven or more contributions to the ENTER conference proceedings were presented in Table 4.

Table 4. Intensely contributing authors (Part)

Authors	Instances		Weighted Instances	
	No of Papers	Rank	No of Papers	Rank
Buhalis D	35	1	16.89	1
Fesenmaier D R	32	2	13.38	2
Law R	28	3	12.01	3
Gretzel U	23	4	9.57	7
Murphy J	18	5	5.07	11
Frew A J	16	6	7.74	8
O'Connor P	16	6	11.83	4
Höpken W	15	8	5.39	10
Sigala M	15	8	10.75	5
Schegg R	14	10	4.32	16

Fuchs M	13	11	3.45	23
Werthner H	13	11	4.99	12
Ricci F	12	13	4.03	17
Tjostheim I	11	14	5.74	9
Wagner R R	11	14	3.89	21
Mills J E	10	16	3.99	18
Wöber K W	10	16	9.98	6
Daniele R	9	18	4.41	15
Tjoa A M	9	18	2.9	29
van der Pijl G J	9	18	3.74	22
Zins A H	9	18	4.67	13
Go F M	8	22	3.15	26
Pan B	8	22	3.28	24
Schertler W	8	22	4.49	14
Steiner T	8	22	3.99	18
Baggio R	7	26	2.99	27
Corigliano M A	7	26	2.99	27
Govers R	7	26	3.16	25
Milne S	7	26	2.49	30
Mitsche N	7	26	3.97	20

4.4 Research Contributions by Institutes

This section analyzes the research contributions of different institutes in the world and identifies the leading institutes in this field.

Table 5 shows the top ten research institutes whose authors have contributed the most from 1994 to 2010. These ten reaseach institutes have contributed at least 29 articles or parts of articles in the past 17 years. Three of these reaseach institutes are in Austria; two are in the U.S.; two are in Italy; and one each in the U.K., Hong Kong, Australia, and Spain. University of Surrey (UK) published the most tourism IT articles, both measured by instances or weighted instances. The University of Trento in Italy and the Hong Kong Polytechnic University ranked the second and third when measured by instances, but ranked lower when measured by weighted instances.

Table 5. Research contributions by the top ten teaseach institutes

Institute	Instances	Rank	Weighted Instances	Rank
University of Surrey (UK)	84	1	35.65	1
University of Trento (Italy)	49	2	11.13	7
The Hong Kong Polytechnic University (HK)	48	3	19.92	4
Johannes Kelper University (Austria)	47	4	13.68	5
University of Illinois (USA)	47	4	21.18	3
Vienna University of Economics and Business Administration (Austria)	47	4	24.71	2
University of Western Australia (Australia)	36	7	8.52	8
Etourism Competence Center Austria (Austria)	36	7	7.8	10
ITC-irst (Italy)	36	7	8.45	9
Texas A & M University (USA)	29	10	11.73	6
University of Malaga (Spain)	29	10	7.5	11

Frew (2000) conducted a critical analysis of publications on IT and tourism in 2000. It is interesting to compare some of Frew's findings with this study as the former included the proceedings of ENTER conferences in the period 1994 to 1999. Frew (2000) pointed out that the UK had the highest level of research contributions in IT and tourism, followed by Austria, Germany, the USA, and the Netherlands. According to the findings of this study, the most productive countries are Austria, the U.K., the USA., Italy, and Germany. Apparently, some authors from Austria and Italy were affiliated with IT companies or research organizations. With a relatively higher number of industry practitioners engaged in the academic research on IT, this might be one of the explanations to the high research productivity by Austria and Italy.

4.5 Summary of the Study

At present, IT has become a major component in tourism and hospitality. A considerable large number of researchers and institutes have been, and will be, conducting research on IT in tourism since the past couple of decades. This study has analyzed the contributions to IT and tourism research from authors, different regions of the world and different institutes. In total, 745 articles were written by 1,037 contributing authors in the period 1994 to 2010 and the findings revealed the number is continuously increasing. In terms of countries, Austria was the most prolific country as a total 341 published articles were authored by researchers in that country. When analyzing the research distribution by regions, Europe ranked the first, which was followed by the America. When it comes to individual institutional contributions, the University of Surrey (UK) published was the most productive institute

contributing 84 published articles when counted by instances, followed by the University of Trento (Italy) and the Hong Kong Polytechnic University (HK).

5 Implications of the Study

As there exists only a limited number of published articles on analyzing tourism and IT's total research productivity and contributions, this study fills this void by presenting who and which institute contributed most on IT in tourism research during the period 1994 to 2010. This longitudinal analysis updates previous studies in the topic and increased the contribution to knowledge how the top institutes and researchers perform in the field.

This study aims to assist researchers and practitioners to understand who was in the center position on tourism IT research during the study period and raise the quality of future research in this field. It will enable scholars who share the same interest to review what has been done and may engage in some additional topics. As Law and Chon (2007) found that publications in conferences were perceived as somewhat important as perceived by university program heads. Current research findings can be used by administrators for decision makings on remuneration, career development, and resource allocation for their faculty members.

Moreover, the volume of research published affiliated to an institute, at least within the academic community, can influence the perception of others on the quality of its programs. When prospective graduate students have difficulties in selecting their proper universities or institutes to further their studies on IT in tourism research, this study can serve as a useful reference for their consideration.

5.1 Limitations and future research

At present, there are more than 70 English journals in hospitality and tourism (Samenfink & Rutherford, 2002; Jogaratnam et al., 2005) and many mainstream business journals for researchers to publish their research findings. Thus, an analysis of only ENTER proceedings might limit the generalizability of this study. Moreover, this study only included full-length papers. However, research notes and other forms of publications could also contribute to knowledge development so that this study may not fully indicate the actual IT research trends. Besides, only the individual and institutional contributions were highlighted. In order to provide a more comprehensive result, future research should be broadened to a wider range of publications, such as books, journals, and other conference proceedings. A review of the research areas, methodologies and data analysis approach should also be conducted as this may identify the research gap by previous studies, Future research can also make a comparison among these different publication channels, and discuss individual researchers' publication preference. Last but not least, this study employed the publication counting methodology to analyze research productivity and institute ranking. In future research, correlation analysis on citations, impact factors, and research-related international awards or prizes, as well as other related factors should also be taken into account for evaluation so that more insightful implications can be provided.

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Factor Analysis of E-commerce Adoption Benefits: A Case of Egyptian Travel Agents

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Abstract

Travel agency managers decide whether to adopt e-commerce or not based on many factors in relation to the adoption implementation process. These factors could be benefits gained from adoption, drivers that push agents to adopt such technologies or boundaries that hinder the adoption implementation. Benefits of adoption may relate to agents' future survival, revenue and profits growth, increasing competitive positions and penetrating or expanding global travel markets. Highlighting the categories of adoption benefits may help to determine agents' enhancement and investment directions of their e-commerce adoption level. This research aims to highlight the benefits to Egyptian travel agents who adopt e-commerce in their activities and categorizing these benefits depending on agents' opinions using factor analysis. Surveyed agents showed that stability, future survival, revenue growth, enhancing internal efficiency in travel agents are among the benefits offered to agents by e-commerce adoption.

Keywords: E-commerce; benefits; travel agencies; factor analysis; Egypt

1 Introduction

According to APEC (1999), the decision-sequence for e-commerce adoption in small and medium-sized enterprises (SMEs) consists of five steps. The first step is the perception realization by SMEs of the opportunities and benefits offered by E-commerce for their enterprises. Based on their perceptions; SMEs begin to develop E-commerce desired capabilities. The third step is checking the inhibitors of desired capability to realize the potential of this capability. The experienced inhibitors might influence their believed measures should be taken to diffuse e-commerce. The last step is leading to recognize the enabled benefits of e-commerce adoption (APEC, 1999).

Furthermore, many research models were built to investigate the factors affecting information and communication technologies (ICTs) adoption in SMEs. Those models included many varied factors significantly affect ICTs adoption. After reviewing 14 models built to check ICT adoption decision and many other articles reviewing factors affecting ICTs adoption in SMEs, it is found that most these models cited perceived benefits among significant factors affecting adoption decision. Terms of benefits mentioned in literature models and articles are usefulness (Davis, Bagozzi, & Warshaw, 1989; Riemenschneider, Harrison, & Jr, 2003; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000), job relevance and output quality (Venkatesh & Davis,

2000), relative advantage (Moore & Benbasat, 2001; Premkumar & Roberts, 1999; Rogers, 1995; Thong, 1999), improved cash flow, increased productivity, ability to compete and reach new customers (Beatty, Shim, & Jones, 2001), better customer service (Beatty et al., 2001; Mehrtens, Cragg, & Mills, 2001; Wiertz, 2001), enhance potential efficiency (Beatty et al., 2001; Kuan & Chau, 2001), gathering information and building firm's image and promotion (Mehrtens et al., 2001), increasing sales and reaching new partners (Wiertz, 2001), competitive advantages (Kuan & Chau, 2001; Lacovou, Benbasat, & Dexter, 1995) and organizational support, managerial productivity, and Strategic decision aid (Grandon & Pearson, 2004).

2 Literature Review

Although many models cited the benefits of e-commerce adoption as significant factors affecting ICTs adoption-decision, they have various benefits mentioned as a broad concept like relative advantage or usefulness. Therefore, the review of this study details and lists theses benefits of adoption. It is worth mentioning that reviewed benefits are not in any specific sequence and do not apply to any location in this research. Table 1 depicts these benefits in literature reviews as follows.

Table 1. Review of Benefits in Previous E-commerce Adoption Models

Benefits	**Researchers**
Increasing SMEs' revenue and profits growth	(Heung, 2003; Karagozoglu & Lindell, 2004; Straub & Klein, 2001)
Support for current and future survival in terms of continuing to obtain the current benefits they have already	(Poon & Joseph, 2001)
SMEs' guarantee for stability and future survival	(Stansfield & Grant, 2003a)
For travel agents as SMEs, creating an opportunity for their re-intermediation rather than disintermediation in global travel market	(Álvarez, Martín, & Casielles, 2007)
enabling travel agents continuing their position in the market	(APEC, 1999; Azam, 2007; Patricia, 2008)
Enabling collaboration as a catalyst to support their survival against competitors	(Bourgouin, 2002; Kvainauskaite, Sarapovas, & Cvilikas, 2005; Mehrtens et al., 2001; Pease & Rowe, 2005)
Interacting with current business partners and finding new ones to strengthen their activities	(Kim, 2004)
Increasing productivity/sales and realizing economies of scale as a direct result of increased sales against cost reduction in almost all aspects of the enterprise operational processes	(Beatty et al., 2001; Beekhuyzen, Hellens, & Siedle, 2005; Bourgouin, 2002; Buhalis, 2003; Dyerson & Harindranath, 2007; Harindranath, Dyerson, & Barnes, 2008; Karanasios, 2008; Migiro & Ocholla, 2005; Simpson & Docherty, 2004; Stansfield & Grant, 2003b; Straub & Klein, 2001; Wiertz, 2001)

Development of new markets, finding new customers and penetration of global markets by an easy access of information on an international scale	(APEC, 1999; Beekhuyzen et al., 2005; Daniel, Wilson, & Myers, 2002; Jin, 2007; Karagozoglu & Lindell, 2004; Kim, 2005; MacGreogor, 2004; Migiro & Ocholla, 2005; Simpson & Docherty, 2004; Zheng et al., 2004)
Improving customer services, satisfaction and loyalty in terms of a faster response to customer enquiries and enhancing, and tracking customer satisfaction	(APEC, 1999; Daniel & Wilson, 2002; Dyerson & Harindranath, 2007; Harindranath et al., 2008; Jin, 2007; Karagozoglu & Lindell, 2004; Migiro & Ocholla, 2005; Quayle, 2002; Saffu & walker, 2008; M. Stansfield & Grant, 2003b; Teo, Lin, & Lai, 2009; Wesrthner & Klein, 1999)
Increasing the ability to customise services to customer needs	(Pease & Rowe, 2005; The e Regions Trust, 2006)
Supporting effective cooperative supply partnerships and relationships	(Daniel & Wilson, 2002; Dyerson & Harindranath, 2007; Harindranath et al., 2008; MacGreogor, 2004; Saffu & walker, 2008; Usoro, 2007)
Facilitating collaboration planning among supply chain partners	(Quayle, 2002)
Increasing the competitive advantages of firms	(Beatty et al., 2001; E. Daniel & Wilson, 2002; Karagozoglu & Lindell, 2004; Kartiwi & MacGregor, 2007; Lacovou et al., 1995; MacGreogor, 2004; Migiro & Ocholla, 2005; Quayle, 2002; Raymond, 2001; Simpson & Docherty, 2004)
Obtaining competitive advantage over non-online competitors	(Poon & Joseph, 2001)
Staying ahead of competitors	(Dyerson & Harindranath, 2007; Harindranath et al., 2008; Kvainauskaite et al., 2005).
Improving their distribution channels and enhancing company image is another benefit of better marketing efforts.	(APEC, 1999; Ayeh, 2006; Beckinsale & Levy, 2004; Bourgouin, 2002; Collins, Buhalis, & Peters, 2003; Kajogbola, 2004; Karagozoglu & Lindell, 2004; Saffu & walker, 2008; Scarborough & Zimmerer, 2003)
establishing a reputation in the international markets that facilitates SMEs to penetrate these markets then forming new partners in these markets	(The e Regions Trust, 2006)
Enhancing SMEs' operational efficiency	(Beatty et al., 2001; Collins et al., 2003; Dyerson & Harindranath, 2007; Harindranath et al., 2008; Karanasios, 2008; Kuan & Chau, 2001; Saffu & walker, 2008; Teo et al., 2009).
Improving business performance	(Jin, 2007; Poon & Joseph, 2001)
Improving business internal efficiency	(Collins et al., 2003; E. Daniel & Wilson, 2002; Kajogbola, 2004; Quayle, 2002)
enhanced staff satisfaction	(Dyerson & Harindranath, 2007; Harindranath et al., 2008).
Improvement of the decision-making process and managers' productivity	(Grandon & Pearson, 2004; Kajogbola, 2004; Saffu & walker, 2008)

Enhancing communications for SMEs with their customers, suppliers and partners	(Azam, 2007; Beckinsale & Levy, 2004; Beekhuyzen et al., 2005; Daniel & Wilson, 2002; Karanasios, 2008; Poon & Joseph, 2001; Quayle, 2002; Saffu & walker, 2008; Simpson & Docherty, 2004; Stansfield & Grant, 2003b; Wesrthner & Klein, 1999)
Enhancing SMEs' business knowledge and building the firms' general ICT capability	(APEC, 1999; The e Regions Trust, 2006)
Improving internal knowledge sharing	(Daniel & Wilson, 2002)
Carrying out online transactions	(Álvarez et al., 2007; Raymond, 2001)
Order taking and tracking processes	(Bourgouin, 2002; Kim, 2004)

3 Research Gap

One critical step in the decision making process in the adoption of e-commerce is to examine the maximized benefits of adoption to travel agents (APEC, 1999) followed by creating their websites (Yao, 2004). Considering strategies to increase their market share such as integrating with travel meta sites (Christodoulidou, Connolly, & Brewer, 2010). Identifying the implementation stage of e-commerce where organisations have their own websites are based on the target benefits they seek (Walcott, 2007). This research aims to group the benefits of e-commerce adoption in Egyptian travel agents as a significant factor to adopt technology. The research seeks to discover the most frequent benefits targeted by Egyptian travel managers' in their agents offered by adopting e-commerce technologies.

4 Research Objectives

The research aims to:

1- Determine significant benefits selected by Egyptian travel managers to adopt e-commerce in their agencies, and
2- Categorize these benefits of adoption in Egyptian travel agents using factor analysis statistics in both agents adopting e-commerce or not.

5 Research Methodology

In order to categorize the benefits of adoption in travel agents, a questionnaire form was designed for analysis purposes. Examining Table (1), about 26 benefits have been included in the form, each benefit takes the value of (5) if it is strongly agreed, the value of (1) if it is strongly disagreed. The form has been piloted by 50 travel agents in order to determine the significant benefits among travel agents. Significant benefits are those which are frequently repeated in the form. Finally, using corrected-item-to-total correlation statistics that allow retaining factors among 0.35 and 0.80, about 17

benefits have been selected to form the final questionnaire form. Mean statistics were used to count the agreed benefits then reliability and factor analyses statistics were calculated.

6 Sample of the Study

There are three categories of travel agents in Egypt; Category (A), companies that organise packages for groups or/and individuals, inside or outside Egypt, organise all other related items of these packages and execute planned packages of other tour operators. Category (B) includes companies that sell, issue transportation tickets (air, water and land transportation) and move luggage besides being agents for airlines and other companies. Category (C) includes companies that operate transportation means; air, land and water ones to transport tourists (Ministry of Tourism, 2008).

The sample of the study covers category (A) travel agencies that have websites. There are a total of 1023 travel agents in category (A) (Egyptian Travel Agents Association, 2008). For the high percentage of travel agents Greater Cairo-based (826 agents), Greater Cairo Greater Cairo TAs category (A) is selected to be the sample frame in this study. Where the study questions have been addressed to adopters and non-adopters of travel agents category (A), therefore, questionnaire has to be delivered and collected from two groups of agents. From the sample frame, about 387 agents are adopters (have websites) and 439 agents are non-adopters (do not have websites).

As a result of non-equal representation of the two groups in the sample frame, therefore stratified sample is used in this study to reduce the heterogeneity of the population and to increase the estimates efficiency. To calculate strata sample size, the following formula is used: $Stratum\ sample\ size = \frac{n_i}{N} \times total\ sample\ size$, where n_i is the stratum size and N is the total number of sample frame (population).

For adopters (stratum 1): $Stratum1\ sample\ size = \frac{387}{826} \times 287 = 135$ subjects

For non-adopters (stratum 2): $stratum2\ sample\ size = \frac{439}{826} \times 287 = 152$ subjects

Technique of simple random sampling with replacement is used within each of those strata to select the sample subjects. However the calculated sizes for strata, about 203 forms were collected from adopters and 204forms from non adopters that sums 407 forms in total.

7 Validity and Reliability

To ensure validity, examining Table (1), a questionnaire form was designed and piloted to be ready for data collection purposes. The primary form was prepared in English language then validated by expert panel and 15 PhD students to check face validity, then it has been translated into Arabic language to check questions comprehensiveness, and then it has been translated back into English language to compare the two forms and avoid translations misleading issues. For the translation validity, mixed techniques include back-translation technique by two independent translators from source questionnaire to target questionnaire to source questionnaire,

then comparing the two new source questionnaires and create the final version (Saunders, Thornhill, & Lewis, 2009). The advantage of mixed techniques in translation is getting the best match between source and target questionnaires then create the final form.

To achieve mixed techniques of translation, firstly the source questionnaire was translated from English into Arabic by a certified translation centre in Egypt. Once more, the Arabic version was translated back from Arabic to English by another translator working for a certified centre in the UK. The next step was comparing the two new source questionnaires by a British native specialized in linguistics. The final form has 17 benefits after using corrected item-to-total correlation to validate retained items in the form. A reliability test of the findings revealed a Cronbach alpha of 0.768 for the 17 items included in the final form for travel agents which means its reliability.

8 Research Results

8.1 Benefits of e-commerce adoption in travel agents

The first research objective seeks the benefits mentioned by travel agents' managers. From descriptive analyses and using mean scores of managers' opinions in travel agents (Table 2); it is clear that agents agreed the 17 benefits of e-commerce adoption as the mean scores range from 4 to 5 that means agree and strongly agree.

Table 2. Statistics of Benefits of E-commerce Adoption in Travel Agents

Benefits	Mean	Std Deviation.
Sales, revenue and profits growth	4.17	.424
Continuation of current benefits (current sales and profits)	4.07	.715
Guarantee for stability and future survival	4.39	.607
Support re-intermediation	4.31	.636
Attracting new services and investment	4.31	.568
Enable and facilitate collaboration	4.22	.689
Customizing services to customer needs	4.35	.652
Improve customer satisfaction	4.15	.714
Effective partnerships (improved supplier/partners relationships)	4.32	.756
Increase competitive advantages	4.31	.664
Improve distribution channels	4.38	.594
Establish reputation in the global markets	4.35	.674
Improve accountability	4.22	.757
Enhance staff satisfaction	4.21	.797
Provide support for strategic decisions	4.28	.686

Improve internal knowledge flow and sharing	4.30	.629
Easiness of carrying out transactions	4.34	.740

8.2 Factor analysis of e-commerce adoption benefits in travel agents

Covering the second research objective targets benefits categorizing in travel agents, factor analysis for agents revealed 6 main groups of benefits (Table 3). It is obvious that 17 initial principal components (with 17 eigenvalues) have been produced. Only the first six have eigenvalues >1 using principal component analysis as extraction method. About 60.042% of variance is explained by the first six components, in other words 60.042% of the information contained in the 17 original variables can be explained by six unrelated components.

Table 3. Total Variance Explained in Travel Agents

	Initial eigenvalues			Extraction sums of squared loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.726	21.918	21.918	3.726	21.918	21.918
2	1.729	10.171	32.088	1.729	10.171	32.088
3	1.310	7.707	39.795	1.310	7.707	39.795
4	1.186	6.976	46.771	1.186	6.976	46.771
5	1.149	6.760	53.531	1.149	6.760	53.531
6	1.107	6.510	60.042	1.107	6.510	60.042
7	.941	5.538	65.579			
8	.853	5.017	70.596			
9	.748	4.398	74.994			
10	.698	4.104	79.098			
11	.691	4.062	83.159			
12	.581	3.416	86.575			
13	.530	3.117	89.692			
14	.528	3.104	92.797			
15	.464	2.728	95.525			
16	.387	2.275	97.800			
17	.374	2.200	100.000			

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO) is 0.733 which means that the variables are middling and valid for factor analysis. Bartlett's Test of Sphericity is used to check the significance of validity of initial variables to continue factor analysis, Chi-square is 641.634, df=136 and $P<0.01$ which leads to the rejection of H_o suggesting that the correlation matrix is an identity matrix where all the initial variables are uncorrelated, therefore the factor analysis is justifiable. Moreover, the

determinant value= 0.040 indicating that there are no linear dependences in correlation matrix (Table 4).

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.733
Bartlett's Test of Sphericity	Approx. Chi-Square	641.634
	Df	136
	Sig.	.000

From the rotated component matrix - Table 5 below, there are six groups of benefits, factor loadings below (0.32) have been suppressed according to Costello and Osborne (2005), and these groups can be labelled as follows.

Table 5. Rotated Component Matrix

	Component					
	1	**2**	**3**	**4**	**5**	**6**
Sales, revenue and profits growth	.745					
Guarantee for stability and future survival	.704					
Increase competitive advantages	.590					
Support re-intermediation	.522					
Improve customer satisfaction		.711				
Enhance staff satisfaction		.670				
Enable and facilitate collaboration			.696			
Improve internal knowledge flow and sharing			.606			
Easiness of carrying out transactions			.569			
Establish reputation in the global markets			.510			
Improve distribution channels				.833		
Customizing services to customer needs				.636		
Provide support for strategic decisions				.535		
Attracting new services and investment					.733	
Improve accountability					.601	
Continuation of current benefits (current sales and profits)						.843
Effective partnerships (improved supplier/partners relationships)						.527

From Table (5), the six groups of benefits can be labelled as:

1. Essential benefits: it includes sales, revenue and profits growth, guarantee for stability and future survival, increasing competitive advantages and supporting agents' re-intermediation.

2. Customer and staff satisfaction: it includes improving satisfaction of customers and staff.
3. Internal efficiency and promotional benefits: it includes enabling and facilitating collaboration, improving internal knowledge flow and sharing, easiness of carrying out transactions and establishing reputation in the global markets.
4. Marketing and managerial benefits: it includes improving distribution channels, customizing services to customer needs and providing support for strategic decisions.
5. Expansion in global markets: it includes attracting new services and investment and improving accountability.
6. Stability of current benefits: it includes continuation of current benefits (current sales and profits) and effective partnerships & improved supplier/partners relationships.

It is clear that agents' stability, increasing competitive positions and effective re-intermediation in tourism global market lead to sales and revenue growth of agents and that is why this group has been labelled essential benefits. Customer and staff satisfaction means that agents guarantee sales and revenue growth which in turn guarantee their existence and encourage them to grow and continue in travel global market. Internal efficiency and promotional benefits are important one way to achieve their essential benefits plus customer satisfaction through knowledge sharing, building good reputation in travel market and support collaborations with other agents. Marketing and managerial benefits are part of agents aim to achieve their essential benefits by supporting strategic decisions and helping to improve distribution channels. Attracting new services and investments is another gateway for agents to effectively re-intermediate in travel market and expand their business. Effective partnerships and improving suppliers' relationships is another supporter of agents' stability beside sales and revenue growth. Generally all these categories of benefits lead to finally achieving the essential benefits of travel agents in travel market especially after the threats of disintermediation of global travel market as a result of decreasing and cutting their intermediary role in packages organising through their strong online competitors. Technology adoption in travel agents in terms of e-commerce is among supportive strategies helping travel agents to survive in the future and increasing their stability and competitiveness.

9 Conclusion and Recommendations

This paper has categorized the benefits of e-commerce adoption of Egyptian travel agents in Egypt. A number of 407 surveys were used in factor analysis of the adoption benefits. This study has met its two objectives; depicting the benefits of adoption by travel agent managers and grouping the benefits of adoption in travel agents. E-commerce adoption benefits are grouped in six main categories; essential benefits, customer and staff satisfaction, internal efficiency and promotional benefits, marketing and managerial benefits, agents expansion in travel global markets and stability of current benefits.

To take the full advantages of e-commerce technologies, travel agencies have to recognize the benefits they can gain from e-commerce adoption and develop their e-commerce readiness to highlight the group of benefits they need more. They may

focus on transactions easiness, market expansion or marketing efforts and that relates directly to the level of e-commerce adoption they adopt.

10 Limitations and Suggestions for Further Studies

When reviewing the results of this study, it should be considered that categorized benefits are not matched to each level of e-commerce adoption in travel agents where agents can determine the level of e-commerce adoption to gain the target group of benefits. One more limitation of this study is the need for qualitative interviews to confirm these groups of benefits and its priorities for travel agents. Further research should be addressed to group the drivers and barriers that affect adoption decision. These barriers could be internal or external boundaries. Future studies might focus on what those barriers may be and how they affect managers' decision to adopt e-commerce technologies in travel agents.

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Publish/Subscribe Systems in Tourism

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Abstract

Publish/subscribe is a communication paradigm that suits mobile application development due to the loosely coupled, asynchronous and anonymous communication mechanisms it involves. The Phoenix publish/subscribe system is a newly created communication middleware aimed at the tourism domain, representing both a tool for the experimental study of mobility and the development of value-added visitor-oriented tourism applications, including a real-time visitor tracking system and a location-based mobile tourist guide application. Initial validation of the Phoenix system has been carried out with positive results that will require additional validation.

Keywords: mobile services; information dissemination; real-time; location-based computing.

1 Introduction

Technological advances in mobile computing and, in particular, the progressively widespread adoption of powerful smartphones by the general public, points to a future where a majority of people will have a near-standard way of accessing information and services of any kind *on the go*, using their mobile devices and the ubiquitous wireless communication infrastructures available to access the information highway. The field of tourism can benefit from this fact if suitable models and infrastructures are developed to support these emerging information consumption flows. Currently, tourism agents offer their services mainly by means of web sites and mobile applications. According to the established model, visitors access tourism services mainly by following a *pull* approach where they need to find the right source of information or services on the Internet or manually navigate the contents of a mobile application in order to fetch information which is relevant to their tourism activity. However, in the envisioned scenario where most of the visitors of the future will carry mobile devices with multimodal communication and location-aware capabilities, a *push* approach to information dissemination, as already noted by several authors, seems to better suit the requirements of visitors and other agents in the digital tourism ecosystem. This push approach to information dissemination involves the publication

of information in the form of events, disseminated to visitors in a potentially anonymous and asynchronous way, and requires flexible and scalable infrastructures.

The publish/subscribe communication paradigm (Eugster, Felber, Guerraoui & Kermarrec, 2003) has proved to fulfil the requirements of such push models supporting both *one to many* and *many to many* communication patterns. Publish/subscribe provides a way to manage information flows in order to deliver this information in an efficient way that matches the interests and preferences of receivers. Moreover, publish/subscribe is particularly suitable in mobile information dissemination scenarios (Huang & Garcia-Molina, 2004). Mobility is a relevant feature in tourism applications that interact with visitor. In situations when visitors are moving and their mobile devices roam through different networks, traditional pull approaches fall short at providing a seamless information consumption experience. Mobile publish/subscribe systems can handle visitor mobility in a transparent way, managing any network disconnections and subsequent reconnections automatically. Additionally, a specific subtype of publish/subscribe systems known as location-based publish/subscribe offers potentially interesting enhancements to the process of efficient information delivery, using location as a key to determine its relevancy.

1.1 Publish/subscribe

Publish/subscribe systems (Eugster, Felber, Guerraoui & Kermarrec, 2003) are distributed event-based systems that provide applications with means to disseminate information in an anonymous, asynchronous and multicast-like fashion. In a typical scenario, the publish/subscribe system is a software layer used by other applications to exchange data. Applications use the publish/subscribe system to both consume and produce (or publish) content. Figure 1 illustrates the structure of a generic publish/subscribe system and identifies the key software abstractions of such systems: publishers (P), subscribers (S) and the brokers (B) in the event brokering system.

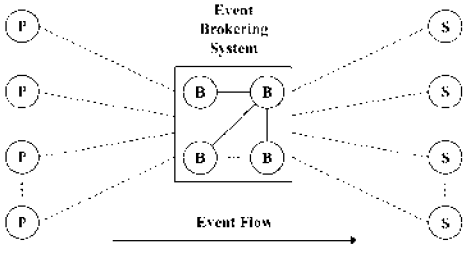

Fig. 1. Components of a publish/subscribe system

Publishers are entities that produce information. This information is encapsulated in *notifications* that are sent to the event brokering system in order to trigger their dissemination. Subscribers, on the other hand, are entities that want to be notified of the publication of certain events in order to provide some functionality to end-users.

Subscribers produce explicit *subscriptions*, which define the features of the events that should be delivered to them, and send those subscription messages to the event brokering system. The event brokering system represents the logical backbone of publish/subscribe systems and is usually formed by a coordinated network of routing nodes known as brokers. These brokers are in charge of mediating between publishers and subscribers. They process both subscriptions and notifications in order to match them and deliver each positively matched notification to interested subscribers.

This filtering functionality constitutes the core of what is known as *content-based* publish/subscribe system (Eugster, Felber, Guerraoui & Kermarrec, 2003). If a given notification does not match any subscription, brokers ignore that notification, effectively filtering out such events and saving system resources.

One of the main benefits of publish/subscribe systems is that event publishers and event subscribers are not required to identify the sources or destinations of the events they exchange, relying on the event brokering system to transport and deliver notifications in a reliable, scalable and transparent way. This loosely coupled approach to communication enables publish/subscribe systems to adapt to changing environments where large numbers of publishers and subscribers join and leave the system without disrupting its stability or the general flow of events. The publish/subscribe communication paradigm is therefore essentially different from the classical request/response model due to the separation of concerns it provides. Furthermore, publish/subscribe systems support asynchronous notifications of events and consequently enable developers to create real-time systems that react to live event notifications without having to rely on periodic polling mechanisms to detect incoming notifications. Due to these features, publish/subscribe systems are particularly suitable for mobile information dissemination scenarios (Huang & Garcia-Molina, 2004) such as the tourism-related applications described in Section 4.

1.2 Contributions

The main contributions of this work are summarized in the following items:

- Identification of the key issues that have to be solved in order to adapt a classical publish/subscribe system to the requirements of mobile computing applications.

- Definition of mechanisms to address the key issues of *mobile device integration*, *seamless networking*, *reconnection support* and *location-based matching*.

- Implementation of the resulting system in the form of a publish/subscribe middleware that enables the deployment of complex applications involving multiple brokers, publishers and subscribers were components can run in a variety of computing platforms, including, but not limited to, Android devices.

- Validation of the aforementioned publish/subscribe middleware in terms of provided functionality (using different prototypes) and quantitative performance.

The rest of the paper is organised as follows. Section 2 analyses the related work in the field of publish/subscribe systems and mobility. Section 3 introduces the Phoenix publish/subscribe system, which is aimed at the tourism domain. Section 4 is focused on the validation of the Phoenix publish/subscribe system while Section 5 gives future research directions and summarizes the insights resulting from the present work.

2 Related work

Although several publish/subscribe systems have been developed in the past, they are either obsolete, unavailable for reuse or lack some of the capabilities required by the mobile information dissemination scenarios envisioned by the authors. Following is a summary of the most relevant research work that has been carried out in this field.

The Siena event notification service (Carzaniga, Rosenblum & Wolf, 2001) represents one of the first public implementations of a content-based publish/subscribe system. From the functional point of view of a communication infrastructure, Siena and other early publish/subscribe systems such as (Segall & Arnold, 1997), (Strom, Banavar, Chandra, Kaplan, Miller, Mukherjee, Sturman & Ward, 1998), (Cugola, Di Nitto & Fuggetta, 2001) and (Fiege, Mühl & Gärtner, 2002) were complete solutions that effectively supported the development of various distributed applications and prototypes. It must be noted, however, that research in those early systems was focused on building systems with static topologies, where publishers and subscribers could not move and the publish/subscribe infrastructure remained relatively stable.

In time, it became apparent that more *dynamic* systems were needed in order to build pervasive computing applications and support seamless information dissemination scenarios. Embracing the potential of emerging mobile devices and wireless communication technologies, several authors (Huang & Garcia-Molina, 2004) (Cugola & Jacobsen, 2002) analysed the implications of mobility for publish/subscribe systems and devised theoretical models and distributed algorithms aiming at supporting disconnected operation, mobility and eventual reconnections. A second wave of publish/subscribe systems (Fiege, Gärtner, Kasten & Zeidler, 2003) (Mühl, Ulbrich & Herrman, 2004) and mobility supporting extensions to older systems (Caporuscio, Carzaniga & Wolf, 2003) were brought to light and fostered the exploration of the mobile publish/subscribe communication paradigm and its benefits. In particular, as argued in (Huang & Garcia-Molina, 2004), the anonymity and potential dynamism of publish/subscribe systems allows them to support the deployment of scalable distributed applications that can adapt to the frequent connections and disconnections of mobile devices in a robust and asynchronous way.

Location-based publish/subscribe systems (Eugster, Garbinato & Holzer, 2005) were a natural evolution of mobile publish/subscribe systems and, combined, provided the ideal infrastructure to develop information dissemination applications in dynamic and mobile domains such as tourism. However, it is only now that smartphones and cheap data service plans have become commonplace that the full potential of mobile publish/subscribe systems is beginning to unfold. In order to reach its potential, new

systems have to be built taking into account emerging mobility-related technologies and prior research in the field of mobile information dissemination in tourism (Beer, Fuchs, Höpken, Rasinger & Werthner, 2007) (Kenteris, Gavalas & Economou, 2009). Our work develops in the context of the latest wave of publish/subscribe systems such as XSiena (Jerzak, 2009) and Rebeca (Parzyjegla, Graff, Schröter, Richling & Mühl, 2010) that offer advanced routing, management and adaptation functionalities but are not specifically targeted at location-based mobile application development.

3 Phoenix

The Phoenix publish/subscribe system is a content-based publish/subscribe middleware that represents a substrate on top of which distributed publish/subscribe applications can be built. Phoenix has been developed in order to explore the potential use of the publish/subscribe communication paradigm in the realms of tourism and mobility, where information dissemination is at the core of multiple applications. Phoenix has been implemented in Java and its architecture builds upon previous contributions by the authors (Salvador, Alzua, Larrea & Lafuente, 2010). The layered architecture of the system is depicted in Figure 2.

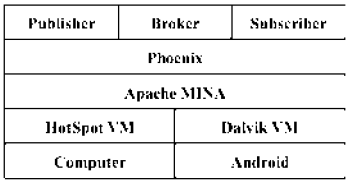

Fig. 2. Architecture of the Phoenix publish/subscribe system

Phoenix supports two different Java platforms: Java SE and Android (http://www.android.com). The publish/subscribe system relies on the Apache MINA network application framework (http://mina.apache.org) to provide non-blocking input/output operations at the application level, which allows Phoenix brokers, publishers and subscribers to run on both computers and mobile devices. The standard setup of Phoenix deployments involves hosting brokers in computers while publishers and subscribers are installed on mobile devices. Phoenix brokers are connected using an acyclic network topology and their connections are persistent, whereas publishers and subscribers are expected to roam the system transitioning between connected and disconnected operation modes. The content-based nature of the publish/subscribe filtering algorithm implemented in Phoenix enables subscribers to specify the nature of the events they want to receive. Events and subscriptions in Phoenix make use of predicate-based semantics (Carzaniga, Rosenblum & Wolf, 2001). The following subsections describe the main functional features of the Phoenix publish/subscribe system. These features stem from the core requirements imposed by the target application domain of the system: mobile information dissemination.

3.1 Mobile device integration

In order to develop mobile applications, mobile devices must be integrated into the publish/subscribe system. The Phoenix publish/subscribe system has been designed with Android devices in mind and all of its software components and libraries are compatible with both the Java SE HotSpot virtual machine and the Dalvik virtual machine found in Android devices. The result is that Phoenix publishers, subscribers and brokers can be deployed across a wide variety of devices, ranging from cellular phones to high performance servers, without the need for software surrogates/proxies. Furthermore, the modular design of the system and the developed communication protocol enables Phoenix to extend its reach to other mobile operating systems.

3.2 Seamless networking

Mobile information dissemination scenarios must foresee mobile devices roaming across different networks and should not rely on static addresses to handle communication between those mobile devices and the infrastructure. Phoenix supports both cellular and wireless local area networks and provides mechanisms to enable the automatic discovery of brokers on those networks. A multicast discovery protocol enables publishers and subscribers to detect brokers that are connected to the same local area network. This protocol has been complemented with a unicast broker discovery mechanism that can connect publishers and subscribers with a broker through a cellular network connection when local area network connectivity is not available. These discovery mechanisms that have been built into Phoenix, combined with a deployed set of public brokers, ensure pervasive and seamless connections between mobile applications and the rest of the publish/subscribe system.

3.3 Reconnection support

Due to the nature of wireless networking, mobile applications can suffer from intermittent network disconnections. Furthermore, these mobile applications may reconnect to the publish/subscribe infrastructure at a later time, changing brokers as they roam networks and recover from disconnections. In order to support this phenomenon, Phoenix includes an event queuing subsystem that stores undelivered events and a broker handoff protocol (Huang & Garcia-Molina, 2004) that manages subscriber mobility in a transparent way (publisher mobility is not an issue for Phoenix). Disconnections require both applications (in the case of publishers) and the infrastructure (in the case of subscribers) to enqueue undelivered events and define summarization and selective discarding policies for them. These policies depend on the nature of events and whether complete event series need to be preserved or only the most recent event is of interest to its subscribers. When a formerly connected application disconnects and then connects to a different broker, normal event delivery may only be resumed after all pending events are transmitted from their respective event queues and a broker handoff protocol is carried out in order to update the routing information maintained by the event brokering system.

3.4 Location-based matching

Location information is an extremely useful resource in mobile information dissemination scenarios as it enables systems to discriminate geographically relevant information and provide users with value-added notifications (Eugster, Garbinato & Holzer, 2005). Therefore, the notifications and subscriptions created by publishers and subscribers in Phoenix contain location information as part of their attributes. For event notifications, this location information determines the relevancy range of such events, whereas location-based subscriptions indicate the interest range of a given subscription. These attributes enable brokers to match notifications and subscriptions only if their respective relevancy and interest areas overlap to a predetermined extent.

4 Validation

This section describes the Phoenix application prototypes that have been developed in order to assess the suitability of the publish/subscribe communication paradigm in tourism and mobility-related scenarios. Performance measurements of the Phoenix system have also been conducted in an effort to illustrate its real-world performance.

4.1 Prototypes

The main objective of the Phoenix publish/subscribe system is to enable the development of distributed applications that embrace mobility in different information dissemination scenarios related to tourism. To that end, two complementary software prototypes have been developed, illustrating the wide range of supported applications.

Real-time visitor tracking system

The first prototype developed to test the Phoenix publish/subscribe system aims at creating a real-time visitor tracking system where a Destination Management Organization (DMO) can monitor the whereabouts of visitors in a real-time fashion. The underlying publish/subscribe infrastructure for this deployment is depicted in Figure 3 and includes one event publisher per visitor and one event subscriber per Visualisation Console. Publishers are hosted in mobile devices carried by visitors, while the Visualisation Console is a web application that is part of a Destination Management System (DMS) and can be accessed through a web browser.

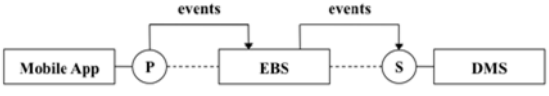

Fig. 3. Publish/subscribe component configuration

Publishers periodically send events to the event brokering system (EBS). These messages contain the GPS location of the mobile device as well as information regarding the visitor (nationality, gender and age). Using the Visualisation Console, a system administrator in charge of the tracking system can perform various

subscriptions to the events generated by the publishers. These subscriptions contain a location attribute (latitude and longitude) as well as a radius attribute, which enable the event brokering system to filter all incoming events and only forward those events matching the specified location criteria. In addition to the location criteria, a system operator can specify different conditions that must be satisfied by incoming events. For instance, the operator can request to subscribe only to the location-tracking events published by French visitors between 30 and 45 years old. This functionality is derived from the content-based nature of the Phoenix publish/subscribe system. The event brokering system takes these subscriptions into account and filters all incoming events (based on location and visitor profiles) in order to supply the subscriber in the Visualisation Console exclusively with those events that match all of the criteria.

The real-time visitor tracking system has been tested with real subjects using Android devices with positive results. However, in order to validate the scalability of the Phoenix publish/subscribe system in real deployments with larger numbers of experimental subjects, *virtual visitors* can be created by the system and instructed to update their location with a given periodicity. These virtual visitors roam the landscape with a random heading, speed and profile values for gender, age and nationality. Furthermore, virtual visitors and real visitors can be combined in a given deployment due to the fact that the underlying publish/subscribe system is independent of the application-level events it receives, matches and delivers.

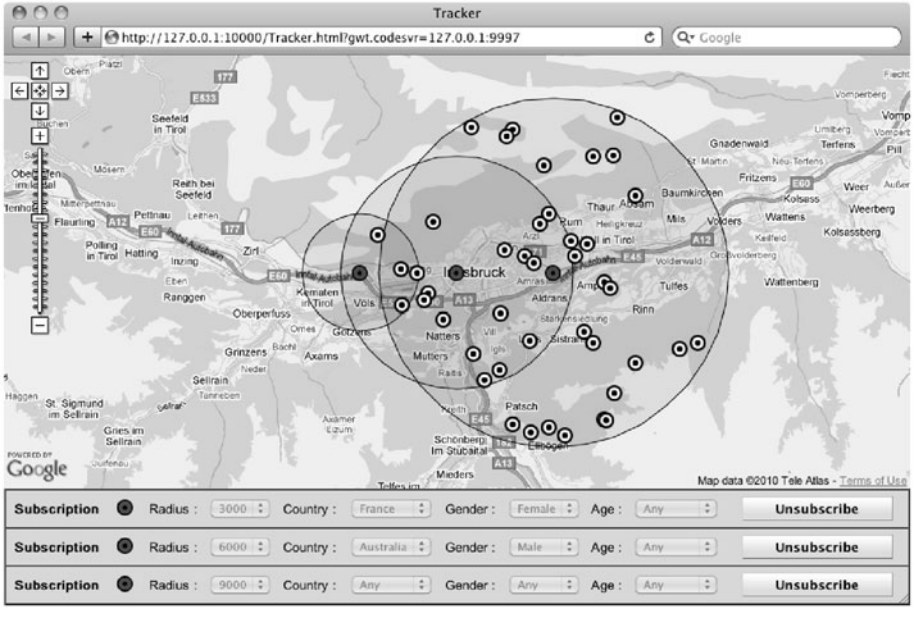

Fig. 4. Real-time visitor tracking system prototype

Figure 4 illustrates the graphical user interface of the Visualisation Console for the real-time visitor tracking system. The graphical user interface is composed of a map view and several subscription panels with combo boxes and buttons. The subscription

panels enable a system operator to define different concurrent subscriptions, specifying the relevant geographical area and profile features of the target visitors to be tracked. Once a subscription is performed, the subscriber components built into the Visualisation Console will receive periodic events containing the location of visitors and will display these events as black and white circles overlaid on the map view. Events are received with a very low latency and thus the Visualisation Console represents a live view of the visitors' location at any given time. Several subscriptions can be active at a given time, as shown by the sequence of screenshots presented in Figure 5, where three subscriptions are performed.

Fig. 5. Incremental subscription sequence

Location-based mobile tourist guide

The second prototype developed to test the Phoenix publish/subscribe system represents a location-based mobile tourist guide that can receive real-time information and events that should be notified to any interested visitors during their stay. The publish/subscribe system deployment for this prototype is depicted in Figure 6 and involves one or several information publishers hosted by content servers in a Destination Management System (DMS) and one event subscriber integrated in the mobile tourist guide application hosted by the mobile devices of each of the visitors.

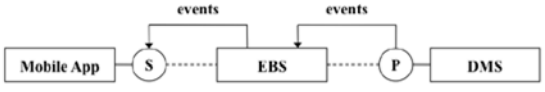

Fig. 6. Publish/subscribe component configuration

Publishers are located in the Destination Management System and therefore can have access to a wealth of information related to a given destination. Examples of the type of information that could be disseminated by the publish/subscribe system include both static information such as restaurants, hotels, bus stops, tourist attractions or other points of interest as well as more dynamic contents such as real-time public events taking place at a given time or alerts for traffic jams and security-related information. Commercial offerings and location-based deals could also be deployed. In any case, the events generated by the publisher contain the geographical relevancy range of that content in order to enable the system to perform location-based filtering of the events and information displayed by the mobile tourist guide.

Using their mobile devices and the mobile tourist guide application, visitors can subscribe to events of their interest. The mobile application can request to filter events and only receive information that has been annotated with a location found within a given radius from the visitor. What is more, the mobile application enables visitors to only receive events matching arbitrary criteria such as type of event, target audience, free admittance, and others. Figure 7 depicts a prototype mobile application designed to let visitors configure their tourist guide preferences, enter their personal profile information and browse all of the received events. Incoming events trigger a notification to the visitor, who could then select the event and receive additional information about a given item, including a description of the item, its location and other relevant content such as images and navigation information to reach the target.

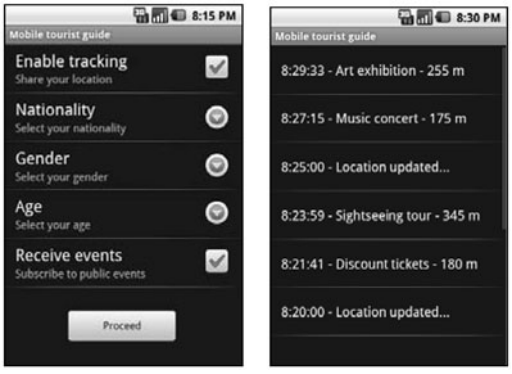

Fig. 7. Location-based mobile tourist guide prototype

4.2 Performance

The core of the mobile application prototype has already been implemented and several performance measurements have been carried out in order to assess the raw capabilities of the Phoenix mobile publish/subscribe system. Two series of experiments have been carried out (Salvador, Alzua, Larrea & Lafuente, 2010) with an Android mobile phone connected to the Phoenix infrastructure using both cellular and wireless local area networks. Table 1 summarizes the results of a latency estimation experiment averaged over 1,000 measurements for each of the network types (WLAN and UMTS), whereas Table 2 presents average event throughput performance based on five series of 10,000 event publications for each of the network types and links. The equipment used in all of the performance measurements includes a MacBook Pro (2.66 GHz Intel Core i7, 4 GB DRAM) with Mac OS X 10.6.4 and a Google Nexus One smartphone (Qualcomm QSD 8250 1 GHz, 512 MB DRAM) with Android 2.2. The notebook computer hosted the Phoenix broker and either a publisher or a subscriber component, while the third component was run on the smartphone.

Table 1. Network event latency (TCP/IP)

Network	Average	σ	P_{95}
WLAN	12 ms.	4 ms.	16 ms.
UMTS	76 ms.	41 ms.	102 ms.

Table 2. Network event throughput (TCP/IP)

Network	Link	Average	σ
WLAN	Uplink	257 events/sec.	6 events/sec.
WLAN	Downlink	315 events/sec.	2 events/sec.
UMTS	Uplink	329 events/sec.	23 events/sec.
UMTS	Downlink	105 events/sec.	3 events/sec.

5 Conclusions

The Phoenix publish/subscribe system represents a research effort aimed at providing the tourism and mobility research communities with a communication systems infrastructure that can enable the development of groundbreaking distributed applications. These applications are characterized by an inherently real-time communication model that makes them attractive for many of the information dissemination scenarios that can be found in the tourism domain. Furthermore, the content-based nature of the system enables different information dissemination patterns to be implemented on top of the system, saving precious resources such as bandwidth while enabling *one to many* and *many to many* communication patterns. The Phoenix publish/subscribe system has been designed, from the grounds up, to cope with the challenges derived from the interaction between mobile devices and the publish/subscribe system, including several mobility-related features that are not present in other more generic publish/subscribe systems that are available today. However, the Phoenix publish/subscribe system is far from complete and its future research lines run along two parallel and highly complementary vectors:

- Quantitative assessment: the initial performance evaluation presented in this paper has to be completed with a thorough batch of performance measuring experiments aimed at: a) testing the performance of the system in highly distributed configurations, b) testing the scalability of the system with growing numbers of publishers and subscribers, c) testing the scalability of the system with growing rates of published events and d) verifying its overall correctness.

- Qualitative assessment: the prototypes developed in the context of this paper represent valid examples of tourism-related applications that can benefit from the Phoenix publish/subscribe system, but they have to be completed in order to support a higher degree of functionality and context-aware behaviour and evaluated with end-users with regards to: a) measuring the overall usability of the prototypes and b) conducting user satisfaction tests to measure the perceived usefulness of the applications from the point of view of tourism domain experts.

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Trustworthiness of Travel 2.0 applications and their influence on tourist behaviour: an empirical investigation in Italy

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Abstract

Travel 2.0 applications are becoming increasingly important. Accordingly to recent research, they exert great influence in generating the idea of travelling, on the actual planning process, and during the post-travel phase. Online applications can also sometimes induce tourists to alter their decisions after obtaining further information. Recently researchers have started to analyse the credibility and trustworthiness that tourists confer upon different Travel 2.0 applications, contributing, in this way, to clarify the extent to which they affect tourists' attitudes and purchasing decisions. Even so, little is still known on this topic. In order to fill this gap, an online survey was conducted on a sample of Italian tourists to investigate the level of trustworthiness they feel towards different types of Travel 2.0 applications, as well as whether these applications exert different influences over the way tourists respond to company images and make their choices.

Keywords: Travel 2.0 applications, trustworthiness, hospitality image, tourist choices, gender differences.

1 Introduction

In the last decade, the Internet has reshaped the way people plan for and consume tourist products and services (Buhalis & Law, 2008). More recently, the most significant development in Internet applications has been in the area of user generated content (UGC) and peer-to-peer applications, the so-called Web 2.0.

In 2004 Tim O'Reilly and Dale Dogherty coined the term Web 2.0, defining it as a distinctive medium characterised by user participation, openness and network effects (Musser & O'Reilly, 2006). Web 2.0, or Travel 2.0, as it is referred to in the tourism sector, includes different applications such as media and content syndication (RSS-feeds), mashups, tagging, wikis, web forums, customer rating and evaluation systems, podcasting, blogs, microblogging (such as Twitter, Pownce, Jaiku, Hictu, etc.) photo sharing, and video sharing (Akehurst, 2009; O'Connor, 2008; Schmalleger & Carson, 2008).

According to eMarketer (2007), about 75.2 million American online users use UGC applications. Again in 2007, almost half the European Internet users made decisions about their travel plans using Travel 2.0 applications, and eMarketer highlighted that, out of every three European tourists, two use the Internet to upload their blogs and

share reviews about their holidays with other people (Li & Bernoff, 2008). Using the Internet and Travel 2.0 applications, tourists can post their thoughts and opinions about their holidays, making them available to the global community of Internet users (Dellarocas, 2003). Among photo sharing applications, Flickr alone has 48 million unique visitors, and almost 3.5 million photos are uploaded every month (Camellini, 2009). The most famous video sharing tool is without doubt YouTube, with 100 million videos viewed every day and 20 million visitors a month (Iavazzo, 2009). In February 2010, Twitter attracted an average of 21 million unique visitors over the month, and sent about 50 million tweets every day (TechCrunch.com, 2010).

Some research sheds light on the significant influence that UGC and Travel 2.0 applications exert in stimulating travel, in the actual planning process, and during the post-travel phase (Gretzel & Yoo, 2008). Sometimes they also induce tourists to alter their decisions after obtaining further information online. Indeed, eMarketer (2007b), for example, reports that, among tourists who use peer reviews to help them make their hotel bookings, the percentage of travellers who changed their booking based on reviews posted online by other consumers are 25% and 33% respectively for infrequent and frequent leisure travellers.

However, research on the credibility and trustworthiness that tourists show towards different Travel 2.0 applications is still in its infancy. There is just one published article studying this topic, carried out on a sample of American tourists (Yoo, Lee, Gretzel & Fesenmaier, 2009). This study was therefore carried out to investigate the level of trustworthiness which a sample of Italian tourists feel towards the different types of Travel 2.0 applications and, then, whether these applications exert a different influence on the company's perceived image and on the tourists' choices. Since current statistics show gender differences, the study also examined whether these differences exist within the topics considered in the present study.

2 Background

2.1 Electronic Word-of-Mouth (eWOM)

The online interpersonal influence exerted by UGC is referred to as eWOM, which can be defined as "all informal communications directed at consumers through Internet-based technology related to the usage or characteristics of particular goods and services, or their sellers" (Livtin, Goldsmith & Pan, 2008). It is possible to consider eWOM as different to traditional WOM because its scale is larger, it allows organisations to monitor and control their operations and, also, it is characterised by the absence of contextual cues and by the fact that it is not possible to know who posted the online reviews, comments and ratings (Dellarocas, 2003).

eWOM is particularly important for the tourism sector because tourism and hospitality products and services are, on the one hand, difficult to evaluate as they are intangible goods (Lewis & Chambers, 2000) and, on other hand, they are high-involvement products where behaviour patterns during purchase are not routine and the purchase of these products requires a significant amount of time, thought and energy as well as other resources (Swarbrooke & Horner, 2007). These circumstances mean that, similarly to previous research carried out in other sectors (Nielsen, 2009),

Travel 2.0 attracts the attention of consumers because the online reviews and recommendations that tourists post online are perceived to have a higher credibility than traditional tourist information sources (Akehurst, 2009; Chung & Buhalis, 2008; Gretzel & Yoo, 2008; Herr, Kardes & Kim, 1991; Weiss, Lurie & Macinnis, 2008). This occurs especially when people interact in virtual spaces over a long period of time. In this case people often develop a sense of community and trust the comments posted online (Dwivedi, Shibu & Venkatesh, 2007) nearly as much as if they were interacting face-to-face (Yadav & Varadarajan, 2005).

Adopting a demand-side perspective, Travel 2.0 exerts a great influence in generating the idea of travelling, in the actual planning process and after tourists' decisions have been taken (Gretzel & Yoo, 2008). In the pre-travel phase, tourists can use social media as a supporting system for research and help when making their bookings, during their stay they can publish comments in forums or blogs and in the post-travel phase they can share experiences by posting reviews or uploading videos and photos about hotels and destinations (Chung & Buhalis, 2008). Overall, the influence reviews exert on tourist decision making has been found to be more significant for accommodation products than for other travel products (Gretzel, Yoo & Purifoy, 2007).

2.2 Trustworthiness of Travel 2.0 applications and their influence on tourist decision making

In marketing literature, trust has been recognised as an enabler that influences people's online behaviour when they are considering making purchases (Bart, Shankar, Sultan & Urban, 2005; Eastlick, Lotz & Warrington, 2006; Premazzi, *et al*., 2010; Urban, Amyx & Lorenzon, 2009). It is therefore important to analyse the credibility and trustworthiness that consumers associate with the sources of information they use in their decision making.

On the whole, UGC sources are considered more credible and trustworthy than market-provided information and, consequently, more likely to direct and influence tourist choices (Akehurst, 2009; Chung & Buhalis, 2008; Gretzel & Yoo, 2008; Herr, Kardes & Kim, 1991; Weiss, Lurie & Macinnis, 2008). Research has shown that trip planners with greater trust in travel-related UGC sources are more likely to perceive the impacts and benefits of UGC (Yoo, Lee, Gretzel & Fesenmaier, 2009). Moreover, research has considered other aspects that could be regarded as possible moderators affecting the influence of Travel 2.0 applications, such as, for example, gender and age differences and frequency of travel. Findings have shown that there are gender differences in the general usage of UGC applications. eMarketer (2007c) for example stated that female Internet users are more likely to be influenced by friends' recommendations than by market-based information. Other research reported that there are gender differences in the impact that travel reviews exert on different aspects of decision-making, with females users gaining most benefit from using reviews (Gretzel & Hyan-Yoo, 2008). Age differences were also found. For example, those aged 65 years or over are less likely to read other travellers' reviews, whilst younger travellers find reviews more important in deciding where to stay (Gretzel & Hyan-Yoo, 2008). Additionally, frequent travellers value peer reviews the most and are more likely to be influenced by them (Gretzel, Yoo & Purifoy, 2007).

Travel 2.0 applications are, however, not without their problems. The proliferation of sites and the sheer quantity of reviews, comments and feedback available online can complicate the decision-making process because consumers often do not have the time or the capability to examine all the data or compare all the options (Bellman, 2006). Furthermore, Travel 2.0 applications give people the possibility of maintaining their anonymity, allowing them to publish comments anonymously or under a false identity (Puri, 2007). It follows that tourism and hospitality managers can also pose online as consumers and then post positive comments about their company and/or negative reviews about their competitors (Litvin, Goldsmith & Pan, 2008).

Credibility, authenticity and trustworthiness are therefore important issues for the UGC applications available online and are becoming even more important and significant because they affect the capability of Travel 2.0 applications in influencing and directing tourist decision-making.

For marketing strategies to be efficient, it is therefore crucial to know to what extent tourists consider the different types of Travel 2.0 applications to be trustworthy and whether these applications do in fact exert different influences over the way tourists perceive company image and make their decisions.

Research has only recently started to analyse the influence exerted by the different Travel 2.0 applications on tourist decision-making. A survey carried out on a sample of 1,900 American tourists who usually buy tourist services over the Internet showed that tourist behaviour is affected, in decreasing order of importance, by (PhocusWright, 2009): reviews in online travel agencies (50%), traveller-generated photography and virtual tours (43%), online travel reviews from travel experts (41%), professional photography and virtual tours (39%), web sites with traveller reviews (33%), professional online travel videos (29%), traveller-generated online travel videos (28%), travel blogs (22%), social networks-people you know (22%), social networks-people you do not know (15%), and travel-related podcasts (13%). Another study (Yoo, Lee, Gretzel & Fesenmaier, 2009) on a sample of 1,170 American tourists indicated that UGC is most credible when posted on: official tourism bureau websites (41.2%), travel agency websites (36.8%), third-party 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 photo and video sharing sites such as YouTube (10.7%). To sum up, the aforementioned research underlined that tourists' choices are influenced more by reviews and comments on Online Travel Agencies (OTAs) than those on tourism-related social networks.

However, research on the credibility and trustworthiness that tourists show towards different Travel 2.0 applications is still in its infancy. A study was therefore carried out to investigate the extent to which tourists express different degrees of trustworthiness towards the different types of Travel 2.0 applications and whether these applications exert different influences on the company's perceived image and on the tourists' choices. Since current statistics show gender differences, the study also examined whether these differences exist within the topics considered in the present study.

3 Methodology

The present study was conducted both to assess how trustworthy tourists feel the different Travel 2.0 applications to be and what influence they exert on the way tourists perceive company image and make their choices. The following Travel 2.0 applications were considered: forums on the company's web-site, tourism-related blogs, photo sharing, video sharing, Online Travel Agencies with booking and rating/review functions (OTAs), tourism-related social networks, non tourism-related social networks, and microblogging.

A snowball sampling technique was used (Wrenn, Stevens, Loudon & David, 2007) allowing the study to reach people from all regions of Italy. The survey used was divided into three parts.

The first part displayed a list of the different Travel 2.0 applications and then asked people if they had ever had experience in using them. Only people giving a positive answer to this question were allowed to complete the questionnaire. Respondents were then asked to reply to some general demographic questions (gender, age, marital status, family income, education and employment).

The second part asked respondents to assess a) how often they use the Internet for general purposes and, in particular, for choosing hotel accommodation, b) whether they assess their involvement with and attachment to forums, blogs and social media to be important aspects that influence them to use UGC applications for their travel planning, c) how often UGC sources induce them to alter their decision once it has been taken, and d) what is the best combination of positive and negative information posted online about a hotel that makes UGC sources credible and trustworthy.

Finally the third part asked respondents to assess, from their point of view, the trustworthiness of different Travel 2.0 applications, as well as the influence these applications exert on the way they perceive the company's image and make choices. A 7-point Likert scale was used (1 = very low 7 = very high) to indicate their answers. Before sending the questionnaire out to the participants, a pilot test on a small sample of Italian tourists was carried out to verify the validity of its content and the comprehensibility of both the questions and the scale used to make the assessments.

Allowing for a two-week survey period, a total of 1,209 questionnaires were returned, of which 823 were complete and could be used for statistical analysis.

The results presented in this paper were obtained entering data into an SPSS database (SPSS version 17.0) in order to be manipulated and analysed. In particular, results were obtained using descriptive analyses, while a One-Way ANOVA with a Post Hoc Bonferroni test was used to assess if there were significant statistical differences between the way tourists assess the trustworthiness of different Travel 2.0 applications as well as the influence these exert on the way tourists perceive company image and make their choices. Furthermore, a Two-Way ANOVA using STATA software was carried out to investigate whether any gender differences exist in the way tourists assess the trustworthiness of Travel 2.0 applications and its influence both on company image and on their choices.

4 Results

4.1 Profile of sample

More female respondents (57.4%) than male respondents (42.6%) completed the survey and the majority can be considered to be frequent travellers, as 56.3% of them travel four or more times a year. Most respondents reported to being single (74.1%), among these, 3.3% have children and 70.8% do not. The number of people who reported to being married was 25.9%, among these 14.6% have children and 11.3% do not. The largest age group was composed of those between 25 and 34 years of age. Only 16.5% were between 18 and 24 years of age, 19.3% were between 35 and 44 years of age, 6.4% were between 45 and 54 years of age, 1.7% were between 55 and 64 years of age and 0.2% were 65 years of age or over. Most respondents reported having a university or postgraduate degree (57.3%) whereas 35% had a secondary school qualification. Types of employment of the respondents were: administrative or clerical worker (29.5%), free-lance (22%), teacher or professor (3.7%), manager (2.9%), manual worker (2.9%), trader (1.2%) and other jobs (37.8%).

According to the terminology used by Li and Bernoff (2008), only a small number of respondents can be considered to be UGC "creators" or "critics", as only a very small percentage reported that they always (1.4%) or almost always (5.25%) post online reviews, videos or photos, whereas 29% of them do so sometimes. A significant percentage of them never do so (36.1%) or almost never do (28.3%). Respondents stated that the involvement and attachment to the community which forms around the social media they use are two quite important factors affecting their decision to use Travel 2.0 to help them make their choices (mean = 4.12, s.d = 1.688).

The analyses showed significant gender differences in terms of attitude in posting their reviews, videos and photos online. In particular, female respondents (67.3%) do so more than male respondents (63.2%) [$X_{(12)} = 9.771$ $p < 0.05$]. Gender differences also emerged in terms of the importance that respondents gave to the involvement and attachment towards the community which forms around social media when they are choosing their accommodation. Female respondents considered these two dimensions to be more important (mean = 4.23 s.d = 1.674) than male respondents (mean = 3.97 s.d = 1.700) [$t = -2.116$, $df = 791$, $p < 0.01$].

4.2 Trustworthiness of Travel 2.0 applications and their influence on tourist decision making

On the whole, respondents reported that they consider comments and reviews posted online to be more trustworthy when there is the same proportion of positive and negative comments (51.2%), or when the latter are less than the former (39.9%). Moreover, analyses highlighted that UGC applications influence tourist decision making even once people have made their choices. Respondents reported that, after having read reviews and comments posted online, they changed their hotel accommodation sometimes (64.8%), almost always (12%) or always (0.5%). As Table 1 shows, OTAs with booking and rating/review functions are seen to be the most trustworthy and, at the same time, they exert the most influence on both the way tourists perceive hospitality companies' image and make their choices. It can be

argued that this occurs because people know that OTAs allow tourists to post reviews and comments only after they have actually spent their holidays in that hotel.

Table 1. Trustworthiness of Travel 2.0 applications and their influence on tourists' choices: One–Way ANOVA and Bonferroni Test

N = 823	Trustworthiness	Influence on company image	Influence on tourists' choices
Forum on the company's web-site	4.12*	4.27*	4.23*
Tourism-related blogs	4.81	4.62	4.61*
Photo sharing	4.47*	4.38*	4.35*
Video sharing	4.54*	4.36*	4.35*
OTAs with booking and rating/review functions	4.95	4.84	4.91
Tourism-related social networks	4.63*	4.47*	4.46*
Non tourism-related social networks	3.90*	3.78*	3.71*
Microblogging	3.21*	3.12*	3.09*
*The mean difference is significant at 0.05 level			

In particular, as regards to trustworthiness, the following are rated in decreasing order: OTAs with booking and rating/review functions, tourism related blogs, tourism-related social networks, video sharing, photo sharing, and forums on the company's web-site, non tourism-related social networks and microblogging. The same order basically applies for the influence which Travel 2.0 applications exert on company image (with the exception of photo sharing applications that come slightly below video sharing applications) and on tourist decision-making (where photo sharing applications and video sharing applications show the same mean rating).

A Post Hoc Bonferroni test was carried out in order to verify whether significant differences exist in the way OTAs with booking and rating/review functions affect trustworthiness, company image and tourists' choices compared to other Travel 2.0 applications. Analyses found that significant statistical differences do not exist between OTAs and tourism-related blogs either for trustworthiness or their influence on company image, highlighting that for these dimensions the two types of Travel 2.0 show the same rating. On the contrary, web portals show significant statistical differences compared to all other Travel 2.0 applications in the way they influence tourists' decision-making behaviour.

4.3 Trustworthiness of Travel 2.0 applications and their influence on tourist decision making: Do gender differences exist?

Since current statistics show gender differences, the present section of the study aims at examining whether these differences also exist for the topics considered in the present research. The analyses show that there are significant differences in the way male and female respondents consider comments and reviews posted online to be credible and trustworthy [$X_{(12)} = 9.034$ $p < 0.05$]. Female respondents are more likely than male respondents to agree that trustworthiness is greater when there is the same

proportion of positive and negative comments (female respondents: 51.7%, male respondents: 50.5%) or when the latter are less than the former (female respondents: 42%, male respondents: 37.1%).

Gender differences were also found in the likelihood that male and female users change their accommodation after having read reviews and comments posted online [$X_{(12)} = 9.447$ $p < 0.01$]. Adding the number of "always" and "almost always" answers, female respondents do so more frequently (14.8%) than male respondents (9.4%).

A Two-Way ANOVA was carried out to investigate whether any gender differences exist in the way tourists assess the trustworthiness of Travel 2.0 applications and its influence both on company image and on their choices.

Table 2. Two-Way ANOVA: gender differences, Travel 2.0 applications and their interaction (p-values)

N = 823	Trustworthiness	Influence on company image	Influence on tourists' choices
Gender	0. 000	0. 000	0. 000
Travel 2.0 applications	0. 000	0. 000	0. 000
Gender * Travel 2.0 applications	0. 317	0. 074	0. 154

Table 3. Trustworthiness of Travel 2.0 applications and their influence on image and tourists' choices (by gender): One–Way ANOVA and Bonferroni Test

	Trustworthiness		Influence on company image		Influence on tourists' choices	
	Males N = 351	Females N = 472	Males N=351	Females N = 472	Males N=351	Females N = 472
Forum on the company's web-site	3.77*	4.39*	3.80*	4.61*	3.84*	4.51*
Tourism-related blogs	4.66	4.92	4.42	4.77	4.45	4.72*
Photo sharing	4.20*	4.67*	4.09*	4.60*	4.06*	4.57*
Video sharing	4.30	4.72*	4.20	4.65*	4.13*	4.52*
OTAs with booking and rating/review functions	4.71	5.14	4.57	5.05	4.62	5.13
Tourism-related social networks	4.36	4.83	4.21	4.66*	4.21	4.64*
Non tourism-related social networks	3.74*	4.02*	3.61*	3.90*	3.57*	3.81*
Microblogging	3.05*	3.34*	2.93*	3.27*	2.94*	3.20*
*The mean difference is significant at 0.05 level						

Gender differences were found in the level of trustworthiness tourists give to each Travel 2.0 application and in the way they perceive that these applications affect both company image and their own choices (Table 2). Specifically, female respondents gave a mean assessment that was always higher than that given by the male respondents (Table 3). According to the findings shown in Table 1, the Two-Way ANOVA confirms that significant differences exist in the way the different Travel 2.0 applications affect trustworthiness, company image and tourists' choices (Table 2).

Finally, Table 2 highlights that the interaction between gender and Travel 2.0 applications is not significant. This means that female and male users basically make the same assessment about the degree in which the different Travel 2.0 applications affect trustworthiness and influence company image and their choices. In particular, the most trustworthy and influential are always OTAs with booking and rating/review functions for both male and female respondents (Table 3). Finally, using One-Way ANOVA, Table 3 shows the significant differences between OTAs and all the other applications divided by gender.

5 Conclusion

Recently researchers have started to analyse the credibility and trustworthiness tourists give to the different Travel 2.0 applications contributing, in this way, to clarify to what extent they affect tourists' attitudes and purchasing decisions. However, research on this topic can be considered still poor and in its infancy. For this reason, an online survey was conducted on a sample of Italian tourists in order to help fill in some of these gaps. Since current statistics show gender differences, the study also aimed at examining whether these differences also exist for the topics considered in the present study.

The survey results provide some interesting insights. Italian UGC users are highly educated and use the Internet extensively both for general purposes and for choosing their holiday accommodation, thus confirming prior research carried out in other countries (Gretzel & Yoo, 2008). According to Li and Bernoff (2008), they can be considered spectators rather than creators or critics, as they use UGC applications, but do not often contribute to creating them. Gender differences were found in terms of attitude about posting reviews, videos and photos online, with female respondents doing so more frequently than male respondents. Involvement in the community which forms around social media is considered by respondents to be quite an important factor in affecting their decision to use Travel 2.0 applications, with female users considering this dimension more important than male users. These two points might be explained by reference to the different ways in which male and female users express their personality, but further research would be needed to examine this proposition.

UGC applications quite often cause tourists to change their accommodation even once their decision has been taken and their trustworthiness is assessed by tourists as being higher when there is the same proportion of positive and negative comments and reviews.

The results further suggest that both the degree of trustworthiness felt by the tourist towards the different types of Travel 2.0 applications and the influence these applications exert on the way tourists perceive company image and make their choices, change according to the specific type of Travel 2.0 applications considered. OTAs, for both female and male respondents, are considered to be the most trustworthy and therefore exert the most influence on company image and tourist choices. In order of importance OTAs are followed by: tourism-related blogs, tourism-related social networks, video sharing, photo sharing, forums on the company's web-site, non tourism-related social networks and microblogging. Regarding trustworthiness and the influence on company image, results show that there are no statistical differences between OTAs and tourism-related blogs. On the contrary, the influence that OTAs exert on tourist choices is always statistically different to that exerted by all other Travel 2.0 applications. On the whole, our conclusions partially confirm those of prior research carried out in the United States, where OTAs were found to be the most credible Travel 2.0 applications, while non-tourism related social networks were found to be the least trustworthy. Nevertheless, photo and video sharing sites were found to be less credible in the United States than in Italy (Yoo, Lee, Gretzel & Fesenmaier, 2009). The weakness of non tourism-related social networks seems to confirm that most consumers regard them as a way to contact friends and not as a means to gather information about products and/or services or to keep in touch with companies (Carrera *et al*., 2008).

Gender differences were found in the trustworthiness tourists express toward each Travel 2.0 application, and in the way they perceive that these applications affect both company image and their choices. Specifically, female respondents gave a mean assessment that was always higher than that given by the male respondents. However, findings also highlight that female and male respondents basically make the same assessment about the degree in which the different Travel 2.0 applications affect trustworthiness and influence company image and their choices. In particular, the most trustworthy and influential are always OTAs with booking and rating/review functions for both male and female respondents.

These conclusions are relevant for both researchers and hospitality managers. On the one hand, they contribute to deepening the scientific debate on the trustworthiness and influence of the different Travel 2.0 applications. On the other, the findings provide support to the marketing and communication strategies of hospitality marketers who have to develop, monitor and manage their corporate brand in a practically infinite virtual domain. Research findings suggest that hospitality marketers should run their marketing and communication activities splitting their time and financial resources between different Travel 2.0 applications differently, and paying attention to other differences, such as the gender and age of their customers. This latter point is important because of the different way tourists trust Travel 2.0 applications and behave towards them when making their decisions and in the post-travel phase. As the findings seem to indicate that Italian tourists are basically 'spectators', the present study suggests that hospitality marketers should provide incentives to their customers to post online reviews, videos and photos.

Although the study helps to fill a gap in knowledge that still exists in the literature, limitations remain. Firstly, the study was carried out on only a sample of Travel 2.0

users. Secondly, its findings cannot be generalised because of the particular method of sampling used (i.e., snowball sampling). Finally, the study analysed the credibility and trustworthiness of Web 2.0 applications focusing only on individual content being posted and not considering the characteristics of the person who actually made the posting. Future research is therefore needed to address these points and to investigate why Italian tourists seem to use UGC sites posted by others but are not themselves good creators of UGC.

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Dynamic Social Media in Online Travel Information Search: A Preliminary Analysis

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Abstract

With a growing amount of consumer generated content in assisting travellers' decision making, social media are becoming an increasingly important tool for marketers and tourist destinations alike to engage online consumers. Following from recent literature on online travel information search, this study focuses attention on the dynamic nature of social media on the Internet. Based upon longitudinal data retrieved periodically from a mainstream search engine, this study investigates various aspects of social media with respect to their change over a period of one-year. This study provides a preliminary understanding of the dynamic nature of social media in travel information search and offers useful insights for online marketing in tourism.

Keywords: Social media; Web 2.0; travel information search; search engines; Internet marketing; social media marketing.

1 Introduction

The tremendous growth of the Internet has changed the way travel-related information is distributed and accessed (TIA, 2008; Werthner & Klein, 1999; Xiang, Wöber, & Fesenmaier, 2008). In recent years, one of the mega trends on the Internet took place as the so-called "social media" including websites like YouTube and Facebook are playing an increasingly important role in our daily life. In travel and tourism, websites such as TripAdvisor and VirtualTourist have generated significant impact on the consumption and distribution of travel products (Xiang & Gretzel, 2010). Since more and more travellers will tap into this new source of information and knowledge, this will pose challenges to the established marketing practices of many tourism businesses and destinations (Blackshaw, 2006; Gretzel, 2006; Litvin, Goldsmith, & Pan, 2008; Sigala, 2008).

Marketing through social media requires a change of focus, re-allocation of resources, and deployment of new strategies (Sigala, 2008). As such, marketers must have a solid understanding of the nature of social media pertaining to their target markets. While there is a growing body of research on social media in travel and tourism, it is argued that the role of social media is not well understood in terms of the way they affect consumers' access and use of travel-related information online. Built upon recent literature, particularly Xiang and Gretzel (2010), the goal of this study is to investigate social media within the dynamic context of online travel information

search. Specifically, this study focuses attention on the changes of social media over a certain time period within the context of a traveller's use of a search engine for travel planning purposes.

2 Related Literature

It is important to understand the new technological environment because current trends on the Internet not only provide opportunities but also create serious challenges for the industry (Buhalis & Law, 2008). Travellers access travel-related information in various ways during the trip planning process (Pan & Fesenmaier, 2006). Social media, along with other technological developments on the Internet, provide new drivers of change for tourism marketing. This section reviews relevant literature and provides the rationale for the current study.

2.1 Importance of Social Media for Travel and Tourism

Social media can be generally understood as Internet-based applications that primarily contain consumer generated content (Blackshaw, 2006). Different from content provided by marketers and suppliers, social media are produced by consumers and meant to be shared among each other. Many of social media websites assist consumers in posting and sharing their comments, opinions, and personal experiences, which then serve as information for others. Obviously, from consumers' viewpoint the value of using social media to a great extent lies in its richness as personal experiences and trustworthiness as electronic word-of-mouth (Gretzel, 2006; Litvin *et al*., 2008; Pan, MacLaurin, & Crotts, 2007; Pudliner, 2007; Pühringer & Taylor, 2008; Tussyadiah & Fesenmaier, 2009).

Although social media is a recently coined term, research on consumer generated contents in travel and tourism is not new as exemplified by the early studies on online tourists communities (e.g., Wang & Fesenmaier, 2003). More recently, new applications have emerged to contribute to the online information exchange among consumers. Particularly, the so-called Web 2.0 offers a range of applications such as RSS, mash-ups, tagging, wikis, forums, reviews and evaluation systems, virtual worlds, podcasting, blogs, and photos/videos sharing. Generally speaking, the growing body of research on social media focuses attention on its use as well as impact on travel decision making, the creation and sharing of tourism experiences, as well as the implications for marketing practices (Gretzel & Yoo, 2008; Mack, Blose, & Pan, 2008; Pudliner, 2007; Pühringer & Taylor, 2008; Sigala, 2008; Tussyadiah & Fesenmaier, 2009; Waldhör & Rind, 2008). In the hotel sector, studies have also been conducted to understand and assess the impact of social media on consumer decision making and direct booking (Vermeulen & Seegers, 2009; Ye, Law, & Gu, 2009).

2.2 Role of Social Media in Online Travel Information Search

As the use of search engines grows to become one of the primary modes in traveller's use of the Internet (Hopkins, 2008; TIA, 2008), it is important to understand changes

in the online tourism domain that affect travel information search (Xiang *et al.*, 2008). As such, another line of research on social media emphasizes its role in online travel information search. Xiang and Gretzel (2010) recently examined the extent to which social media are represented as search results in Google. Their study clearly showed the growing impact of social media on travellers who are looking for travel products online. It revealed the ubiquity of social media websites in online travel information search in that social media websites occurred everywhere (i.e., on different search results pages in Google and for different tourist destinations), regardless the search keywords a traveller uses. Certain social media websites such as TripAdvisor, VirtualTourist, and IgoUGo are becoming increasingly popular and are likely to evolve into primary online travel information sources. In addition, the growth of social media is not only represented by these frequently used websites but also by the existence of different types of social media and numerous small websites. Particularly, blog sites (e.g., Travelpost and Blogspot) and social networking sites (e.g., Meetup) are making inroads into the territories that used to be dominated by traditional suppliers. The results confirm that tourism marketers can no longer ignore the role of social media in distributing travel-related information without running the risk of becoming irrelevant.

2.3 Research Questions

Given the continuous growth of the Internet it is expected that the composition of the online tourism domain will continue to evolve and change. Considering social media is a fairly recent phenomenon on the Internet, it is important to understand the direction of the development. Also, recent studies (e.g., Pan, Xiang, Fesenmaier, & Law, 2010a; Pan *et al.*, 2010b) on the role of search engines in online travel information search have shown that there are substantial changes in the way search engines represent the online tourism domain over time. That is, the online tourism domain represented by a search engine is dynamic. However, existing studies, e.g., Xiang and Gretzel (2010), only provide a cross-sectional analysis of the current status of social media. It is, thus, argued that, from a marketing perspective, managers must keep track of the dynamics in online information search, particularly in the domains related to social media for travel. Therefore, the following research question was raised to guide this study:

> How does the domain of travel-related social media change over time within the context of using a search engine for trip planning?

3 Methods

Following from Xiang and Gretzel (2010), this study employed a similar method to retrieve search engine results from Google by mimicking a traveller's use of the search engine for travel purposes. Google was chosen due to its dominant status in the online search market (Bertolucci, 2007). Given the exploratory nature of the study, New York City was selected for the analysis as a single tourist destination. A total of 34 search queries were constructed using the destination name (i.e., New York City)

and keywords recommended by Google AdWords Keyword Tool (http://adwords.google.com) based upon their popularity during a certain time period. These queries were related to lodging, attraction, dining, shopping, nightlife, transportation, and general travel-related information categories in order to generate relatively comprehensive search scenarios related to travel planning.

A Web crawler program written in Perl programming language was used to enter those queries into Google and retrieve textual search results automatically from the top 10 search result pages (SERPs). Retrieved data were saved in a plain text format for later processing. While the data collection has been on-going for more than one year, analysis in the present study only focused on the date collected during a one-year period starting from September, 2009 to August, 2010. The rationale for selecting this time period was to keep the main vacation times in the United States (summer and winter vacations) uninterrupted. Data collection was conducted once every month (on the same week day to maintain the consistency) with approximately same intervals, resulting in twelve data points throughout this one-year time period.

Data analysis involved content analysis to identify social media websites and descriptive analysis based upon the unique domains of social media identified throughout the one-year period. This was accomplished in several steps: First, content analysis was performed to identify social media websites among the search results retrieved at the beginning (i.e., September 2009) and end (i.e., August 2010) of the data collection period. Two human coders were used to go through all the search results generated based upon these 34 queries on New York City to identify top-level domain names (e.g., www. TripAdvisor.com), which consist of primarily social media contents. In case a disagreement occurred, the researcher would intervene and reconcile the coding result. Second, a series of descriptive analyses were conducted to show 1) the extent to which the entire domain of travel-related information consists of social media contents; 2) the composition of the social media websites; and, 3) how these social media websites evolved over this time period.

4 Findings

There were some minor variations during the 09/2009-08/2010 time period in Google's representation of the domain in terms of number of search results on a single SERP. On average, there were 101,642 search results each time from the first 10 SERPs in Google using the 34 queries, ranging between 101,122 and 101,779. Content coding of Google search results identified a total of 6,427 domains, with the range from 500 to 555 every month, as social media sites throughout the one-year time period. To show the proportion of social media within the entire domain defined by the 34 queries, Figure 1 shows the distribution of the percentages of social media during the 12-month period. As can be seen, overall the proportion of social media among the entire domain represented by Google was consistent, with an average of approximately .53%. It seems the percentage of social media was declining at the end of this period. However, with only one year data the result is inconclusive.

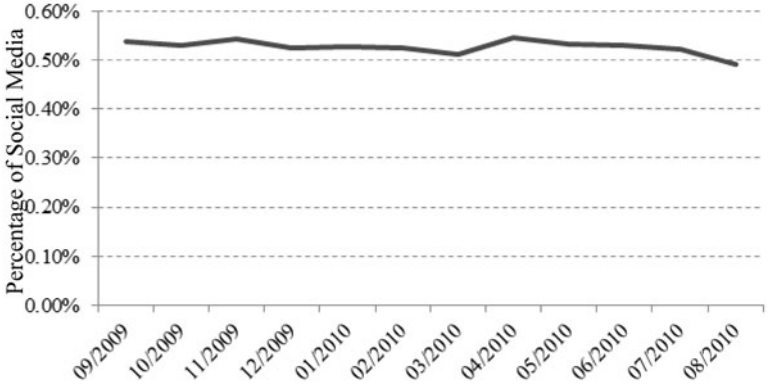

Fig. 1. Percentage of Social Media Websites among All Search Results over One Year Period

Table 1 lists the top unique social media domains along with their total frequency, average frequency per query, and percentage among all social media domains. As can be seen, the top five domains, i.e., TripAdvisor, Wikipedia, CitySearch, VirtualTourist, and Fodors constitute about 30% of the total frequency of all social media domains. The top 20 domains constitute over 60% of the total frequency of all social media domains. Consistent with the Xiang and Gretzel (2010) study, it seems the distribution of social media domains has a structure wherein a handful of top domains represent a substantial proportion of the domain while a "long tail" represents a large number of domains with very low frequencies. As in the Xiang and Gretzel study TripAdvisor emerged as the number one domain in social media in terms of number of times being displayed as search results in Google. However, it is also interesting to note websites such as CitySearch and Travelandleisure seemed more popular in the case of New York City compared to the Xiang and Gretzel study. This may reflect the idiosyncrasies of the tourism domain for a specific city compared to other destinations.

In order to illustrate the dynamics of individual social media websites over time, Figure 2 shows the distribution of the frequencies of the top 10 social media domains during the 12-month period. As can be seen, there were considerable variations for some of these websites over this time period. For example, at the peak month (i.e., March 2010) TripAdvisor was displayed 57 times as search result in Google while only 40 times at the end of the data collection period (i.e., August 2010). Another interesting case is NileGuide whose presence in Google jumped quickly from a frequency of 6 in November 2009 to 17 in December and then to 27 in January 2010. As shown in the graph, its growth in this short period seemed to contradict to a general trend of decrease among other social media websites. This might be the sign of sudden growth of one website within the social media domain.

Table 1. Top 20 Social Media Domains

Domain	Frequency	Avg. Freq. Per Query	Percent	Cumulative Percent
tripadvisor.com	604	1.48	9.4%	9.4%
wikipedia.org	376	0.92	5.9%	15.2%
citysearch.com	324	0.79	5.0%	20.3%
virtualtourist.com	307	0.75	4.8%	25.1%
fodors.com	295	0.72	4.6%	29.7%
yelp.com	188	0.46	2.9%	32.6%
travelandleisure.com	186	0.46	2.9%	35.5%
parentsconnect.com	183	0.45	2.8%	38.3%
nileguide.com	161	0.39	2.5%	40.8%
concierge.com	160	0.39	2.5%	43.3%
lonelyplanet.com	153	0.38	2.4%	45.7%
zagat.com	148	0.36	2.3%	48.0%
craigslist.com	135	0.33	2.1%	50.1%
away.com	118	0.29	1.8%	51.9%
letsgo.com	114	0.28	1.8%	53.7%
travelpod.com	111	0.27	1.7%	55.4%
blogspot.com	109	0.27	1.7%	57.1%
mommypoppins.com	109	0.27	1.7%	58.8%
tripcart.com	102	0.25	1.6%	60.4%
associatedcontent.com	88	0.22	1.4%	61.8%

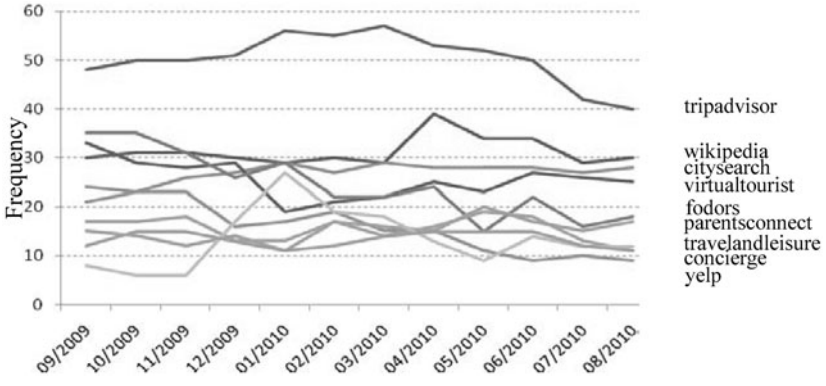

Fig. 2. Change of Top Ten Social Media Domains over One-Year Period

Since ranking in a search engine is an extremely important factor in influencing search engine users, the percentage of a website's occurrences on the first search engine result page can be used as an indicator of this potential impact. Figure 3 plots the percentages of the top 10 social media websites occurring on the first Google SERP during the 12-month period. On average, CitySearch was the number one "high

performer" with approx. 40% of its occurrences displayed on the first Google SERP, followed by TripAdvisor (avg. 30%), Fodors (avg. 30%), and Wikipedia (avg. 25%). On the other hand, websites such as TravelandLeisure (avg. 5.5%), NileGuide (avg. .6%), Yelp (avg. .4%), and Concierge (avg. .0%) had very low presence on the first SERP. Also, for some of these websites there were considerable variations during this 12-month period. For instance, in the two months of December 2009 and February 2010 nearly half of the occurrences of CitySearch were from the first SERP. However, in August 2010 its presence on the first SERP dropped to less than 30%, which might indicate the loss of its popularity.

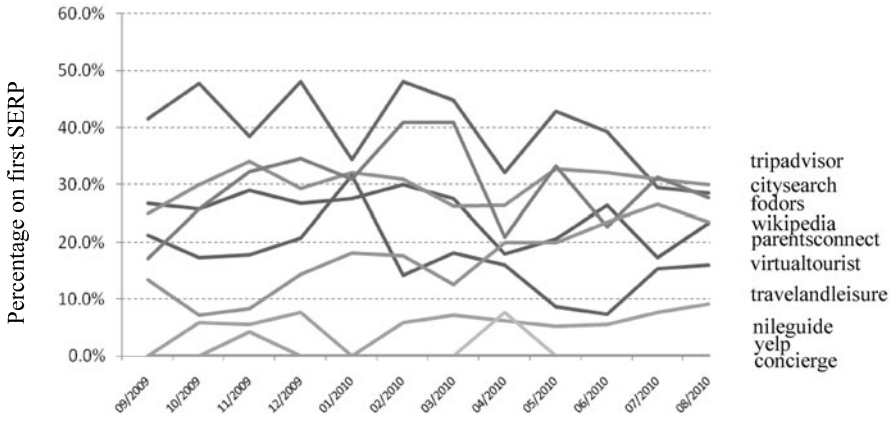

Fig. 3. Distribution of Percentages ofTop Social Media Domains on First SERP

To show the extent to which social media were displayed in Google SERPs based upon different search queries, social media websites were extracted from the data along with the pre-selected 34 search queries and then their frequencies were calculated. The top ten search queries generated approximately 46% of the total frequency of all social media websites. They include, from high to low: "fun places" (5.2%), "food" (5.1%), "travel guide" (4.9%), "activities" (4.9%), "things to do" (4.7%), "restaurant" (4.5%), "travel" (4.4%), "dining" (4.4%), "family fun" (4.2%), and "nightlife" (4.2%). Understandably, these search queries represented the "hot" topics in the social media domain. To further understand the structure of these domains, Figure 4 plots the cumulative percentages of social media websites in relation to search queries. As can be seen, this curve looks fairly close to a straight line, suggesting social media were ubiquitous among information domains defined by these search queries in Google.

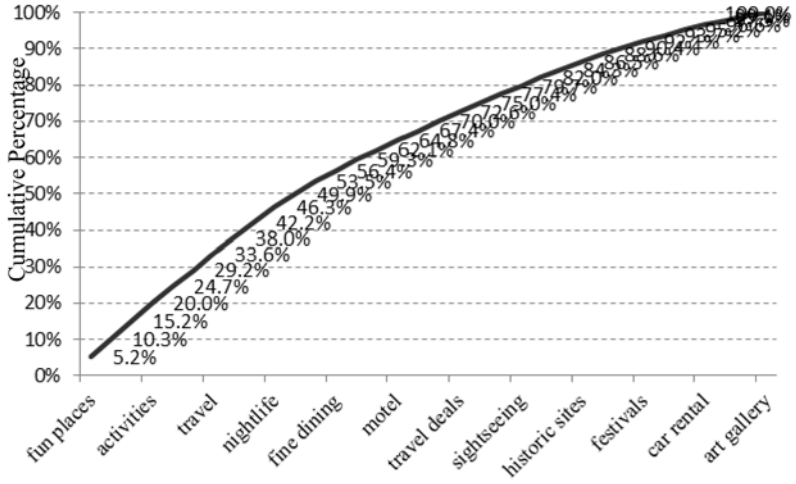

Fig. 4. Cumulative Percentages of Social Media Websites based upon Search Queries

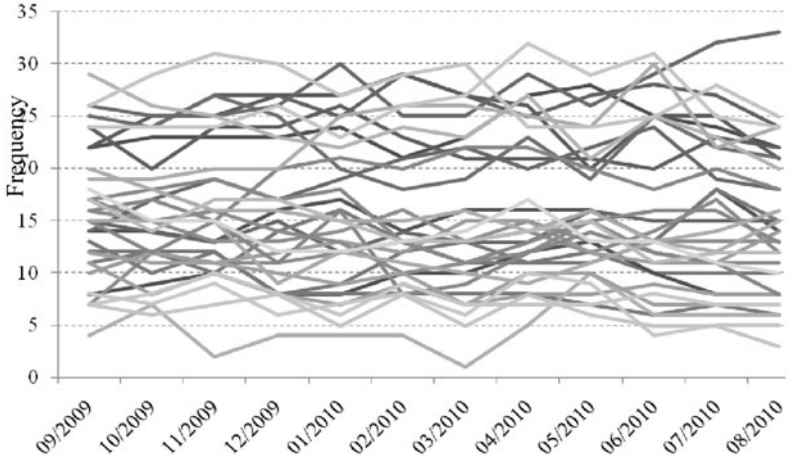

Fig. 5. Distribution of Social Media Domains based upon Search Queries Over Time

Figure 5 plots the frequencies of social media websites in relation to the 34 queries over the 12-month period. Interestingly, there seemed to be two "layers" among these search queries in terms of the amount of social media websites generated. The first layer includes queries such as "fun places", "food", "dining", "family fun", "things to do", etc, while the second layer consists of queries such as "attractions", "park", "downtown", "transportation", and "travel deals", etc. It seems that, for individual queries, the amount of social media generated over this period was relatively stable, except in a few cases such as "fun places", "art gallery", "nightlife", and "shopping", where there were considerable "waxes and wanes". This may reflect the seasonality in those queries.

5 Discussion

The fast changing technological environment requires marketers and managers to be equipped with fresh thinking and abilities to learn. Social media, along with other increasingly important tools and channels for online consumers, pose opportunities and challenges for tourism businesses and destinations. This study provides a preliminary analysis of the changing nature of social media based upon data retrieved over a "short" time period on the Internet. It contributes to our knowledge of social media for travel and tourism in several ways.

First, this study further confirms the existing understanding of the role of social media in online travel information search in that it shows social media websites constitute a considerable proportion of the tourism domain online within the context of using a search engine for trip planning purposes (Xiang & Gretzel, 2010). It seems the presence of social media in a search engine like Google is fairly stable over the time period of data collection. While this seems to contradict our expectation that there should be observable growth of the amount of social media, this finding may not be surprising given the limited length of time.

Second, consistent with the findings in Xiang and Gretzel (2010) it seems the domain of social media represented by Google consisted of a relatively small number of websites. There were variations among some of these websites, which may reflect the seasonality and dynamics of search over time. When it comes to website visibility, a few websites such as CitySearch and TripAdvisor had prominent presence in Google in terms of the percentage of their occurrences on the first Google SERP, while others were largely "buried" in SERPs that are far less likely viewed by search engine users.

Third, the findings of the study showed social media were ubiquitous in various search domains as defined by the pre-selected keywords. Although this was a limited pool of queries potentially related to travel, the findings clearly showed that all of these queries generated certain amount of social media websites. However, there were also considerable variations among these search domains in terms of amount of social media displayed by Google, which revealed the "popularity" of certain topics for online consumers to provide their reviews and share their experiences for a specific destination over a specific time period.

As pointed out by Pan *et al.* (2010a), today's marketing strategies for tourism businesses and destinations must be adaptive, and their ability to keep track of the dynamics in various tourism domains is a crucial success factor. This study demonstrated the dynamic nature of social media within the context of search engine use for travel purposes. As such, the findings of this study can be used to provide guidance for tourism and destination marketing online. For example, marketers will be interested in knowing the places to find the "hot" topics of social media. This study, by linking social media with the search domains in a search engine, offers a useful approach to facilitating this strategy. Also, visibility in a search engine is a useful measure to gauge a website's potential impact and effectiveness in influencing online consumers. As shown by this study, marketers can constantly keep track the

positions of those popular social media websites when there is a need to allocate necessary resources in their social media marketing strategies.

As a preliminary analysis, this study has a few important limitations. For example, the data were collected over a 12-month period. While this is arguably a long time on the Internet, whether it is long enough to capture significant changes of social media cannot be certain. Also, search results were retrieved from Google once a month instead of on a daily basis. As a result, this study is limited in the "granularity" of its data. Furthermore, this study only focused on one single destination. It would be more desirable to generate a pool of destinations that can better represent tourist destinations in general to improve the external validity of this research.

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When a Magazine Goes Online: A Case Study in the Tourism Field

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Abstract

In this paper, the digital hybridization of travel magazines is studied, presenting how they are using their online presence to extend their reach and expand their business. This is done by means of a grid, designed to cluster all the types of content and functionalities offered online by 120 different travel magazines, giving a synthetic overview of their actual use of the internet. Actually, when entering the online world, travel magazines get many elements that are not affordable on a printed paper, while at the same time losing other elements. But this process is not just a matter of adding or removing features; rather, it requires a deep re-consideration and re-invention of online travel communication itself, offering venues for new business models and for new agreements between the magazines and their readers, yielding to a new communication landscape.

Keywords: online travel magazines, travel magazine business models, digital hybridization

1 Introduction

In recent years media convergence has been one of the most important processes among media: digital media and the internet are pushing all earlier media to undergo a process of hybridization, and to start becoming virtual. Newspapers, radio and television (as well as magazines and other media) have been experiencing a mediamorphosis in the digital world and – the internet in particular – is pervading our everyday life experience (Fidler, 1997; Castells, 2009). While many research activities have studied this virtualization process in general (Lévy, 1998; Virilio, 2006; Baudrillard, 2002), there is still a need for vertical analyses, to better understand how media in specific niches shape and evolve under these circumstances. Although newspaper web sites have been regarded for a long time as electronic supplements and are seen by most publishers primarily as a means to protect their franchises and build circulation for their printed editions, they are evolving into something quite different. There is consensus, both academic and professional, that Internet publications have acquired a journalistic status at least equivalent to that of

other conventional media, such as the press, the radio and the television (Palacios and Diaz Noci, 2007). Communication companies now consider Internet as a strategic factor for their future development (PEJ, 2010; Angwin & Hallinan, 2005); more significant than the increase in the number of digital publications is their qualitative consolidation on the media market (Cornella, 2002; Aguado, 2004). Some publishers are adapting their online content and services to the inherent strengths of the web, which derive from a blend of interpersonal and document traits. Instead of merely replicating their paper editions online, they have turned their web sites into community forums and mediated knowledge stores, discovering how web 2.0 can enhance readers' involvement in the communication process (Carlini, 2003). In fact, these sites offer readers the opportunity to express their opinions and engage the paper's staff and community leaders in interactive discussions. They also provide their customers with a wealth of useful and timely community information that has been validated by journalists and offer convenient connections to other sites and services which may be of special interest. Besides, they are often connected with the most popular social networks, such as Facebook and Twitter, in order to spread content among the web community (Navasky & Lerner, 2010). By becoming the focal points on the web for people who have an interest in the communities they serve, newspapers are now able to operate reasonably profitable knowledge stores in cyberspace. As with electronic broadcast media, digital systems are providing both producers and consumers with greater control over the forms of print media (Fidler, 1997; Hanusch, 2009). Publishers can economically package and distribute information that is more current and tailored than their mechanically printed editions as well as add value through feedback and transactional services (Fidler, 1997; Zambardino & Russo, 2009). For readers, electronic editions will provide more convenience by allowing subscriptions to be fulfilled; greater access to background, explanatory and archived material; the ability to personalize and search content; two-way communication for immediate interactions with editors and advertisers (Fidler, 1997). This vision is based on the assumption that most people will still prefer general interest forms of print media, that are mediated and packaged by professional editors, and retain their brand-name identities and editorial context (PEJ, 2010). In this paper, the digital hybridization of travel magazines is studied in order to give a contribution in an undervalued research field. Thus, much of the existing empirical research on journalism focuses largely on hard-news journalism, at the expense of its less traditional forms, particularly the soft-news areas of lifestyle and entertainment journalism.

2 Literature

Travel journalism is at the intersection between information and entertainment, journalism and advertising. Moreover, its increasingly significant role in the representation of foreign culture makes it a significant site for scholarly research (Hanusch, 2009). Fürsich and Kavoori (2001) notes five reasons why travel journalism needs to be studied more deeply: (1) the boom of the tourism industry; (2) tourism and its impact remains under-studied; (3) leisure is a significant social practice; (4) travel journalism is an important site for international communication research; and (5) travel journalism has special contingencies as it is a highly-charged

discourse strongly affected by public relations. While there is a reasonably large body of work under the umbrella "media representations and tourism", many such studies are concerned not with journalism, but with media such as movies, government websites and other promotional materials, or even tourists' use of media. In addition to the traditional travel sections in most major national and regional dailies, a large number of general travel magazines are published, along with an extraordinary number of specialized travel publications dealing with interests as diverse as rock climbing or cruise vacations. The internet is a highly successful outlet for travel-related information. Travel sites of online services and travel-related web pages are among the most accessed websites on the internet. The increased prominence of travel journalism has relevance for scholars. International communication research has focused on the spread of news, entertainment or advertising in a global market (Reeves, 1993); when looking at the way national media represent foreigners and foreign cultures, studies usually analyze international news content in newspapers or on television. However, audience interest in 'hard' international news is waning while media representations of 'others' remain decisive factors in this era of globalization. Therefore, a research agenda of international communication studies should refocus by evaluating other media genres as well. Examining travel journalism is an important strategy for analyzing the ongoing dynamics of media globalization (Fürsich & Kavoori, 2001).

The hybridization of magazines refers to the theoretical context of virtualization. According to Lévy (1998), virtual is not the opposite of real: possible is the opposite of real and virtual is the opposite of actual. If real can been logically deducible from possible, moving from virtual to actual, and vice-versa, is an act of human creativity. The virtualization process includes three steps: the grammatical, the dialectical, and the rhetorical one. The digitalization phase embraces only the first and the second one. The first step is inventing a new grammar: the digital language. The second one – which introduces the dialectic between the real and the possible – is encoding a printed text into the digital language: that is the dialectical substitution of a material object with its digital matrix. If a printed text belongs to the domain of the real, its digital matrix belongs to the domain of the possible. We perceive a digital text as a richer one – in terms of possibilities of realize it in different ways – compared to a printed one. Both potentialization (moving on from the real into the possible, such as digitizing a printed text) and realization (moving on from the possible to the real, such as printing a digital text on paper) are logical operations performed by computers: there's no need for human involvement. The third or rhetorical step – which introduces the dialectic between the actual and the virtual – is creating a hypertext by transforming a text into a textual problematic (Lévy, 1998). This problematic exists only if we take into consideration the human-machine interaction and not only computer-based processes. A hypertext can't be logically deduced from the source text. It is the result of a series of decisions: adjustment of the size of the nodes and basic modules, arrangement of connections, structure of the navigation interface, etc. If digitalization is a logical operation performed by computers, virtualization (for instance, hypertextualization) is an act of human creativity (Lévy, 1998). Both virtualization (moving on from the actual to the virtual, such as transforming a text into a textual problematic or hypertext) and actualization (moving on from the virtual

to the actual, such as reading a hypertext by following your own path) are intentional operations (Lévy, 1998). The virtualization process is an ethical issue, because human will has a fundamental role both in determining its quality and building a collective intelligence (Lévy, 1997). The transition from printed text to hypertext is a form of virtualization (Lévy, 1997). This ascent turns the actual text into one of many possible figures in an available, mobile, freely reconfigurable, textual field, and thus connects it with other texts, incorporates it in the structure of other hypertexts and the various instruments of interpretation. By doing so, hypertextualization multiplies our opportunities for producing meaning and makes the act of reading considerably richer. Hypertext, hypermedia, or interactive multimedia thus continues an ancient process of artificializing reading (Lévy, 1998). Hypertext mechanisms represent an objectivation, exteriorization, and virtualization of the reading process. Digital hypertext could be defined as a collection of network-based multimodal information that can be quickly and "intuitively" navigated (Negroponte, 1996). If we define a hypertext as a space of possible readings, a text would then represent a particular reading of a hypertext. The navigator thus participates in the writing or at least the publishing of the text/s he "reads", since s/he determines its final organization (the *dispositio* of classic rhetoric). Online editions of travel magazines are very different from paper ones, because the virtualization process implies a deep reconsideration of the way in which information is organized and published (contents), the way in which writers and reader interact (functionalities), the way in which information can be acquired and shared. Online publishing has some positive and negative implications (Fidler, 1997). On the positive side, magazines have recognised brand names and the ability to promote their online sites extensively in their printed editions. On the negative side, online customers have tended to be attracted more too specialised information and interactive services than to the aggregated general interest information provided by established mainstream publishers.

3 Research Design

In this paper, the digital hybridization of travel magazines is studied, presenting how they are using their online presence to extend their reach and expand their business. This is done by means of a grid, designed to cluster the types of content and functionalities offered online by 120 different travel magazines in three different languages, giving a synthetic overview of their actual use of the Internet. The main objective of this study is to describe the domain of online travel magazines and to understand how websites are organized to find design patterns and business model patterns. Particularly, the study investigates: (i) the most complete websites, (ii) the most frequent design patterns and, (iii) the business model(s) of online travel magazines. The described approach employs a quantitative methodology that helps in finding and ranking content and functionalities of a large number of websites. This methodology investigates the presence of a given type of content or functionality in a set of given web sites (Cantoni et al., 2007). Being a quantitative approach, it does not provide information about the quality of the information or communication. The procedure is standardized: after choosing the domain and the sample web sites, the inspector should create an analysis grid based on indicators. One indicator is a piece of content or functionality given by a website; a piece of content or functionality to be

chosen as an indicator must be relevant both for the domain and for the end-users (Cantoni et al., 2007). The inspector accomplishes an explorative analysis browsing the sample web sites annotating all the features of each web site and/or taking into account the most important feature for the given web site or domain. A feature is listed as "content" when it defines information published as a text, image, audio, video; it is listed as a "functionality" when it defines an action that readers can do on the website, such as acquiring, sharing, producing information. When the indicator grid is complete, the group of websites is ready to be analyzed. The inspector goes through the websites allocating marks to them with respect to the indicators given in the grid; the grades are 1 and 0. Value 1 simply indicates that the object represented by the indicator is present; there is not any valuation on the quality of the information. Particularly the creation of the analysis instrument and the data collection is based on a five-step indicator-based methodology.

(i) Domain identification: The selection of the tourism magazines was suggested by recent studies concerning the increasing relevance of soft-news journalism in the editorial market. Hard news generally refers to up-to-the-minute news and events that are reported immediately, while soft news is background information or human-interest stories. Politics, war, economics and crime used to be considered hard news, while arts, entertainment and lifestyles were considered soft news. But increasingly, the lines are beginning to blur. One difference between hard and soft news is the tone of presentation. A hard news story takes a factual approach: What happened? Who was involved? Where and when did it happen? Why? A soft news story tries instead to suggest, entertain or advise the reader, and promises "news you can use." Besides, an interesting debate is being held on which strategies should be adopted by the editorial companies in order to respond to sales drops. In fact, as newspaper and magazine circulation continues to decline, publishing companies are adopting new means to increase customer affinity by offering free online content to print subscribers and other rewards similar to those made by the credit card and airline industries. Such programmes merge print with online world. Online behavioural targeting has emerged as new mantra. Traditional publishing companies are investing in electronic publishing whose contribution to revenues has been increasing. Acquisition of electronic publishing entities by traditional publishing companies corroborates the accent of electronic publishing in recent times. Also, entering in the e-tourism business is a big opportunity for editorial companies to find new business models. *(ii) Key players identification*: the second step is the identification of the main online editions of travel magazines. The study focused on the following languages: English, French, and Italian. Alexa.com has been used to select the 40 most popular online editions of travel magazines for each of the three languages. *(iii) Indicators identification*: The third step of this methodology is the identification of indicators to describe, in a quantitative manner, content and functionalities of every website, and the definition of an analysis grid with these indicators. A group of websites has been chosen randomly among the sample (i.e. 30%, n= 36); each website has been analyzed, and content and functionalities have been annotated on post-its. A card sorting activity helped to organize contents and functionalities, and to merge similar ones. According to Rosenfeld and Morville (2006), card sorting "can provide insight into users' mental models, illuminating the way that they often tacitly group,

sort and label tasks and content within their own heads." The technique has proved very useful in helping to organize several pieces of information or concepts. It entails providing a group of users with a set of cards. Written on each card there is a concept or piece of information from the information library that needs to be organized. Users then sort the cards with similar concepts into piles. The result suggests how users would organize a given set of concepts, which can be valuable information when organizing a system or Web site (Faiks & Hyland, 2000). In this context a so called closed card-sort technique has been adopted: "users are presented with the cards to be sorted and the names of groups that the cards should be sorted into" (Tullis, 2007). In this case it implies that categories have been already been identified, following to the narrative, and users have just assign each indicator to a category. The created grid presents 100 indicators, grouped into 7 main categories and 24 sub-categories. The 7 categories describe a narrative path and represent the following steps: the indicators grouped into the "Information about the magazine" (area 1) let us understand how the magazine presents itself to readers, as they ask "Who are the authors? Are they reliable?" The indicators grouped into the "Text" (area 2), "Audio" (area 3), "Photo" (area 4) and "Video" (area 5) areas let us understand what kind of content the magazine presents to readers, and what kind of functionalities they can use in order to share and even produce UGC (User Generated Content) using web 2.0 tools, such as social networks, as they ask "What can I find here? What can I do here?" The indicators grouped into the "Purchase process" (area 6) let us understand what kind of travel suggestions the magazine presents to the readers, and what kind of functionalities they can use in order to plan and book travels, as they ask "Where should I go on holiday? How can I plan and book my trip?" The indicators grouped into the "Community" (area 7) area allow us to understand what the readers can do when they register in the community forum, as they ask "What kind of functionalities can I use in order to produce and share content in the community?" *(iv) Website analysis and (v) Data Collection*: the inspector marks the presence or the absence of each indicator for each given web site (presence = 1, absence= 0). For example: 1 was assigned to indicator "Weather forecast" even when no weather info was actually on the website, because there was a link to the website of a forecasting service. In the same way, when no shopping catalogue is on the website and there is a link to a generic shopping catalogue (but not specific for travellers), 0 was assigned to indicator "Travel shopping catalogue". Please note that this is not a qualitative score: 1 simply means that the object represented by the indicator is on the website, but no evaluation of information quality is given, nor is the correct/smart positioning of the object in the navigation of the website considered. Figure 1 shows an example for the magazines data collection. Le Figaro Voyages has 100% of the indicators clustered into the "Contacts" category; Liberation Voyages has only 50%.

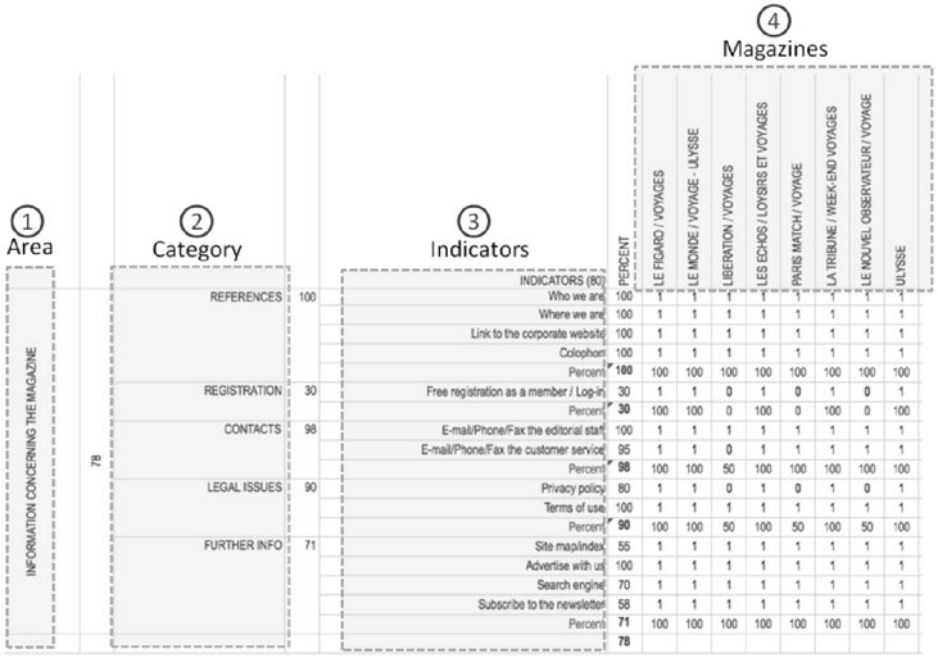

Fig. 1. Example of score for category. The red values are in percentage on total; the black ones are 1 and 0.

Figure 1 also highlights the way the analysis grid has been created: indicators (3) are grouped into categories (2) and in areas (1); journals (4) are then listed and values have been assigned to each magazine.

4 Results

In the next paragraphs, the results of the analysis are investigated. Particularly, (i) the most completed websites, (ii) the most frequent design patterns and (iii) the business model(s) of the online travel magazines are described. Figure 2 shows the most completed online magazines analyzed, from the 1st to the 60th position.

4.1 (i) the most completed websites. The highest presence of indicators was found in the travel dedicated section of the magazine "Guardian" (with the presence of 61 indicators) while the less completed magazine is "Viaggiando" (with the presence of 8 indicators).

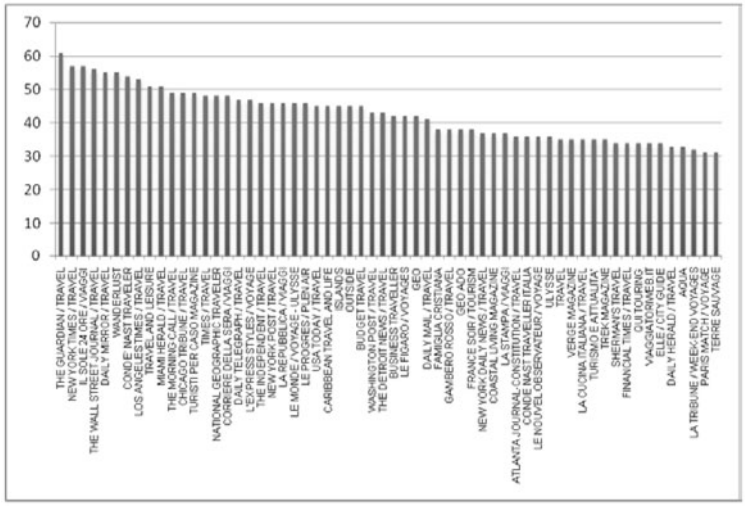

Fig. 2. The most completed online magazines analyzed, from 1st to 60th.

The following table describes the tendencies within the three markets:

Table 1. Results for each language market

Market	All markets	English	Italian	French
Average	32	42	26	27
Max Val.	61	61	49	46
Min Val.	8	19	8	11
Mode	23	45	23	27

Table 1 shows that among the three different markets, the English one seems to be the most interesting. It has the magazine which hosts the highest number of indicators and the highest mode, while Italian and French magazines are the ones less completed in terms of number of indicators. Analyzing the data, English online magazines analyzed, from the most to the less completed; 33 of them hold more than 30% of the indicators; 9 of them hold more than 50%. Italian online magazines analyzed, from the most to the less completed; 13 of them hold more than 30% of the indicators; 1 of them holds more than 50%. French online magazines analyzed, from the most to the less completed; 14 of them hold more than 30% of the indicators.

4.2 (ii) most frequent travel magazine web design patterns. Figure 3 shows the most frequent design patterns the online travel magazines analyzed. Macro areas indicators have been grouped to understand the value of each macro areas. Indicators have been normalized and presented in percentage.

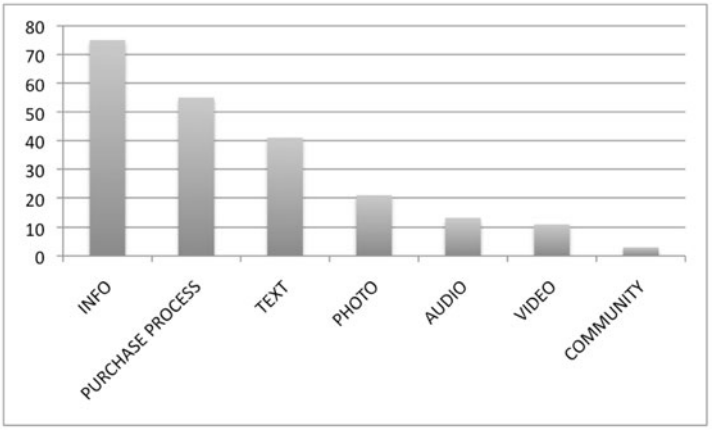

Fig. 3. Macro Areas indicators.

The macro area information about the magazine is the one which has got the highest number of indicators. Then the areas which collect all the purchase process indicators ranked second before the media sections (text photo audio and video).

Indicators for the 24 sub-categories are listed in Figure 4. Notably, the first three sub-categories refers to information (contact us and legal issues) and purchase process (in this case advertising) while the last ones refer to multimedia audio contents (media sharing, audio contents and audio functionalities).

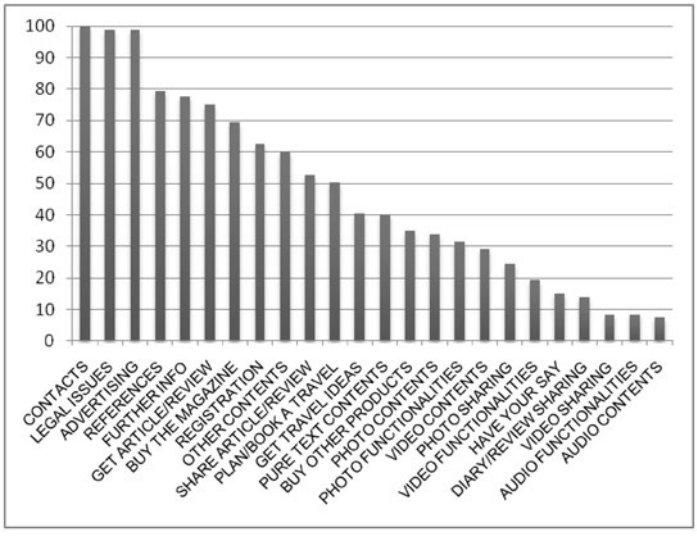

Fig. 4. Percent value for sub-categories.

11 sub-categories are present at least in 50% of the magazines analyzed. Most of them ("Contacts", "Legal issues", "References", "Further info", "Registration") concern the "General information" area. It's important to notice that 3 of them concern the business model (the "Purchase process" area): "Advertising" (98%), "Buy the magazine" (70%), and "Plan/Book a travel" (50%). Besides, 2 sub-categories concerning the business model are present at least in 30% of the magazines analyzed: "Get travel ideas" (40%) and "Buy other products" (35%). Interactivity has also an important role: "Get article" (75%) and "Share article" (52%). Thus, the editorial strategy and the design patterns seem to reflect the following goals: (1) present the magazines as reliable and keep in contact with readers; (2) create a new business model; (3) improve interactivity.

4.3 (iii) the business model of the online travel magazines. The business model of the 120 online travel magazines has been analyzed using 22 indicators grouped into 5 sub-categories and one category, as shown in Figure 5. Figure 5 shows an overview of the business model:

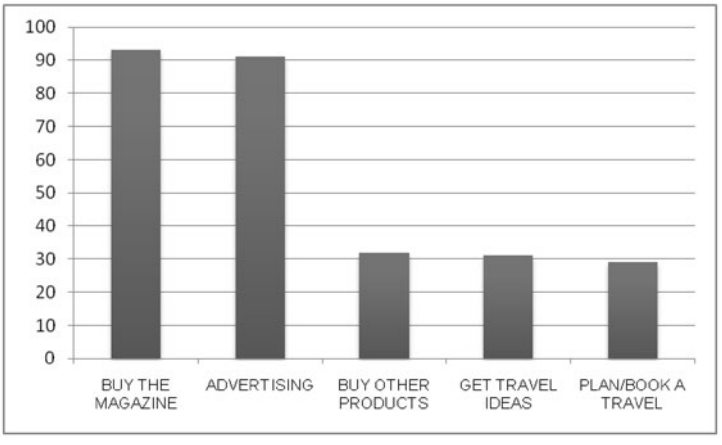

Fig. 5. An overview of the purchase process in the 120 online travel magazines analyzed.

Figure 5 shows that the indicators grouped into the "Buy the magazine" (93%) and "Advertising" (91%) areas are the most relevant in the business model. Figure 6 shows a detailed view of the 22 indicators concerning the purchase process: 7 indicators are present in at least 50% of the online magazine analyzed. "Subcribe to the magazine" and "Advertising banners" are over 90%. "Travel suggestions" (89%) and "Contact the destinations suggested in the article review" (68%) also have a high score. A new business model is defined, as readers can directly book the travel suggested by the magazine.

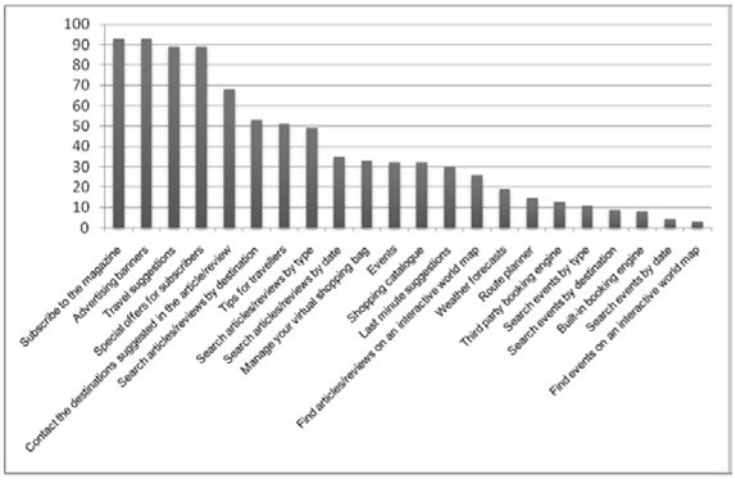

Fig. 6. A detailed view of the purchase processin the 120 online travel magazines analyzed.

5 Conclusions

Selling magazine issues to the readers (i.e. via subscriptions) and selling contextualized advertising spaces to related companies are the two main pillars of the travel magazines' business model. Travel journalism relies heavily on sponsorship from the tourism industry; an uneasy marriage which carries with it immense ethical implications. If many online travel magazines adopt a business model based on contextualized advertising banners, some other ones adopt a new business model, based on built-in booking engines. In fact, some online travel magazines offer readers an archive of articles covering a large selection of topics and destinations. Readers are then free to select their desired path, to compare possibilities and prices, to discover unexpected content and travel suggestions, adopting a sort of serendipitous approach (Spagnolo et al., 2010), and finally 'buy' a vacation. As the reader is free to choose between large numbers of suggestions, even drawing a trip solution based on his own preferences, that new business model could work as a basis for a new ethical model in travel journalism. Besides, an English magazine contains a section entitled "Sponsored articles" – one of the 100 indicators used in our research. What seems clear is that this is an honest way to publish articles, such as saying "We, the authors, received some money for publishing these articles, but we really believe that what we wrote is true". We define this approach as a model for a new "ethical alliance between reader and authors". Existing research into journalists' ethical standards (Hanitzsch, 2007; Weaver et al., 2007) and also into ethical aspects both of computer-mediated communication (Lizzi, 2009) and human relations (Valori, 2009) will be quite useful for guiding questions in this regard.

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Mobile hybrid networks for tourist service provision in small Destination Management Organizations

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Abstract

The combination of broadcasting networks with the emerging Digital Video Broadcasting – Handheld (DVB-H) standard and broadband cellular communication networks, produces a hybrid network with interesting potential for mobile multimedia tourist applications. This hybrid network allow tourists to access tourist multimedia contents while on the destination, combining several telecommunication networks in order to provide innovative added-value services. This paper presents the design, implementation and evaluation in a small destination of a hybrid network composed of point-to-multipoint technologies for the provision of general information about the destination (points of Interest, agenda, food and beverage, accommodation) that are the same for all tourists; and point-to-point technologies for a point-to-point interaction to access personalized added-value services (ticket purchasing, personalized contents).

Keywords: hybrid network; tourist services; authoring tool; validation; small destination.

1 Introduction

Many mobile applications and Location-Based Services (LBS) have been implemented for cellular technologies such as GSM, GPRS or UMTS. However, if many people at the same time and place interact with those applications with high data rate requirements (i.e. video streaming), even 3G networks like UMTS face several limitations. This is where the standard for high bandwidth point-to-multipoint communication Digital Video Broadcasting (DVB) comes into play. DVB is designed to transmit high volume data (mainly video) which will be used simultaneously by a large number of users. Moreover, DVB-Handheld (DVB-H) enables broadcasting digital television as well as data to mobile devices. As next generation devices may be equipped with a cellular network, it is likely to combine both networks to achieve an effective hybrid network. In such a way, new types of multimedia applications for mobile users may be created.

This paper presents the design, development and validation of a hybrid technological platform that allows accessing tourist multimedia contents while on the destination, combining several telecommunication networks in order to provide innovative added-

value tourist services. Therefore, two technologies have been combined: DVB-H technologies for the provision of general information about the destination (Points of Interest, agenda, food and beverage, accommodation) that are the same for all tourists; and UMTS, GPRS or HSDPA/HSUPA technologies for a point-to-point interaction to access personalized added-value services (ticket purchasing, personalized contents).

This paper is organized as follows. Section 2 describes briefly the state of the art in mobile television and hybrid networks, as well as examples of existing applications. The methodology implemented for the development of the hybrid network, the authoring tool implemented and the mobile services developed are described in Section 3. Section 4 describes briefly the validation scenario and the resultas of the evaluation campaign. Finally, conclusion and further work are summarized in Section 5.

2 State of the art

2.1 Mobile broadcasting

Broadcast networks are point-to-multipoint networks (like common television), which deliver data simultaneously to a large number of users. Recently, digital video broadcast (DVB) has evolved as a standard for broadcasting digital television as well as data services (DVB Project, 1996). As a standard for high bandwidth point-to multipoint communication, DVB-T is designed to transmit high volume data, to be used simultaneously by a large number of users (Reimers, 2001). A DVB-T network is built up by a number of cells, each cell covering an area of up to 50 km in radius.

DVB-H (Digital Video Broadcasting-Handheld) is the latest European standard for the transmission of broadcast content to handheld terminal devices, developed by the international Digital Video Broadcasting Project and published in 2005 by ETSI (DVB Project, 2004). It is based on the European DVB-T standard for digital terrestrial television but tailored to the special requirements of the pocket-size class of receivers. Using broadcasting networks while being mobile is especially challenging, as power capacity, storage space, and processing power of the end devices are rather limited. In addition, mobile devices might not be continuously online due to limited network coverage or power supply. Thus, DVB-H optimizations for mobile reception include Time-slicing, Multi-Protocol Encapsulation, and an additional 4K transmission mode.

The data to be broadcasted is organized in carousels, which repeat their content periodically so that users can watch programs or retrieve data on a regular basis. The content of the carousel can be changed on the run partly or totally. Round times are still a question to be answered depending on the type of data. While specific data like news should be available frequently, others such as weather forecasts might be interesting only for a short time.

2.2 Existing hybrid systems

Although DVB-H supports multiple media and data channels, it remains a unidirectional transmission path. Thus, it enables only purely local interactivity where viewers interact with e.g. Electronic Service Guide (ESG) information or applications downloaded to the terminal via IP Datacast. More advanced interactivity concepts (quizzing, side-information browsing and ticket purchase) require a bi-directional return-channel over a unicast network for the exchange of personalized content and information.

The combination of such powerful point-to-multipoint broadcast to reach mobile devices with a supplementary point-to-point interactive communication network forms a hybrid network (Heuck, 2004). Several projects have worked in the field of hybrid platforms for advanced interactive service applications.

Hartl *et al.* (2005) describe the setup of a hybrid mobile-broadcast network in Berlin, using DVB-H as the broadcast system and the existing GSM/SPRS network as the interaction channel. Three types of services were implemented in the pilot trial: streaming of TV-like content to mobile devices; interactive TV providing voice call-in, SMS or mobile web access as the return channel; and service and content download independently from transmission time with different options for the return channel.

The "night scene live" prototype (Balzner *et al.*, 2005) demonstrated the potential and special features of the hybrid network in the domain of mobile entertainment. To aid revellers in their decision on where to go, videos from parties are broadcasted to party-revellers, attracting them to current events and helping them to stay informed about what is going on where. Videos and additional information for each event, such as who is performing, the music style and happy hours can be selected in a web portal.

Moreover, Klinkenberg and Steckel (2006) introduced an approach to modularize interactive services in broadcast-only and respectively hybrid networks. Their work focuses on Java applications delivered via DVB-H and the IP Datacast framework on top.

Regarding European projects, the LIVE project (Bürger *et al.*, 2007) aims at the development of semantic-based and user/content-aware systems to pioneer intelligent self-describing interactive TV content. The project relies on an intelligent media framework to match the content with personal user preferences. The concept even envisages letting audience feedback influence the live editorial workflows in real-time.

Finally, the Amuse project has developed a platform to present the scenario and requirements enhancing live sports coverage via interactive mobile TV (Schatz, Wagner and Berger, 2007). The context of an alpine skiing event provides a typical

sports event situation which demands real-time reception of information about the current status of the race, the start-order, ranking and the “did-not-finish” list.

As a conclusion, it is clear that hybrid networks could have an enormous impact on destination promotion and Location-Based services while in the destination. However, most of the existing applications are more related to entertainment and sports. Thus, Destination Management Organizations (DMO) should deeply analyze the possibilities in order to integrate these innovative approaches in their technological roadmaps. In this paper we present an example of the design, implementation and evaluation of a hybrid network, describing the required step for a functional DVB-H implementation focused on the tourism domain.

3 Description of the Prototype

3.1 Architecture

Fig. 1 shows the basic communication networks and required architectural components of a hybrid network. The unicast path is based on UMTS/HSDPA network, analogous to common real-world hybrid trial deployments. Standard-compliant DVB-H broadcast equipment is used for IP encapsulation, multiplexing and transmission.

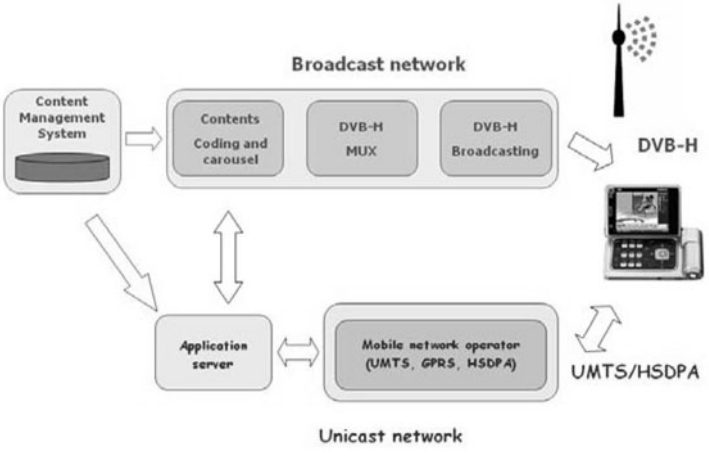

Fig. 1. Architecture of the proposed hybrid network.

Content and information are exchanged via both the broadcast and unicast paths (Fig.2). Multimedia content are provisioned via similar programmable tools and can be modified in real-time. Unicast is primarily used for one-way (e.g. promotional videos) and two-way interactivity including personalized content exchange, ticket reservation and additional on-demand (video) content.

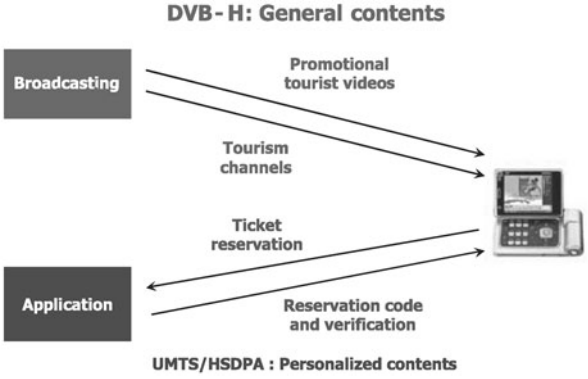

Fig. 2. Examples of tourist contents in a hybrid approach.

3.2 Design of the DVB-H network

A methodological approach has been designed and implemented for the design of DVB-H networks in tourist destinations. Generally speaking, the objective of coverage planning for these networks is to provide sufficient signal quality over the destination with minimal network cost, while keeping the potential interference under a specified level. Practically, this means that given a tourist destination and the operation frequency, a candidate set of sites in which a transmitter or a gap-filler will be placed should be determined at each destination.

First of all, the site with the wider coverage has to be determined. In order to broadcast multimedia contents using the DVB-H standard, a radio network that preferably uses a UHF channel of the radio spectrum is required. As this spectrum is regulated, it is compulsory to find a free channel with broadcasting permission in order to offer the service.

In order to determine the geographical coverage of the DVB-H network, several parameters have to be fixed, such as the description of the network with information about the transmitters and the coverage area; the geographical coordinates of each transmitter (latitude and longitude); the characteristics of the radiant system in each transmitter; the average power of the transmitters or the maximum equivalent radiant isotropic power.

All this information is processed using a special GIS software to dynamically simulate a gain map to define the optimal position of the transmitters and the size of the DVB-H cells for each destination. A gain map is defined as a map of gain values for a fixed cell radius, at the same resolution and size as the scenario map. This map is calculated for each point of the destination area. Once the position and size of the DVB-H cells have been determined, the antenna height and transmission power have to be estimated.

The software includes a propagation model which estimates the signal level received in each location of the destination, taking into account the propagation losses suffered by the signal due to different propagation mechanisms such as reflection, refraction or scattering. Its dynamic simulation allows evaluating the overall QoS perceived by tourists for a given information as a function of the transmission configuration.

3.3 Authoring tools for generating carousels

As it has been mentioned before, the Electronic Service Guide (ESG) includes information about the services available. Tourists can select the services and items they are interested in and find stored items on the terminal. Thus, this project has implemented an authoring tool for non-technical users to seamlessly automate the creation of the ESG, and therefore, to update the carousel of multimedia contents that will be broadcasted. The tool is based on the XMLTV standard, which is used for the programming of the ESG, and has been implemented in Java to develop user-friendly interfaces.

No previous knowledge about XML or DVB-H is required to work with the tool. People at the DMO have to determine the starting time of the emission of the promotion contents, define the channels and programs, and combine them using the interface. It is also possible to load and modify existing ESGs created with the tool. Fig. 3 displays the graphical interface of the authoring tool. There are several tabs on the top part, each of them representing each of the channels that compose the ESG. Each tab displays the corresponding information for each channel, with five main sections.

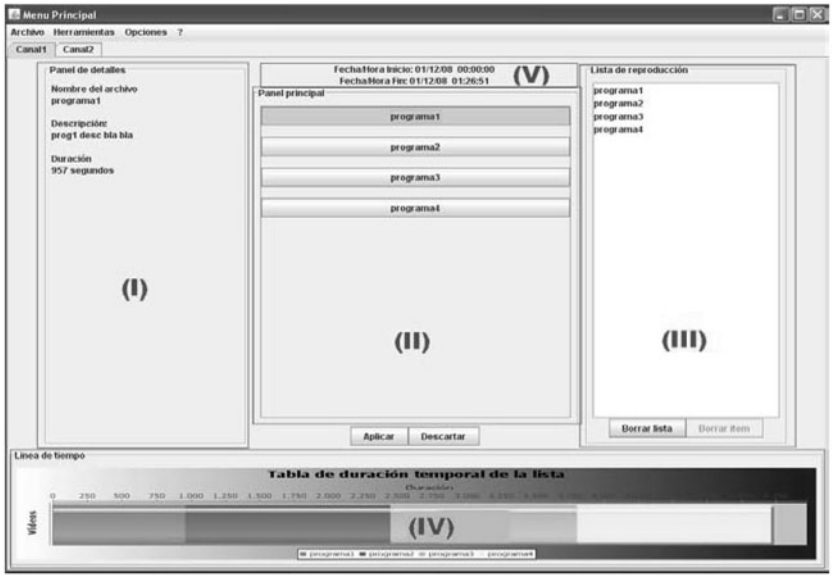

Fig. 3. Main GUI of the authoring tool.

The panel with the details of the program (I) displays the basic information (name, description and duration) of the selected program in panel II or III. Panel II lists all the created programs for the ESG, including all the details. This panel is common and identical for all the channels. The emission list (III) shows the programs in the same order as they will be broadcasted. This list can be edited to add, modify or delete programs as well as to change the emission order. Timetable (IV) represents graphically the emission list, so that the user has a visual image of the duration of each of the selected programs. Finally, panel V displays the time and day of beginning and end of the carousel.

Once the carousel has been generated, the authoring tool creates the corresponding ESG. Moreover, the videos and applications included in the carrousel are transmitted to the DVB-H equipments in order to be broadcasted.

3.4 Definition of the mobile services

DVB-H allows the transmission of applications and services related to the video content that is being broadcasted, which can be freely accessed by tourists from their mobile devices. Furthermore, the proposed hybrid communication network offers new opportunities for mobile services. Bandwidth-intensive non-personalized contents (i.e. good quality videos) can be linked to specific applications related to the content. These applications should contain profile information to recommend contents and tourists activities that could be of interests for different tourist profiles.

However, due to current technical limitations, the DVB-H hardware is not accessible from custom mobile applications. The JSR-272, Mobile Broadcast Service API for Handheld Terminals defines an optional package in the Java ME environment for interactive broadcast services for mobile terminals. The API is designed to provide full control of a broadcast service implementation on a device. However, as no manufacturer has implemented this API yet, mobile DVB-H applications have to make use of the embedded DVB-H player, delegating the access to the broadcast content and application in the player. Although this should not be a serious limitation, the DVB-H player provided by the hardware manufacturers does not correctly receive the broadcasted data.

In order to overcome this problem, the implemented approach attaches links to the broadcast videos. The DVB-H player is able to recognize this type of content and notify users that additional contents and services are available. Tourists can follow these links to open a mobile application from their browser, communicating with the web server through the point-to-point network. A mobile tourist portal has been implemented (http://oinati.batura.mobi/) in five different languages related to the main tourist profiles of the destination (Spanish, Basque, Catalan, French and English) (Fig.4). Although it is based on the existing destination portal, contents have been reformatted due to the limitations of mobile devices.

(a) (b)

Fig. 4. (a) Main menu of the mobile application; **(b)** Agenda.

Available multimedia contents and applications are related to the daily cultural agenda, information about top resources of the destination (the caves of Arrikrutz, the University), restaurants, trekking and cultural routes, and weather forecast. In order to simplify the navigation through the application, the DMO has to redefine the message and the contents provided. One of the main services implemented is the reservation of tickets for the caves.

4 Validation

4.1 Description of the evaluation campaign

The prototype has been validated in the municipality of Oñate. Oñate is located at the heart of the Basque Country (Spain), a small destination in a valley surrounded on all sides by verdant mountains, except to the south. Moreover, it is considered as one of the most relevant historical place in the province of Gipuzkoa, being a popular tourist destination (around 20.000 visitors during 2009). One of the main attractions are the caves of Arrikrutz, with nearly 3,500 visitors between July and August 2010.

First, the design of the DVB-H network has been conducted in close collaboration with the regional and local broadcasters. After calculating the most convenient location for the transmitter (in this case, one transmitter has been enough) and receiving the required legal authorizations to use a free channel to broadcast, the final step has been the deployment of the DVB-H hardware equipment. The DVB-H platform from SIDSA has been selected, as it offers an overall solution known as POLARPLUS. This transmitter and the required antennas have been installed in the emission centre of Belar, reaching a good coverage level of Oñate.

Fig. 5. DVB-H hardware.

Regarding the multimedia contents, two main sources of contents have been used for the evaluation campaign. On the one hand, seven broadcast videos have been recorded and produced by the DMO (Fig. 6), each of them oriented to different profiles of tourists (nature, culture, traditions.) All the videos have been recorded in both Spanish and Basque, and have an average duration of ten minutes. On the other hand, contents from the local television were also broadcasted, so that visitors could also feel and know the daily life of the citizens. The contents have been organized in carousels so that they are repeated periodically. These contents can be easily modified by the destination using the authoring tool.

Fig. 6. Frame of a broadcasted video.

Tourists were able to access general tourist information about the destination (non-personalised) using DVB-H technologies. If the tourist is interested in getting more information about any of the presented Points of Interest (such as purchasing tickets for the caves), the mobile device connects to a point-to-point network (UMTS, GPRS or HSDPA/HSUPA) in order to provide personalized information to the user.

Four Nokia N96 devices suitable for DVB-H standard have been available for loan at the DMO. Tourists were invited to try the prototype when visiting the tourist office (Fig. 7).

Fig. 7. Stand inside the tourist office to hold the questionnaires.

Questionnaires have been designed and implemented by the DMO in close collaboration with the technological providers. The following aspects have been collected: profile of the visitor (data about their range of age, gender, origin, education and familiarity with new technologies); easiness of use of the mobile device (size of the screen, the size of the device or the use of the keyboard); features of the multimedia contents (quality of the contents (both video and audio), the perceived quality of the broadcasted content and the duration of the videos); and willingness to pay and overall satisfaction.

4.2 Results of the evaluation

18 people (eight male and ten female), mainly between 15 and 45 year old (although there were two people over 60), took part in the evaluation campaign. Nearly one quarter of the users were frequent Internet users and more than one third were familiar to the use of laptops.

The first set of questions was devoted to analyze the usability of the mobile device. Most of the users were satisfied with its size and weight, although 25% of them thought it was too big. Anyhow, all of them agreed on the usability of the keyboard to

interact with the device. Another critical aspect is the size of the screen which was acceptable for two thirds of the users. Finally, the answers about the easiness of use of the device have shown that two thirds of them were able to interact with the platform without further explanations. It was also quite easy to select the multimedia contents from the carousel.

Users were also asked about the perceived quality of the multimedia contents available about the tourist resources of Oñate. Only 12.5% of the users were not very satisfied with the perceived quality. The answers were much more disperse when querying about the duration of the videos, so it was not possible to gain a clear conclusion. Technical limitations about the reception of the DVB-H signal were also queried. The main problems arouse in very narrow streets in the Old Town in Oñate and indoor. This problem can be solved with a radio license allowing transmitting signal with more power. Regarding the perceived value of watching tourist videos, more than half of the users considered that videos had a very high or high utility. Only ten percent of users considered that tourist videos had low or very low value. The perceived value of watching regular TV channels on the mobile phone was not so high; less than a quarter of the users considered that it had a very high or high utility, a third of them an appropriate utility, and nearly half of them low or very low utility.

Although many other questions were asked about the perceived utility of the services available, the questionnaire provided very useful information about the willingness to pay for the offered services. Most of the users would pay for broadcasting services related to tourist contents, but they would not pay for watching general mobile television. Finally, and although weather forecasts have always been seen as a crucial mobile tourist service, only 12% of the users would only pay for those contents.

5 Conclusions and Future Work

In this paper, we have presented a hybrid technological tourist platform based on point-to-point and point-to-multipoint networks. DVB-H is the European standard for the transmission of broadcast content to handheld terminal devices. In the hybrid approach, the DVB-H network is used to deliver non-personalized tourist content (multimedia and data) of general interest to mobile devices. Tourists can consume this content and make use of the point-to-point network to access personalised content of their interest. The methodology to design and implement a hybrid network for tourist purposes has been presented and validated in a small tourist destination.

Although results from the evaluation campaign have been very positive and encourage further work on the real implementation of hybrid networks in tourist destinations, different factors may affected the success of such networks. Regarding the costs of the required infrastructure, it is obvious that a big investment in infrastructure is required for wide coverage areas. Moreover, the future of DVB-H is not clear. Although there are a lot of big players involved (content providers, telecommunication operators, broadcasters) and there are some successful examples in Asian countries, in Europe no one has dared to face the required investment. Thus,

the DVB-H coverage has been mainly limited to testbed scenarios or very restricted areas.

However, the potential of hybrid networks in the tourism sector cannot be denied. As a future work, the use of the transport protocols defined in DVB-H applied on Wifi based multicast networks should be analyzed. This type of hybrid networks requires a minimal inversion and present engaging open research topics.

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Mapping the Web Presences of Tourism Destinations: An Analysis of the European Countries

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Abstract

Planning a comprehensive Web presence for a tourism destination is becoming more and more challenging. Beside traditional websites, tourism destinations have to define their presences on social network websites. Trends in tourist behaviours in respect of these networks show the importance of tourism destinations presences on them. However the fast evolution of the technological and cultural context makes it difficult to identify best practices to support destination management organizations in their analysis and decisions. In this paper we propose to map official and semi-official presences of a tourism destination using graphs which nodes correspond to different online 'spaces', and links to connections among them. Parameters of different kinds are used to describe the performances of the spaces. To illustrate the application of the modelling technique we report results of a study conducted on the Web presence of the European countries as tourism destinations.

Keywords: official spaces, semi-official spaces, Destination Management Organizations, social networks, control level; presence map

1 Introduction

The concept of Web presence has been long connected with that of the company or organization website. Therefore, Web presence strategies of destination management organizations (DMOs) focused primarily on designing and maintaining a successful website (WhatIs, 2005). Recent developments of the Internet and the Web, and the inception of the so called Web 2.0 (O'Reilly, 2005) have opened a variety of new opportunities especially in relation to the social network websites (Balwani, 2010; Brauner, 2009; eMarketer, 2010; Hunt, 2010; Nielsen, 2010). Many of them offer functionalities to define official DMO presences (e.g., brand channels on YouTube or fan pages on Facebook). Statistical data confirm an increasing importance and relevance of the role of spaces other than the DMO website in tourists' decisional process in several respects: to choose a destination, to plan and manage their stay in the destination, to book and pay travel and accommodation and to share their experiences before, during and after their holiday (see for example, (Mediapost, 2010;

Travelmole, 2010)). However, defining and building a comprehensive Web presence exploiting new 'spaces' poses a serious challenge to destination managers. First of all there are a variety of possible spaces: besides tourism and travel related social network websites (e.g., TripAdvisor) there are also 'general-purpose' networks (e.g., FaceBook) that contribute to enlarge the potential scope of official tourism destination presences. Moreover, such websites have specific languages, rules, constraints and terms of service, so that any presence on them requires specific investments and skills. Another critical aspect is the quick evolution of the social networks scenario, so that new sites gain high numbers of members, with large movements of users passing from one social network to another, or simply registering to different networks, while important communities lose their appeal and positions in the lists of successful sites. From a technical point of view, the applications and functionalities of social networks that allow publishing and sharing of user content and interactions of the members are provided on platforms which are partially based on proprietary technologies. Consequently, it is necessary to address interoperability requirements, where the main concerns are the alignment of content and strategies among the different spaces occupied by a DMO, and increasing costs. Critical issues are therefore: (a) choosing which social networks are worth investing in to yield a positive return in terms of promotion and commercialization of the destination, and (b) defining how to connect the destination's site and its presences on social networks.

As a first step to address these questions, in this paper we propose a diagram to model a DMO's Web presence. The diagram is called the *presence map* and enriches the framework proposed in (Mich, 2010) for the classification and analysis of online spaces to be included in a Web presence strategy. From a DMO's point of view, Web spaces are characterised by different levels of control on content and services; the framework allows to classify them in three groups: (a) official, (b) semi-official and (c) unofficial. Focusing on the first two, the presence map assigns the official and semi-official spaces occupied by the DMO to nodes of a graph and the connections among these spaces are represented by links (directed edges). In this way we obtain a space connectivity map. By adding tags to nodes and links it is also possible to represent data useful to describe the relevance of the spaces. To test the applicability of the framework we conducted a study on the Web presences of a set of European countries as tourism destinations. The goal was to obtain information useful to characterise and compare their Web presences on the most successful social networks. These results can be used by destination managers to support decision making about a Web presence strategy.

The rest of the paper is structured as follows. Section 2 introduces the presence map in the context of the Web presence framework, illustrating the criteria that we suggest for classifying Web spaces and the elements of the maps used to represent the Web presence of a tourism destination. Section 3 illustrates the application of the framework to the analysis of the Web presence of the European countries as tourism destinations. Section 4 discusses the results and section 5 concludes the paper.

2 The Web Presence Framework

The Web presence framework is based on a model defined in (Mich, 2010) to classify the online spaces where an organization can be involved. In this paper we enrich this model introducing the presence map as a modelling tool for these spaces.

2.1 Classification of the Web spaces

To classify the Web spaces an organization has to take into consideration for its Web presence strategy, we adopt a criterion based on the level of control the organisation can exert on them. According to this criterion, we identified three classes of Web spaces:

- *Official spaces:* are those that can be fully controlled by the organization;
- *Semi-official spaces:* are the spaces where the organization has only a partial control;
- *Unofficial spaces:* are spaces beyond the control of the organization.

A detailed description of Web spaces in each of these categories is given in (Mich, 2010a). Here we will focus on those aspects that are relevant for introducing the Web presence map.

On the first category of spaces, i.e. *official spaces*, the organisation has an active role in creating its presences, in defining and publishing content, and in offering services. Moreover, it also controls the technical platform on which such presences are maintained. The websites of the organisation are the most important spaces in this category. Organisations do often invest in diverse websites addressing different goals and targets. Large companies can have a corporate website, a B2C and a B2B one, which sometimes are different for its brands (see for example, https://app.stb.gov.sg [Sept. 17, 2010]). Smaller companies and organizations generally create only one website which satisfies all their needs.

Semi-official spaces include official company blogs (e.g., CEO's or testimonials' blogs), wikis, and organization pages on social networks, as for example a group or a business profile on FaceBook, a profile on Twitter, LinkedIn, or others. Among the social networks that an organization can choose in building its Web presence, there are (a) 'general-purpose' social networks, that have a large audience; (b) social networks whose domain and members' interests are those of the organisation (e.g., WikiTravel for tourism). For presences at this level, user contributions can be filtered or monitored with a limited effort, as members exchange messages, pictures, videos, or other information items on spaces the organization is aware of.

The last category of spaces, *unofficial spaces*, has a wider scope, as it is represented by all the Web spaces on which the organisation is mentioned. These spaces are beyond the direct control of the organisation and must be identified by searching the (whole) Web. In fact, they contribute to the Web reputation and play a critical role for the organisation's marketing and success (see for example, (Beal, 2009; Farmer &

Glass, 2010)). Unofficial spaces include blogs, online communities, social networks, and all the websites that provide the users with tools to publish and share information, resulting in the so called User Generated Content and Media (UGC and UGM, correspondingly) - recommendations, ratings, post, comments, videos, and other content.

Compared to the two levels of spaces, official and unofficial, adopted in (Inversini, Cantoni & Buhalis, 2009), the proposed three-level classification allows distinguishing official presences of an organisation on social networks (that we classify as semi-official), as for example an official fan page on Facebook, from an unofficial one, created by a group on the same subject (also called unofficial in our classification).

A comprehensive Web presence strategy has to deal with all the categories of spaces, addressing the specific challenges they arise. Unofficial and, even if at a lesser extent, semi-official spaces, are characterised by the active role of users. Realising the original vision of the Web as an interactive network (Berners-Lee & Fischetti, 1991), Web 2.0 tools demand a deep change in communication and marketing approaches, moving from CRM (Customer Relationship Management) to CMR (Customer Managed Relationship), and to all the forms of marketing 2.0. In particular, the last category of spaces entails the need in the Web reputation management. UGC relevant for the organisation has to be identified and monitored in an adequate way (e.g., answering to the posts of an influential blog), using gathered information to also improve the quality of products or services. From an organisation's point of view, there is another important difference among the spaces in the first two categories and those in the last one: while for the unofficial spaces it is necessary to monitor where it is mentioned (directly or indirectly: name, brand, products, etc.), the main concept for the first two levels is 'creating' Web presences. In other words, the organization is aware of its official and semi-official spaces. However, the main challenge for an organisation is making the decisions regarding the spaces to be included in its Web presence strategy and their connections.

2.2 The presence map

Focusing on the official and semi-official spaces, we introduce the presence map to model the Web presence strategy of an organisation on them. The map constitutes a descriptive model to represent actual or planned Web spaces in which the organisation invests in; it also allows to represent connections among these spaces and some parameters to characterise them. To draw a presence map, the first step is to collect all these information in a two-dimensional matrix.

As regards official spaces, for any Web presence strategy, official websites play the role of hubs for spaces in the second category. In fact, structured information and e-commerce services have to be given by official websites. For example, in the tourism sector, a list of the hotels in a given destination or an e-booking service can be offered by the official DMO or by commercial websites but not in a blog or by a Twitter profile of the organisation. For the first level of spaces, according to Web

Engineering, the main goal is to develop high quality websites (Deshpande, 2001). Quality evaluation results can be used as indicators of the effectiveness of a given website. There are a large number of approaches and models to website quality evaluation. Some of them are general-purpose and can be applied to different sectors and domains (see for example, (Lowe et al., 2005) and (Triacca, Inversini, & Bolchini, 2005)). The WTO Destination Web Watch, is an example of an evaluation model for the tourism domain (WTO & WTOBC, 2006).

The presence of an organization on spaces in the second category, semi-official spaces, is important for capturing leads, to reach audiences on the main social networks and, in some cases, to avoid misuse of the brand name. There are a variety of social networks and new ones appear continuously. See, for example, the success of Twitter, that took only a few months to reach top positions in the Alexa ranking, while, for instance, SecondLife lost many positions (www.alexa.com, [Sept. 17, 2010]). Given their large dimensions, successful social networks are the first to be considered as candidate spaces to define the Web presence of an organisation. Moreover, marketing segmentation can be useful to scout the Web for social networks which members are in the target markets. Even if these networks are smaller, they can be very useful for an effective Web presence. However, changing dramatically and requiring exploitation of specialised knowledge (for example, collecting information on the ways how to properly appear on Twitter (Comm, 2009)), the choice of the networks for investing in is risky and cannot be taken for granted. Such a dynamic context also implies that there is little past experience available for investigation to identify best practices and analyse lessons learned. As regards the parameters that can be used to describe semi-official spaces, the Web offers many sources. First of all, the main social networks give the number of registered members, members that are named in different ways. Thus, you have *friends* on a FaceBook personal page, *fans* for a business profile, *followers* on Twitter. Alongside, it is often possible to get indicators of the content published or shared: number of posts (tweets on Twitter), number of videos or photos published. Also, data on different pieces of these presences allow to get an idea of how lively the space is, as for instance, the date of the last posts or their frequency. Table 1 gives an example of a presence matrix obtained for one of the European national destinations that will be exposed in the next section. A 'Yes' corresponds to a link from the space in column to that in row. The presence map for the matrix in Table 1 is shown in Figure 1. If necessary, the map can be enriched with the data from the matrix (e.g., those in the third row in Table 1). The graph shown in Figure 1 highlights a Web presence strategy based on all the main social networks, which are FaceBook, Twitter and YouTube; moreover, this DMO recently created a profile on Flickr. All these spaces are cited on the official website and vice versa (apart from Flickr); there is also a link between the Finland page on FaceBook and its YouTube brand channel. Connections to the websites are recommended to give the members of the social networks a way to get more information about the destination and possibly to book a tourist package. Links from the official website to the social networks are more controversial. The idea is that if a visitor of the site is registered to one of them, he or she can interact with other members of the 'presence' of the destination (e.g., with fans of the destination FaceBook page). Data on the official contributions in the matrix - posts, tweets,

videos, photos - show recent updates, but not on daily basis. Numbers related to the participation to the pages are not very high and are somehow homogenous. It can be concluded that Finland is investing in all these social networks, not giving a predominant role to any of them. The underlying goal is probably to gain some experience on their specific contribution.

Table 1. Example of presence matrix (Last update Sept. 14)

Finland	*Official site*	*Facebook*	*Twitter*	*YouTube*	*Flicker*
	www.visitfinland.com [en, de, fr ..]	www.facebook.com/visitfinland	twitter.com/ourfinland	www.youtube.com/user/visitfinland	www.flickr.com/photos/visitfinland
		3408 people like this; last off. post Sep 10	818 followers; last off. tweet Sep 3	views 3302; downloads 50275; last off. video Jun 7	last photo Sep 6
Official site		Yes	Yes	Yes	
Facebook	Yes				
Twitter	Yes				
YouTube	Yes	Yes			
Flicker	Yes				

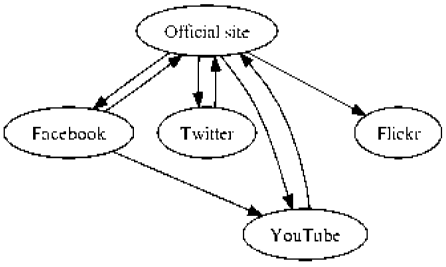

Fig. 1. Presence map of Finland

Presence maps allow also to quickly analyse and compare different web presence strategies. Moreover, if an organisation faces a new social network as a candidate space for its Web presence, it can add and investigate it in the presence maps and matrices of its main competitors or first movers on that space. The application of this modelling tool is illustrated in the next section for a subset of the national European destinations. The study represents a kind of laboratory to experiment with the Web presence framework described earlier in this section. A first version of the study where the classification schema in subsection 2.1 has been applied is described in (Mich, 2010). In this paper we will apply the web presence framework enriched with the presence map, adding one more destination, Romania. Also, in this paper, we carry out a more detailed quality evaluation of the websites. Apart from the descriptive statistical analysis of the results, a multivariate analysis has been

conducted, applying the Multiple Correspondence Analysis (MCA) technique (Greenacre, 1993) to highlight profiles characterising the Web presence strategies.

3 The Study

To apply the Web presence framework we focused on a subset of the European countries as tourism destinations in order to be able to conduct a detailed evaluation of the quality of their website and to collect a reasonable amount of data on their semi-official Web spaces. The complete list of these destinations is available on www.visiteurope.com [Sept. 17, 2010]. From this list we selected the first 15 according to data published by Eurostat (http://epp.eurostat.ec.europa.eu [Sept 17, 2010]). In particular, we used data for the year 2008 (2009 data were partial) for the arrival of residents with a threshold of 5 millions of tourists. Other statistics could not be used because they were also partial. Table 2 reports the selected countries in the descending order by number of tourists.

The choice of social networks has been made looking for those in the first positions in the list of the most visited sites of Alexa, (Alexa, http://www.alexa.com [Sept. 17, 2010]). In particular, in this list, three social networks are among the first ten: Facebook (2nd), YouTube (3rd), Twitter (10th). The others are search engines, or Blog publishing tools, with the notable exception of Wikipedia, whose goals are barely related with the Web presence strategy of a DMO. For the study we considered the English versions of the websites and of the presences on the social networks.

The quality of the official website has been evaluated applying an inspection schema defined by tourism and quality experts according to the approach described in (Mich, Franch & Martini, 2005). The schema contains 44 questions, including issues related to all the dimensions of the 7Loci meta-model: Identity, Content, Services, Identification, Management, Usability and Feasibility. Web presences on the three main social networks, FaceBook, Twitter and YouTube were analysed looking for the official pages of the destinations. In particular, for FaceBook the type of presence (profile, group or fan page) was checked; for YouTube it was checked whether the destination has a brand channel. Also, data on the number of members registered (channel views for YouTube) on these spaces and the date of the last official update (post, tweet and video, respectively) were collected. For each destination, a presence matrix and map were built, as the ones reported in Table 1 and Figure 1 for Finland.

4 Results

The quality of the official websites of the European national destinations resulted very different: there are websites with positive performances for almost all the questions in the evaluation schema, while others have significant gaps among the 7 dimensions (Casagrande, 2010). This is often the case with recently redesigned websites, with a strong Identity, based on an effective graphical design, good Services, but which Content or Usability are not yet adequate. For the following analysis, quality results were classified in 4 types: low, medium, high and very high. Apart from Italy, whose

stop and go website development project is barely credible (see, for example, (Berretta, 2008)), such gaps are the main reason of the low quality results for Greece, Portugal and Romania (for two of them new website versions were developed in the course of this study). On the other hand, the United Kingdom, Sweden, Holland and Switzerland have demonstrated high quality. These results are coherent with those obtained in a preliminary inspective evaluation (Mich, 2010a), which was performed by four experts (1 senior expert in website quality, 2 junior experts in website quality and tourism and 1 manager in charge for the Web presence strategy of a regional destination), using the 7Loci meta-model to identify weak and strong points. Of course by applying the 44 questions table and giving also a qualitative answer for each of them we gathered a much larger quantity of information. Besides data on the success of the websites were gathered from Alexa – *traffic rank* and *sites linking in* – and then classified in quartiles (Table 2). A first MCA was conducted to look for profiles characterising the 15 destinations, using the number of arrivals (classified in three groups) as supplementary category. This analysis allows to put in association all the variables, represented as vectors and the angle between the vectors determines the connection relationships. Results are given in Figure 2.

Table 2. Data for the official European websites (May 2010)

Nation	Arrivals°	Year^	Website quality	Ranking+	Links+
Germany	>60	1999-2000	Medium	*	*
France	>60	1995-1998	High	1	2
Spain	30-60	2001-2002	High	1	1
United Kingdom	30-60	1995-1998	Very high	2	1
Italy	30-60	>2002	Low	4	4
Sweden	<30	1999-2000	Very high	2	3
Holland	<30	1995-1998	Very high	3	1
Poland	<30	>2002	Medium	4	4
Norway	<30	1999-2000	High	1	2
Austria	<30	1995-1998	High	2	2
Switzerland	<30	1999-2000	Very high	1	1
Greece	<30	2001-2002	Low	2	2
Finland	<30	1999-2000	High	4	3
Portugal	<30	2001-2002	Low	3	3
Romania	<30	1999-2000	Low	3	4

° In thousands, from Eurostat data; ^ from Alexa (date the domain was first registered) and www.archive.org; * Not available as aggregate value; there are different domains for versions in languages other than German; + Classified in quartiles

The multivariate analysis shows the existence of three profiles for the official websites:

- Profile 1: very high quality, at least one of the Alexa's parameters *traffic rank* (ranking) and *sites linking in* (links) in the first (1) or second quartile (2); it includes Switzerland, United Kingdom, Holland and Sweden; Greece is close to this profile because of the values in the second quartile for both ranking and links.

- Profile 2: high quality, ranking and links 1 or 2; it includes Spain, France, Norway and Austria; Finland is closer to profile 3 as regards Alexa's parameters.
- Profile 3: medium, low quality, ranking and links 3 or 4; Poland, Portugal, Romania and Italy are in this profile.

The existence of three profiles is an interesting result and somehow reflects the experience accumulated by the European DMOs for their official website.

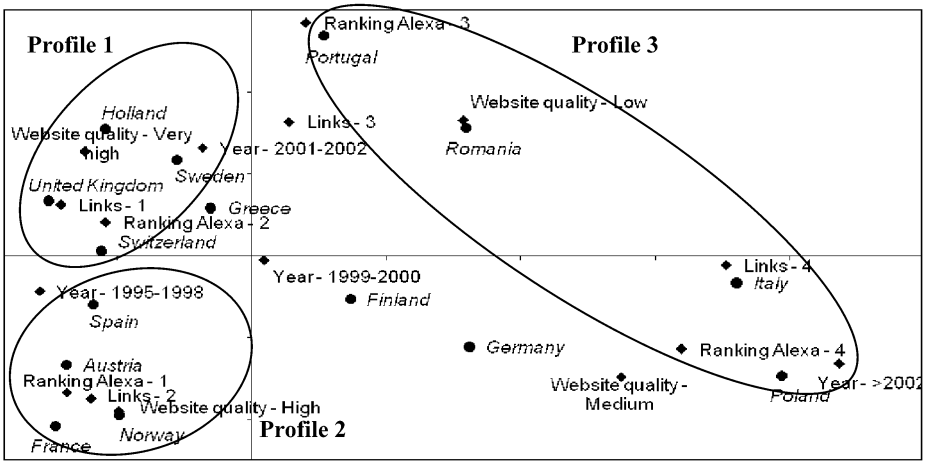

Fig. 2. Website quality and Alexa success parameters MCA graph

Important differences have been found also among the presence of the destinations on the social networks chosen for the study. The first aspect to be underlined is that with a few exceptions (for instance, Formspring for Spain, Flickr for Holland, Greece and Finland) there was no alternative social network included in the Web presence strategies of the destinations. All of them, apart from Italy, have a presence on FaceBook. However, these presences are quite different: Germany, Poland and France have a profile on it, United Kingdom is present with a group page; both forms of presence are inappropriate for organisations (e.g., there is a limit for the number of friends). All the others have a fan page. As regards Twitter, only Greece has not officially invested in it yet; but the number of members on Twitter is lower than that on FaceBook for all the destinations. It is difficult to say if these differences are due to the very recent advent of Twitter or to its peculiar posts limited to a maximum of 140 characters or to other characteristics of this social network. Finally, YouTube is not used for hosting a brand channel by Portugal and Romania.

Taking into account the connections among the official and semi-official spaces of the European destinations, that is the links in the presence map, we can also identify three main profiles: (a) the social networks spaces (nodes) are connected to the destination website by unidirectional edges; (b) the social networks spaces are connected to the website by bidirectional edges; (c) there are connections also among some of the social networks. The United Kingdom, Holland and Germany (with only two edges)

are examples of the first profile. The second profile comprises Norway and partially Greece (that is not on Twitter), Austria (which twitter profile is not signalled on the website), Romania (which YouTube Brand channel does not give the link to the website). Finally, the last profile includes the most complex Web presence strategies. Besides Finland's (shown earlier in Figure 1), there are those of Spain, Sweden and Switzerland. However, there are significant differences in their presence matrices and maps. For instance, Sweden and Spain have the same number of connections (8), but if for both of them connections from and to the website are the same (as in profile 2), for Spain there is a link from YouTube to Twitter and FaceBook pages, while Sweden gives a connection from the FaceBook page to Twitter and YouTube. Both Sweden and Spain update Twitter via FaceBook. Data on the vitality of the semi-official spaces on the social networks are also important to analyse the Web presence strategies, because they allow to understand whether a destination has a sound presence on them. Also, it is interesting to investigate if the direction of the connection affects the number of members. For example, we can see that the proportion between FaceBook members and YouTube channel visualisation for Sweden (for which there is a directed edge from FaceBook to YouTube) is 0.19, while for Spain (with a direct edge in the opposite direction) is 4.34. The case of France is difficult to analyse and compare to others because it has a presence on Facebook different for each target market. Its presence on Twitter seems related with its online magazine and YouTube has a brand channel only for Canada. Data on the social networks collected in the presence matrices of the 15 European destinations are resumed in Table 3 according to the classification used for the MCA. In particular, the number of members and channel views has been classified in groups: 5 for FaceBook, 4 for Twitters and YouTube. The number of connections (directed edges) among the different presences is given in the last column.

Table 3. Data for the European semi-official Web presences

Nation	**FB fans***	**FB last**	**TW followers***	**TW last**	**YT channel views***	**YT last**	**YT total views**	**#links**
Germany	<1	days	1-2	today				<3
France	<1	days	<1	today	<1	months	<10	3-6
Spain	>100	today	>10	today	>20	weeks	>300	>6
United Kingdom	<1	days	>10	today	10-20	weeks	100-300	<3
Sweden	10-20	days	2-10	days	>20	months	100-300	>6
Holland	20-100	today	2-10	days	1-10	months	10-100	3-6
Poland	1-10	today	2-10	today	1-10	weeks	10-100	3-6
Norway	1-10	today	2-10	days	10-20	weeks	>300	3-6
Austria	<1	today	<1	today	10-20	months	100-300	3-6
Switzerland	10-20	days	1-2	days	10-20	months	>300	>6
Greece	10-20	today			10-20	months	100-300	3-6
Finland	1-10	days	<1	days	1-10	months	10-100	>6
Portugal	20-100	today	1-2	today				3-6
Romania	1-10	today	1-2	days	10-20	months	10-100	3-6

* In thousands

Results of the MCA analysis conducted on the data in Table 3 are shown in Figure 3. The graph highlights an association between very high or high website quality, an effective (in terms of the number of members or of views) presence on at least one of the social networks, and a well-connected presence map. This association can be observed for Switzerland, Sweden and Norway; Spain is far from them on the graph because it outperforms for all the parameters. Greece, Portugal and Holland are close to destinations in the first group because of their strong presence on YouTube (Greece) or FaceBook (Portugal and Holland); while Finland is close to them because of its well connected presence map. A second set of destinations, possibly starting their first steps in the social networks, are characterised by a high or medium website quality, a less connected presence map, and fewer members on daily updated social networks: Austria (with a high number of views on YouTube), the United Kingdom (with many followers on Twitter), Germany and France (probably underestimated because of its distributed presences).

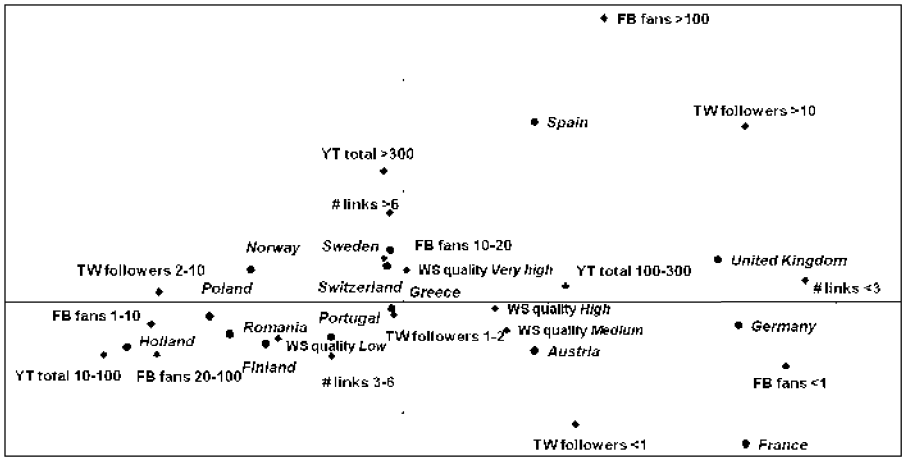

Fig. 3. Website and social networks Web presence MCA graph

5 Conclusions

In this paper we proposed a new model to map official and semi-official Web presences of a DMO. The application of the Web presence map-based framework on a set of European destinations allowed to distinguish different web presence strategies. The framework can support destination managers to make their decision on (a) which social networks are worth investing in and (b) how to connect the destination's site and its presences on social networks. Our future work will investigate the association between the experience of a destination on the website and its social networks strategy; the impact of differently directed edges (e.g., of a fully connected map vs. a subset of connections). In further investigation we will consider other social networks (e.g., tourism related ones) and fulfil a deeper analysis of official and semi-official presences and their relationship with the unofficial ones for individual destinations.

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Tourist Office Counselling Service

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Abstract

In an ongoing R & D project, the authors investigate the consultation situations of travel counselling in travel agencies and tourist offices at destinations. The first investigations described in this paper indicate more similarities than differences between these two situations. The design requirements for collaborative co-located travel counselling from previous work describe a reformulation of the consultation situation to a joint problem-solving one. Since this procedure was confirmed and the requirements development for tourist offices revealed similar needs, the authors decided to implement design requirements of co-located travel counselling to a prototype system for supporting a collaborative tourist office counselling situation. Initial results of a first proof-of-concept field study look promising for further work in this direction, as they enrich the situation with further problem-solving capabilities to the advantage of both customers and tourist office personnel.

Keywords: collaborative counselling, destination counselling, traveller needs, advice-giving.

1 Introduction and Background

In an on-going R & D project, the authors aim to develop concepts for innovative IT-supported counselling services for travel and tourism (e.g., Novak & Schwabe 2008). These services enable intermediaries to reconfigure their business models to successfully compete against pure Internet-based competitors. We thereby focus on the situation of the service encounter at the locus of a travel agency or a tourist office at the destination. Compared to the wide-spread opinion that the Internet will replace human-based counselling, the authors are convinced that travel agencies, as well as tourist offices, benefit from viewing the Internet as an opportunity of change. Thereby, integration of the advantages of interactive multimedia technologies, touch-sensitive displays, and Web 2.0-technologies to a novel, but still personal, customer-agent interaction, will provide new value-added counselling service. The counselling-related problem areas of the (1) principle-agent conflict, (2) the stickiness of information needs, and (3) the burden of choice motivate the overall situation reformulation to a joint problem-solving process in preference to a pure sales process.

Regarding the problem area of the obvious (1) principal-agent conflict (e.g., Novak 2009), there are a number of potential pitfalls in a counselling situation that impair the interaction between the customer and agent. Since the agent usually sits behind a desk with access to several information sources and the customer has only access to the information the agent wants to provide, the customer has an information disadvantage. In other words, the customer cannot be sure that the agent acts in the customer's interest, and has no control about the situation that can decrease trust or foster distrust. This subsequently impairs counselling satisfaction, which can also negatively influence the customer's willingness to visit the travel agency or tourist office in order to purchase products. Beyond the privileged access to information, agents also possess the solution space that is hidden to the customer. Customers, on the other hand, enter an agency or tourist office with their own problem space in mind and have only a vague idea of the possible solutions. The task of the dialogue between the two actors then is to bridge the gap between the problem space and the solution space. This gap, however, can be difficult to bridge, depending on the travel needs of customers and their ability to communicate these information needs. Customers are commonly not able to explicitly describe their needs and desires, and have difficulty expressing these needs/desires in terms suitable to being directly mapped onto product offers (Schwabe et al. 2008, Novak & Schwabe 2009). Transferring this "sticky" information (2) (Hippel & Katz, 2002) to the agent is difficult and time consuming, and thus calls for a sophisticated dialogue in a travel agency or tourist office, or a high level of media competence during self-service via the Internet. Internet information, as well as the offerings at travel agencies or tourist offices, is almost unlimited. Decision-making becomes even more difficult with the exploration of new opportunities. Internet information additionally is accompanied with opinions, and customers have to decide whether they believe the information source or not, and need to come to a solution regarding their problem. These subsequent procedures can again be time-consuming and lead to cognitive overload described as (3) "burden of choice" (Schwartz 2005).

Apart from the essential travel information, feelings of pleasure and excitement are important information attendants (Goossens, 2000). Travel planning, as a process of generating a highly individualized travel product, is naturally a strong emotional process (Hyde, 1999). The product itself is thus attached to many feelings and emotional expectations that should be experienced right at the beginning of travel planning. This fact is already acknowledged in strategies and marketing efforts. The current authors' partner travel agency, for instance, follows a strategy for its counselling process labelled "Complete Experience" and defines counselling as a similar-to-trip experience. The authors' partner tourist office encounters its customers as "Echt" (meaning: authentic or credible) and labels websites, as well as flyers and brochures, with a short sentence according to the characteristic of the presented content (e.g., "Echt informativ"). This again emphasizes the form of service encounter: real attention to customers and their needs. The transfer to the counselling situation, however, is not yet existent. Although the awareness of providing an involving, enjoyable service encounter seems to be available not only by our partners (e.g., Globetrotter promises that their counselling is "more authentic, more

informative, more profound" [12], and Switzerland Tourism's marketing message is: "We do whatever it takes to make your holiday perfect." [13]), they do not differ explicitly from competitors regarding service. Suggested solutions to this gap between marketing and practice are interoperability, personalization, and constant networking (Buhalis and Law, 2008), as well as strategies for acting as online intermediaries (Buhalis and Licata, 2003). While innovative business models that see the Internet as an opportunity (Buhalis and Law, 2008; Barnett and Standing, 2001) have already been considered, these considerations only emphasize the online distribution channel (e.g., Fesenmaier et al., 2003). Offline distribution, as well as human advice, is neglected. Even insular attempts, such as the work of Hruschka and Mazanec (1990) that proposes an increased technical support of the agency's personnel, neglect the conceptualization of the human-human conversation and its interplay with the system, which is typically needed when designing a socio-technical system.

This paper follows a user-centred design process (ISO 1999). First, the investigations of the current situation in tourist offices are described. Second, the elaborated design requirements are presented according to the concept of collaborative travel counselling (Novak & Schwabe 2009) with respect to the context of tourist offices. Subsequently, the system instantiation, SmartStay, is depicted, and an initial field study discussion follows. The paper ends with conclusions and future directions for this work.

2 State of Practice in Tourist Offices

In order to investigate the current work practice at tourist offices, a one-day-long qualitative observation at a tourist office (not the partner tourist office) was performed. Insights were used to arrange problem scenarios (Rosson & Carroll 2003, p.64 et seq.) of current practice (concrete narrative stories) that had been validated with the general manager of the partner tourist office. Afterwards, interviews with four tourist office employees were conducted, and the service encounters at the partner tourist office during a high-traffic day were observed. Subsequently, insights were validated in two group discussions: first with the general manager and the sales manager, and then with the previously interviewed tourist office employees. The results of these investigations described in the following subsections can be organised according to four categories: environmental issues and the above introduced three counselling-related problem areas.

2.1 Environmental Issues

Environmental issues in this paper address the circumstances of tourist office counselling. Since most counselling aspects are linked to information access, organisational information gathering, and understanding the personnel, the environmental topics centre on the available knowledge and learning.

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[12] Globetrotter's mission statement at globetrotter.ch [2010-09-16]
[13] myswitzerland.com [2010-09-16]

Tourist office employees differ in knowledge regarding the destination and the offerings for tourists at the destination. Their fluency in counselling situations and competence that they are able to communicate to their guests depend on their personal experience of the destination. This *problem of different service capabilities* through knowledge differences grows with elevated fluctuation, which results in employees' repeatedly "forgetting" the organisational demand of selling products (such as hiking maps) - beyond pure counselling. While the organisation aims to sell products, employees aim to learn destination characteristics first, since these are a pre-condition for, e.g., map selling. Customers thus receive competent counselling only by accident.

In the situation of a new offering to-be-learned, there is usually only one approach taken: An e-mail is sent by management to inform employees, who then use flyers and brochures to learn more. These flyers are also intended to support counselling, and therefore being ahead of the knowledge of a guest is an illusion. Additionally, when tourist office employees need to search for information about other destinations, (offline) information often is out of date, or it is accessed through the website of the other destination. This can be time-consuming to the degree to which the website and destination are unknown. Consequently, the service encounter will last longer since this research takes place during counselling and the guest potentially becomes frustrated. This *knowledge development problem* even grows due to the missing organisational embedding of learning-on-the-job time as well as an appropriate program.

2.2 Information-Asymmetry Issues

When guests enter a tourist office and ask for assistance regarding accommodation, they ask infrastructural questions (e.g., "where is X", "what does location Y look like?"), or they request activities counselling. Concerning accommodation counselling, the tourist office employee searches for available hotels using the local databases and digital transaction interfaces. Information is searched and filtered first by the employee, and the customer is involved only when the employee decides to involve him or her. The customer's boredom while the employee uses the PC is visible in his or her behaviour: looking out of a window or by an unmotivated-thumbing-through a brochure. Active guests manifest this *potential for distrust* by trying to have a look at the screen by leaning uncomfortably over the desk. When the employee is ready, s/he shows the hotel pictures on the small screen, turned to the guest. After a decision is made, a location is depicted on a physical (cost-free) destination map. This reflects the information asymmetry that, in most cases, results in *staccato counselling* - switching between different media and material. With this frustration, the situation is prone to confuse the guest and lead to his/her distrust of the employee ("What does the tourist office employee do during the silent time slot of his/her search using the PC?").

2.3 Burden-of-Choice Issues

The guests' impatience during the silent time slots depicts another important issue of tourist office service encounters: *time pressure.* A service encounter typically lasts

around five minutes but can also be even shorter, e.g., when a guest only asks for a bus schedule. Tourist office employees are advised to efficiently conduct advice-giving when guests expect a short destination counselling. Most observed guests enter the tourist offices ready to experience their activity (e.g., wearing hiking boots), which leads to the employee's impression that the guests expect the counselling to be short. With an increasing number of guests, employees tend to shorten encounters even more. They do this by referring to printed material, which guests sometimes even have to take themselves from a shelf. The guest's recognition of this can be observed by his/her refusal of self-informing expressed in slight anger. Tourist office employees confirm our observation by stating: "Guests refuse reading on their own. They want the right information quickly and from me." Summing this up, the basic need for individual service aimed at personalized solutions (products) is undermined by that behaviour.

Following the afore-mentioned need for external material to efficiently shorten encounters, a tourist office's task is to provide personal information and prepare self-service information (usually by catalogues, brochures, flyers, etc.). In any case, the organisation needs to integrate as much information as possible from a great number of service and product providers to act with 'one face to the customer'[14]. This *information integration problem* exists in the offline and online world.

2.4 Sticky-Information-Needs Issues

As mentioned above, entering guests are implicitly segmented according to the three demand segments of accommodation counselling, infrastructural counselling, and activities counselling. This segmentation in itself produces a straight-forward counselling that, on the one hand, is quick and goal-oriented, but on the other hand, hinders inspiration and the possibility of *hidden needs elicitation*. Guests with less specific ideas of what they want to do will not receive satisfactory service. Thus, addressing the stickiness of information needs is violated.

Regarding the second demand of infrastructural counselling, guests feel a gap, for instance, between the description of a flyer (e.g., an ice pavilion) and their understanding (e.g., where the ice pavilion is located). Thus, 'creative' language is needed from the tourist office employee since s/he often just does not have access to more than the flyer. The same holds true for accommodation counselling when PC monitors are inaccessible, and pictures of a hotel or a hotel room are unavailable or of low quality. This *visual expression deficiency* leads to unsatisfactory service encounters which risk cancelling the counselling and potentially close sales opportunities (e.g., hotel bookings, map selling). In terms of activities counselling, we have to differentiate between summer and winter (in this case, an alpine destination). Guests in winter visit the Alps to enjoy sports such as skiing. The relevant product variety may be rather limited, while the guests' demand can be very specific. Contrarily, summer guests have greatly varying demands, especially for activities

[14] 'One face to the customer' is a soundbite summing up the idea to provide customers with service from one source to improve customer interaction (Fiorina, 2002).

(requiring more than a ski pass) where the solution space is much larger than in winter. The specific counselling on activities (like a concert visit) is exacerbated through the unavailability of *(multi-) medial presentation material,* since from the tourist office's perspective, a flyer is not worthwhile printing due to the short time frame of the event. Since in summer the guests' main demands are focussed on hiking counselling and searching for appropriate maps, the destination already offers interactive maps of the region on the website; however, these maps are tailored to the needs of mountain railways, and may contain some useless information (e.g., state of open slopes), and also lack specific interesting information (e.g., an alpine garden). Hence, these maps are inappropriate for guests who are interested in more than just the mountain railway. The *problem of improper material* is also noticeable regarding the huge number of different flyers which embody the general disadvantages of analogous information (not limited to the itemized): they do not grow old but become out-of-date. Further information can only be received by a modal fragmentation, and searching them is linear. Guests regard these disadvantages as an unsatisfactory vacation interruption, and leave the tourist office no wiser than before, reflected in their looks of frustration.

3 Design Requirements for Collaborative Destination Counselling

The current work practice can be summarized according to the problems depicted in **Table 1**. A transfer to specific design requirements (right column) is given according to the problem categories.

Table 1. Tourist office counselling problems (left) according to problem categories and requirements for an improved counselling (right)

Problem Statement (PS) in Destination Counselling	**Design Requirements (DR) for Improved Destination Counselling**
information asymmetry	
PS1. Potential of distrust describes the occurrence of the principle-agent conflict in destination counselling	DR1. Provide shared information access and DR2. shared interaction to stimulate involvement and foster empowerment of the guest in a continuous counselling with traceable actions
PS2. Staccato counselling issue describes the uncomfortable waiting times for the guest and his/her reduced involvement	
burden of choice	
PS3. Time pressure describes the nature of destination counselling sessions which typically are rather short (approx. five minutes on average)	DR3. Provide short cuts and fast tracks to common demands
PS4. Information integration problem describes the deluge of paperwork and the amount of Internet resources needed for counselling	DR4. Provide integrated forms of information gathering for comprehensive product impression
sticky information needs	

PS5. Missing hidden needs elicitation describes the absence of an inspiring counselling form and sufficient material	DR5. Provide inspiring information, visualizations and mind-compatible counselling material
PS6. Visual expression deficiency depends on inadequate used or missing tools / material (is exacerbated by unavailable (multi-) medial presentation material and the problem of improper material)	DR6. Provide describing media in an emotionally impacting way
environment	
PS7. Knowledge development problem describes the result of introducing new products and service to an environment of a high employee turnover	DR7. Provide maintenance opportunities for content and possibilities for quick-learn-paths
PS8. Problem of differing service capabilities describes a result of a high employee turnover and missing training-on-the-job concepts	DR8. Provide an easy-to-learn interface and increase content accessibility to support learning

In a shared meeting consisting of the design team, software developers and general manager, as well as sales manager, DR1-DR6 were finally chosen for instantiation, since DR7 and DR8 are long-term design requirements, whose evaluation is only possible when DR1-DR6 are confirmed and are proven to be suitable.

4 Instantiating Collaborative Destination Counselling

A typical workflow of hiking counselling starts with a tourist (Beat), wearing, e.g., hiking shoes and entering the tourist office. A kind tourist office employee (Regula) welcomes him and invites him to have a look at the destination counselling support system, SmartStay (see Fig. 1 for a screenshot), that is running on a 23" touch-sensitive screen (DR6 since touch-sensitivity and screen size can positively influence emotional involvement (Novak & Schmidt 2009)). Regula asks Beat how she can help him. Beat answers that he wants advice for a hiking tour, but it should be not that difficult. Regula briefly introduces the touch-functionality and suggests that together they can search for a most suitable tour. Since SmartStay allows directly searching for hiking tours, Regula clicks on the relevant button from the demand segments area (DR3, 4), and soon a map (Google Earth), as well as listed hiking tours, appear. Since Beat is noticeably in a hurry, Regula scrolls through the listed tours and suggests two easy and one gourmet hiking tour with a medium rating, which they decide to further investigate. Beat is interested in the tour details and is really intrigued by the gourmet hiking tour. He decides to save the gourmet hiking tour to his itinerary (DR1, 2). Since he also wants to stay independent, he asks whether there are additional places near the tour route to enjoy interesting food. Thereupon Regula opens the street-map on the screen and includes the restaurants layer. Pictures of restaurants appear in the column of additional offers which draw Beat's attention (DR5, 6). He asks for the special "crime and dine" offer, which Regula briefly explains and then adds to the itinerary. Finally, Beat asks for a map he would need. Regula suggests buying the

local hiking map that also includes the other two hiking tours. When the itinerary with the chosen offers is printed and paid for, Beat happily leaves the tourist office.

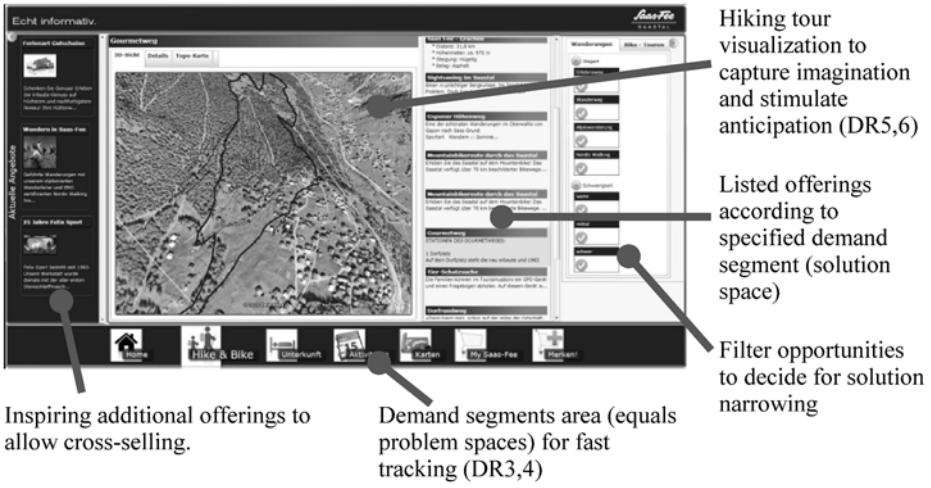

Fig. 1. SmartStay prototype screenshot

The interaction with the tool, SmartStay, is very brief since the counselling in destination is only short-timed. Add-on time for the employee for first understanding the system feedback, translating it to the guest, and then visualizing it anywhere is reduced to a minimum. Guests find their demands directly on the screen, and they receive the needed visualization while they are in the search process. This enables both parties to be quickly well-informed.

5 First Empirical Investigation

On a one-day field study, the prototype system was set up at the partner tourist office including the touch-sensitive screen (see Fig. 2). The within-subjects testing was combined with the following workshop-like debriefing on that day. Observation impressions were discussed during the debriefing. The study took place in winter and the prototype content was optimized to that case.

5.1 Participants, tasks, setting

Six tourist office employees, four appointed guests, as well as two spontaneous guests were involved. Employees were between 18 and 51 years of age, and guests ranged between 17 and 68. In a within-subjects design, guests and employees experienced either the traditional setting or the enhanced situation first, and the other one afterwards. The three counselling tasks were framed to the available content of the prototype system. The tasks were to plan a mountain hiking tour, an activity for kids during the next three days, and a search for a hotel room on short notice, including availability check. Guests were framed to the demand but were asked to behave as

they usually would (regarding price, interest, etc.). Each task was performed twice during the study for both traditional and enhanced setting. Each session was limited to five minutes since this reflects the typical time span for counselling at the destination. After a guest had performed both settings, s/he was asked to fill out a questionnaire. Afterwards, an informal discussion about system and test experiences was held with each participating guest. Tourist office employees received a 30-minutes hands-on training of the system before the test start. After employees had finished their sessions, they were also asked to fill out a questionnaire, and were requested to join the debriefing after all test trials.

Fig. 2. Tourist office employee (using a pen) explaining a map view on the touch-sensitive screen (on the counter) to the customer

5.2 Measurement

The evaluation was operationalized according to design requirements. During observation concentration was placed on tendencies of joint problem-solving and the guest's activity (DR1, 2). Additionally, the guest, as well as the employee questionnaire, contained: the Attrakdiff2 semantic differential (Hassenzahl et al., 2003) for pragmatic (DR3, 4) and hedonic quality aspects (DR5, 6), direct questions regarding effectiveness (very good result) and efficiency (very fast achieved) of system use in the experienced context (DR3, 4), and a final intention-to-use judgment adopted from Venkatesh (2003).

The semantic differential of Attrakdiff2 (Hassenzahl et al., 2003) measures the overall user experience in the two dimensions of hedonic and pragmatic quality, which are proven to be distinguishable from each other by users. While pragmatic quality (PQ) reflects the usefulness and ease of use of a system, hedonic quality (HQ) reflects system qualities "beyond the instrumental" (Hassenzahl & Tractinsky, 2006). These aspects address the ability of the system in use "to surprise, to foster curiosity and to provide opportunities for the perfection of knowledge and skills" (HQ-aspect of stimulation – HQ-S) (Hassenzahl, 2005), and the ability "to communicate self-serving symbols to relevant others" (HQ-aspect of identity – HQ-I) (Hassenzahl, 2005). Each quality aspect is constructed by seven items whereby the participant is asked to indicate on a seven-point Likert scale whether the destination counselling (traditional

and again for enhanced) is, e.g., undemanding or challenging (as example for HQ-S), unprofessional or professional (as example for HQ-I), and confusing or clearly structured (as example for PQ). (We additionally paraphrased the PQ-dimension by direct questions on effectiveness and ease of use.) The final intention-to-use judgment (adopted from Venkatesh, 2003) provides a cautious glance at the potentials in the future of system and service acceptance. Ratings were conducted on a seven-point Likert scale and the following three items: (1) I intend to use the SmartStay-supported destination counselling for my next near-term planning at the destination, (2) I predict to use the SmartStay-supported destination counselling for my next near-term planning at the destination, and (3) I plan to only use SmartStay-supported destination counselling for my next near-term planning at the destination.

5.3 Results

Since the sample was constrained to only six guests and six tourist office employees, the data analysis was limited to average calculations, and the data was enhanced with the observation descriptions and debriefing results. The results from the Attrakdiff2-instrument indicate a high advantage of the SmartStay-enhanced situation regarding stimulation quality (ø 6.2 vs. 3.6). Guests confirm this by lauding the integrated 3D maps with the tour visualizations with different perspectives and zoom levels. Observations revealed that especially the 3D maps were most often used (in all enhanced sessions), and all participants mentioned this feature as most valuable (e.g., "I was impressed by the maps"). Touching the screen additionally enhanced the impression ("Hu, I can touch my hiking tour"). One participant knew Google Earth and indicated a high satisfaction regarding that kind of destination counselling: "Finally it sunk in! This is a modern counselling." Regarding the identity aspect, participants had difficulty answering the questionnaire (e.g., "alienating" vs. "integrating" was difficult to interpret), which they indicated during the ticking of boxes. Although word pairs were then explained, ratings must not be as intended (enhanced: ø 5.8 vs. traditional: ø 5.6). The pragmatic quality is marginally lower for the enhanced situation (ø 5.6 vs. 5.7). Compared to the results of the paraphrasing, the picture about the system's utility is slightly different. Guests indicated a higher agreement to the statement "SmartStay-enhanced counselling led to a very good result" (ø 6.1 vs. 5.4), as well as to the statement "SmartStay-enhanced counselling led very fast to a result" (ø 6.4 vs. 5.9). When guests were asked about that discrepancy they indicated they were undecided about the utility of the two situations; thus, they rated the direct questions higher due to the joy they felt in the enhanced situation. Since they were not aware of the implications of the semantic differential rating, the effect of enjoyment outshining effectiveness and efficiency is not visible.

The intention to use SmartStay for destination counselling clearly shows a high interest in such counselling (ø 5.4). Without the exclusive third item of that construct, SmartStay reaches an even higher rating (ø 6.2). The debriefing concerning this issue revealed that guests do not perceive the system inset as commonly useful. There were cases, for instance, of only asking for a certain address or bus schedule, whereby the system would be excessive.

Apart from the questionnaire-guided debriefing, the six framed traditional and six enhanced situations were also observed. During the traditional counselling sessions, the first observations that led to system design were confirmed. Additionally, while in traditional counselling, active and curious guests expressed their activity by leaning over the desk, as they were very interested in touching the map on their own in the enhanced situation. Commonly, there are very active guests in enhanced counselling clicking on buttons, moving and zooming maps, or discovering interesting offers that the tourist office employee had not noticed before. Guests experience this as increased involvement. All guests, on the other hand, criticized the still predominantly text-heavy content. They agreed with tourist office employees that a second generation of the system needs to provide more context-oriented, multi-media content. They mentioned, for instance, short films for activities which could enrich the impression of activities. Tourist office employees were especially concerned about the furnishings and the integration of a possible technology with the shop concept.

6 Conclusion and Future Directions

Based on previous experiences in travel agencies, this paper presents a first step to collaborative destination counselling. The presented concept addresses the identified three problem areas of the principle-agent conflict, the burden of choice, and the stickiness of information needs, and thereby provides a perspective on destination counselling that focuses on actors and their interaction. Derived design requirements have been instantiated by SmartStay, which combines information and interaction sharing, burden-of-choice-reducing segmentation, and an imaginary, "touchable" content presentation accompanied by a touch-sensitive screen. The initial field study uncovered potential for improvement.

The equalizing situation is beneficial to both guests and employees. Since SmartStay is the first attempt, improvements and further development are needed. Context-awareness and text-reducing preparation of content are crucial due to time pressure. Therefore, the concept of demand segmentation appears to be not only useful but very necessary. Beyond system characteristics, an emphasized process support (needs elicitation, procedures while planning, alternatives comparison, etc.) needs to be considered for future service versions to foster sales orientation. A suitable counselling method needs to empower the guests while supporting the moderating role of the employee adequately. It needs to establish direct relations to cross- and up-selling opportunities, and needs to address printed artefacts as "information outsourcing" (esp. regarding texts). A rethink of the workplace situation according to workplace ergonomics and work psychology is also needed. The described measurements for concentrating within the retrospective discussions build a baseline for future evaluations with larger sample sizes when a further developed version of SmartStay can be introduced to daily business. For further embedding of the new service design, accompanying scenarios can be envisioned: a distributed counselling scenario which enables involving a tourist office employee of a neighbouring destination and a mobile scenario which enables taking along information digitally or using digital tickets for activities.

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Modelling e-Tourism Services and Bundles

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Abstract

One of the main challenges in the e-Tourism industry is to present a potential traveller (or travellers) with exciting holiday possibilities during the booking process in order to deliver her/him a memorable experience. Such an experience is not only bound to services offered by a hotel, but also to extra (mostly third-party) services that can be combined together in order to offer a complete and customised holiday package. The diverse nature of such services make it very hard to integrate them together and to achieve this objective. The scope of this paper is to address this problem by defining and describing a set of requirements and data-models that are able to capture different aspects of such services and also a combination thereof.

Keywords: services; bundling; e-Tourism; composition; OTA; packages.

1 Introduction

The boom in e-Tourism has brought travellers enormous amount of possibilities for them to organise their holidays. Travellers can choose from all sorts of services that they usually find using standard search engines such as Google. As a consequence, they end up zapping around web pages to find services that satisfy their needs and/or find it very hard to configure them properly according to their requirements. Apart from leading to frustration, travellers very often give up on the whole process. Our work focuses on helping travellers to combine such services and on helping service providers and hoteliers to attract as much as possible such travellers to book their services. These services are very diverse in nature; some of them are bookable via email, others via sophisticated SOAP interfaces or simple REST services or Web APIs. Consequently, modelling and integrating these services together is a tedious and costly task.

This work describes the requirements for modelling 3rd party services and a combination thereof, which is a direct contribution to the work described in (Scicluna *et al*., 2010a). The latter describes service bundling by using template refinement techniques, and we complement it with the required elements to model services and bundles. Our contributions are applied in our existing systems, *seekda! connect* and *seekda! dynamic shop*. The former allows hoteliers to manage their properties by defined descriptions, rates and availabilities and export them to various booking channels, as well as importing reservations from these channels. On the other hand, *seekda! dynamic shop* is complementary to *seekda! connect* in that it allows end users to book rooms for that particular property according to the specified rates and

availabilities. Apart from booking rooms, this system will be extended with booking third party services. At the core of our extensions is a business service repository for storing and searching for services and for managing bundles. The layout of the main components is shown in Fig. 1. A service provider registers her/his services with the system - this is so far done manually but will be in the future part of our generic service bundling platform, as described in (Scicluna *et al*., 2010a). Then, a hotelier sets up her/his property and enters the data for hotel content description, rates and availabilities which can be exported on different channels via the switch.

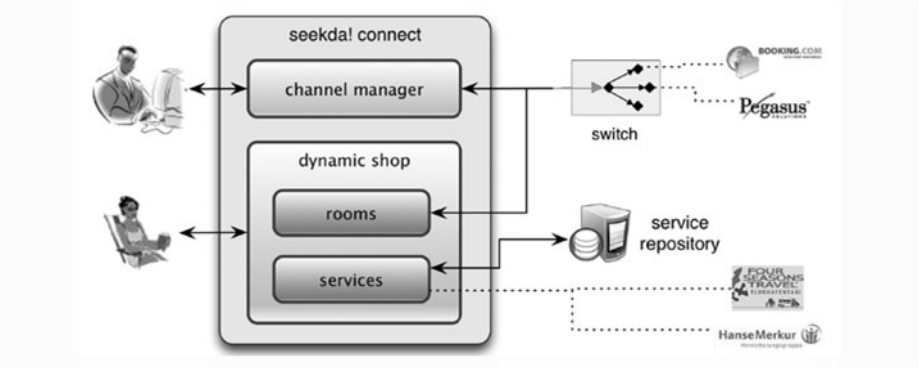

Fig. 1. High level overview of the framework.

Following that, the hotelier chooses which 3rd party services are enabled on the hotel's dynamic shop widget. An end user then searches for a room using the dynamic shop and potentially chooses a few of the interesting services that were enabled by the hotelier. The booking is then done directly to these 3rd party services and the complete package – which we call *bundle* – is stored. The data-model used in our systems is OTA[15], which provides a set of XML schemas for describing various aspects of travelling. The main ones are hotel stays, cruises, flights, golf courses and car rental. Although they model these domains quite extensively, the whole set does not capture other "everyday" services that may be desirable during travelling. In the region of Tyrol (Austria), such services include airport shuttles, skiing tickets, mountain bike rental, ski equipment rental, wellness centres and museum tickets. Our main contributions are to provide generic extensions to overcome these limitations in OTA and create a generic model for describing the combination of business services. Note that this work does not tackle the actual bundling computation and we refer the reader to (Scicluna *et al*., 2010b) for details about this aspect.

The rest of the paper is structured as follows. Section 2 describes the requirements and extensions for modelling business services, followed by Section 3 for service bundles. Section 4 describes the main related work and Section 6 concludes.

15 http://opentravel.org

2 Business Services

Along the aspects of a service itself, the properties of its provider must also be captured. This is partially achieved through the *Profile* elements defined by OTA, for modelling business entities. More specifically, OTA allows to create profiles via OTA_ProfileCreateRQ/RS and to read them via the OTA_ReadRQ and OTA_ProfileReadRS message types. We use the *Profile* element for describing both the service providers and the end users. Extensions for service providers describe the provided services and – possibly – pre-defined bundle templates (described later). Extensions for customers identify the booked service bundles. In the following, we describe the requirements for describing services in Section 2.1 and their respective data-models in Section 2.2

2.1 Requirements

There are many available diverse services for which it is desirable to define a generic data-model that can capture their aspects. Table 1 provides a summary of the aspects that we collected from services from our potential partners. These provided services range from transportation, equipment renting to event tickets.

Table 1. Summary of the requirements for describing services.

General	
Identifier	A unique identifier for the service.
Service Provider	ID of the service provider offering the service.
Service Category	Domain/Category of the service.
Descriptions	Name of the service and multimedia descriptions (multi-lingual)
Policies	
Terms and Conditions	Those applicable for hoteliers that enable the services and also those applicable to end users that book the services.
Guarantee	Some services require a guarantee for the service to be booked (for example, a deposit payment or credit card details).
Cancel Policy	Determines the conditions (and penalties) for booking cancellation.
Constraints	Constrain the usage of the service (for example, which hotels can use it and during which periods of the year it is available).
Parameter Configuration	
Integration Pattern	Determines the kind of integration pattern used to interact with the service (for example, when booking it).
Offer	Describes the offer provided by the service (if possible). Optionally, it can be parsed from an external source via a URL.
Parameters	The data required to be gathered from the user in order to book the service. Some or all of this data can be acquired from sources like the room booking process (avoiding multiple input of the same data).
Deposit Payments	Captures payment information (for example, credit card details).

2.2 OTA Limitations and Implemented Extensions

We now discuss the shortcomings of OTA for representing the above aspects, followed by our extensions. In many cases, elements from OTA can be reused to cover some of the aspects discussed above. However, there does not exist a specific element that comprehensively and clearly covers the aforementioned aspects of services. OTA approaches the idea of services at two levels. At the top most level, it provides messages that deal with a small set of domains. At a lower level, it allows hotel descriptive content to define services provided by the hotelier. The top level elements cover flight, cruise, golf, hotel stays and vehicle renting. Although these top level elements cover their respective domains very well, there is no other similar element that is more generic to cover other domains (such as those in Fig. 3).

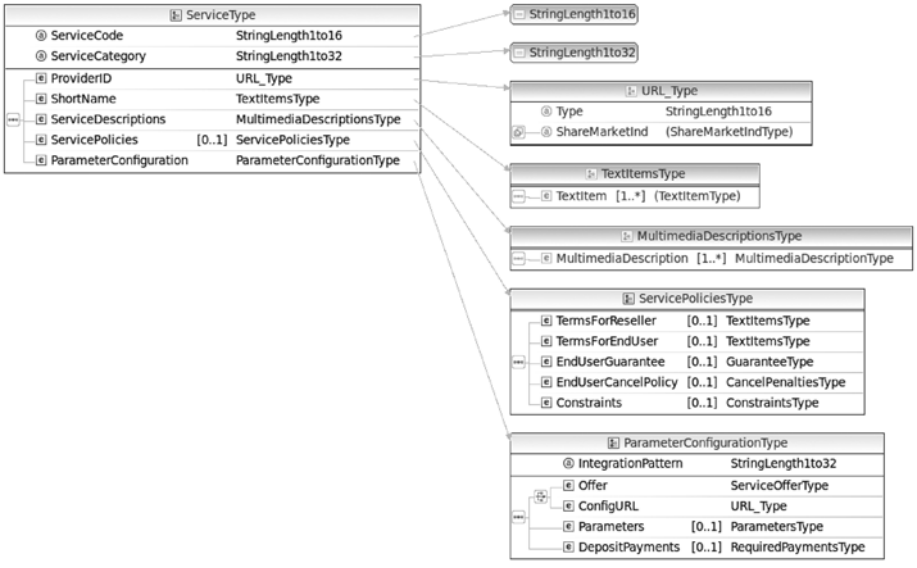

Fig. 2. Service schema type as designed for the dynamic shop.

The *ServiceType* element defined by OTA is part of the hotel descriptive content[16]. As stated, the first basic problem is that these elements cover only those services provided by the hotelier. As a consequence, the constructs defined by this type are not adequate enough to cover the requirements for describing 3rd party services. A few comments about the elements defined by OTA follow. The *AvailabilityToAnyGuest* boolean attribute captures too little information. We would like to capture the conditions under which a service is available to a guest. These include – amongst others – number of people and the period during which it is available. The other attributes are not relevant to our requirements. The *Contact* element contains information about the contact person (or entity) for that particular service. We express these aspects in a different and more expressive way using the elements provided by the *Profile* type (more below). The *RelativePosition* element defines the position of

16 http://www.opentravel.org/2010A/OTA_HotelContentDescription.xsd

where the service can be consumed/used in relation to the hotel offering the service. We intend to provide absolute location information for where the service is available. The difficulty here is how to define constraints that capture this information. For example, how should the term "near" be defined? This type of constraint is left as part of our future work. The *OperationSchedules* defines when the service is available for operation. This type is completely reused as part of our *Seasons* element (discussed further below) and *MultimediaDescriptions* is also completely reused. The *Features* element describes some highlights of the service, including multimedia descriptions. We do not use any of these elements since we feel that a single set of descriptions is enough. The final element provides a way to add *DescriptiveText*. We also ignore this element since textual descriptions can be entered in the multimedia descriptions part, where multi-lingual entries are also allowed.

The elements provided by OTA to describe the above mentioned types of services clearly do not capture the requirements listed in Table 1. Our extensions complement the ones provided by OTA and extend them to cover all of these aspects. These extensions are shown in Fig. 2. Our discussion focuses on our extensions and only briefly describes/mentions those elements that have been directly reused from OTA.

The *ServiceCode*, *ProviderID*, *ShortName* and *ServiceDescriptions* attributes and elements are self-explenatory. The interesting attribute here is the *ServiceCategory*. The dynamic shop maintains a taxonomy of services in order to enable a more intelligent and useful search. Categories are subsumed, meaning that when a traveller (or an intelligent agent) searches for services in a certain category, all those services in the subcategory are returned. For example, given the current developed taxonomy in Fig. 3, when searching for *Mountain Sports* services, those that belong to skiing and mountain biking (along with the other sibling categories) are also returned. This is also particularly useful for domain specific hotels – like ski hotels – that are generally interested in specific kinds of services. Note that this technique is purely based on reasoning and not text.

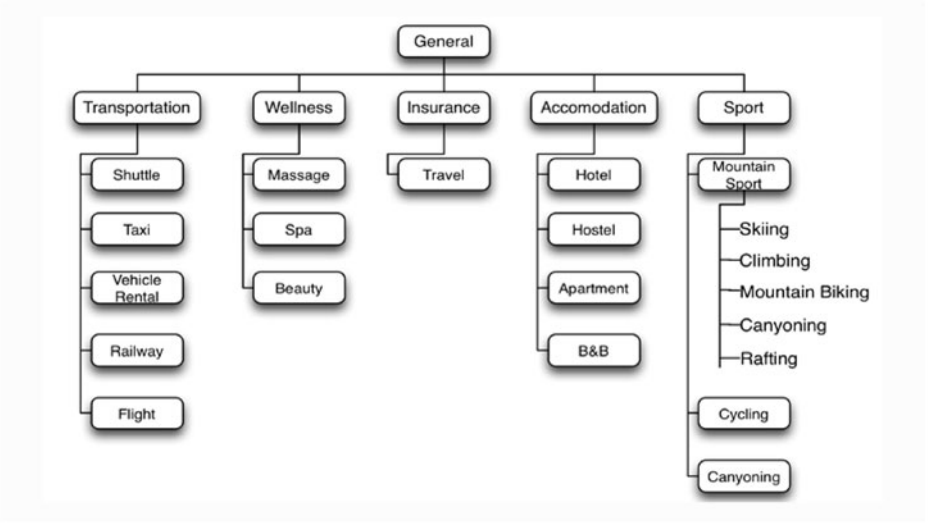

Fig. 3. Taxonomy of service categories as defined by the dynamic shop platform.

The *ServicePolicies* element is perhaps the most interesting aspect, in particular the *ServiceConstraints*. Before tackling the latter, a few words of the other elements follow. The *TermsForReseller* and *TermsForEndUser* are text item descriptions that allow to express the terms and conditions for the appropriate entity in a multi-lingual fashion. The *EndUserGuarantee* and *EndUserCancelPolicy* types are reused directly from OTA. The schema types for these elements are *GuaranteeType* and *CancelPenaltiesType* respectively and they are further described online[17].

Of particular interest to us are the service constraints, of which an example is shown in Listing 1[18]. One of the basic constraints is the availability period of the service which is captured through the *Seasons* and *OperationSchedules* constructs. Periods of availability are therefore identified through seasons, and the operation schedules determine the actual dates (and possibly, times) of when the service is available. The example describes that the service is available during a season called “Summer” from 01.06.2010 to 15.09.2010 and between 08:00 and 18:00 every day. The service is not available outside these periods. Note that days of operation can also be explicitly restricted. The next construct – *AllowedHotels* element - describes which hotels are allowed to use this service under specific conditions. The *Global** attributes define that the particular restriction applies to all hotels that use the service. In this example, *GlobalMinAdult* and *GlobalMaxChild* indicate that, unless otherwise specified, no children are allowed and at least one adult is required in order for the service to be used. However, the hotel with code *DS_HOTEL001* overrides the minimum adult requirement to 2 and specifies a further restriction that the minimum length of stay in order for the service to be used is 3 nights. Hotel *DS_HOTEL002* specifies a different restriction: the *AllowedRoomCode* indicates that the service is only available if the

17 http://www.opentravel.org/Specifications/OnlineXmlSchema.aspx

18 The namespace prefixes are removed for readability.

end user books room *JNR_SUITE* for that hotel. Of course, the global restrictions also apply. This approach for describing constraints provides a lot of flexibility – and also expressivity – for different situations and conditions under which a service can be booked. Note that if the *AllowedHotels* element is empty, the service is available to all hotels, given that the global restrictions are met.

```
<Constraints>
  <Seasons>
    <Season SeasonCode="SMR" SeasonName="Summer">
      <OperationSchedules>
        <OperationSchedule Start="2010-07-01" End="2011-09-15"
                           Name="Summer Schedule">
          <OperationTimes>
            <OperationTime Start="08:00:00" End="18:00:00" />
          </OperationTimes>
        </OperationSchedule>
      </OperationSchedules>
    </Season>
  </Seasons>
  <AllowedHotels GlobalMinAdult="1" GlobalMaxChild="0">
    <AllowedHotelCode HotelCode="DS_HOTEL001" MinAdult="2" MinLOS="3"/>
    <AllowedHotelCode HotelCode="DS_HOTEL002">
      <AllowedRoomCode>JNR_SUITE</AllowedRoomCode>
    </AllowedHotelCode>
  </AllowedHotels>
</Constraints>
```

Listing 1. ***An example of a constraints definition.***

The XML in Listing 2 shows an example of a parameter configuration for a service. The *IntegrationPattern* indicates the mode of integration of this service. Note that the interaction/integration pattern itself is not described in this work. We are developing a set of integration patterns gathered from our current services (from real service providers) and will tackle these aspects in our future work, giving special attention to, and inspiring ourselves from the integration patterns described in (Hohpe *et al.*, 2003). The *Offer* construct describes the pricing, if available. In our example, we have an item *MBK_XT15* whose price per adult (attribute value 1 for *Adult*) is €25.0 per day (attribute value "Daily" for *Basis*). The name of the item can be also added (in a multi-lingual fashion). Note that the element *Offer* is used in a different way according to the context. In terms of a service description, it determines the pricing scheme (as in the example above). If it is not given, the pricing of the service is fetched from an external source, say, the service provider or a local file. However, in the context of bundling and the actual booking of the service by an end user, this element describes exactly how much the service costs.

```
<ParameterConfiguration IntegrationPattern="101.INT">
 <Offer><PriceList>
    <PriceItem>
      <ItemCode>MBK_XT15</ItemCode>
      <Price Adult="1" CurrencyCode="EUR" Value="25.0" Basis="Daily"/>
    </PriceItem>
    <PriceItem>
      <ItemName>
        <TextItem Language="EN" Title="Mountain Bike XT15 Rental"/>
      </ItemName>
    </PriceItem>
 </PriceList></Offer>
 <Parameters><Parameter Required="true"><Code>startDate</Code>
    <ParameterValue><ValueType>Date</ValueType></ParameterValue>
  </Parameter>
  <Parameter Required="true"><Code>endDate</Code>
    <ParameterValue><ValueType>Date</ValueType></ParameterValue>
  </Parameter>
  <Parameter Required="true"><Code>adultCount</Code>
    <ParameterValue><ValueType>Integer</ValueType></ParameterValue>
 </Parameter></Parameters>
</ParameterConfiguration>
```

Listing 2. ***An example of a parameter configuration description.***

The *TotalPrice* element – not present in the example – is used to model the total pricing of the offer. Our final element to discuss is *Parameters*. This element – as the name suggests – defines the parameters that are required to be filled in by the end user in order for the service to be bookable. In the example above, we have the start and end dates and the number of adults.[19] Again, once this service is booked, another element *Value* is added as a child of *ParameterValue,* which indicates the value to be used. Such a value is parsed according to the type specified by *ValueType*. Therefore these elements are also used in different ways depending on the context.

3 Bundles

In this section we describe the aspects surrounding bundles. In order to model bundles, we chose BPMN (for the graphical representation) and extend and reuse OTA (for the XML representation). We start off in Section 3.1 by describing the requirements for modelling bundles and go on in Section 3.2 to define the extensions and the XML elements themselves.

3.1 Requirements

The desired features of service bundles are listed in Table 2. These requirements focus on easy management of bundles, in particular by using templates and constraints for finding suitable services as described in (Scicluna *et al*., 2010a/b).

19 Note that realistically, a service such as this one will have more parameters. We just provide a reduced version for saving space.

Table 2. Requirements and desired features for service bundles.

Identifiable	The bundle must be identified for storage and association.
Owners	The owners are both the one that provides the bundle (for example, the hotelier) and the one that books the bundle (i.e., the end user).
Abstract vs Concrete	Distinguish between bundles that do not offer a full functionality (abstract) in contrast to those for which the required services have been found (concrete).
Global vs Local Constraints	Local constraints specify requirements over specific tasks/activities; Global constraints apply to all tasks/activities in a bundle.
Task Dependences	It can occur that certain services depend on others. For example, an airport shuttle service cannot be booked before a flight is available.
Message Routing	An output of a service may be used as the input of another. This is especially important for tasks which are fullfilled by a combination of services, which in turn need to exchange information via inputs and outputs.
Standard Control Flow constructs	These elements describe the order in which the services are executed/booked. For example, in contrast to dependences, certain services may be safely booked in parallel.
Graphical Notation	Writing bundles in XML – or any other format – can be a tedious task. It is therefore desirable that bundles are represented by a simple – yet expressive – graphical notation.
Annotations	Annotations range from simple textual descriptions, to multimedia annotations and semantic/constraint annotations. All these must be supported in order to enable a rich description of a bundle.

3.2 BPMN Extensions and XML Representation

BPMN (OMG, 2003; Dijkmann *et al*., 2007) is one of the most widely used notations for describing processes. It allows to specify processes both at the abstract and at the concrete levels, making it a perfect fit in the context of template design and refinement. The main deficiency of BPMN in terms of our requirements for service bundles is the lack of support for constraint annotation (both global, and local ones). We overcome this by using BPMN "Artifacts" which provide modellers with the facility of showing additional information about a process that is not directly related to its sequence flow or message flow. Artifacts are linked to flow objects through associations. In the core specification, three types of artifacts are defined: *Data Object*, describing what activities require to be performed and/or what they produce; *Group*, allowing to group certain elements in the flow; *Text Annotation*, allowing to provide textual information about some object in the diagram.

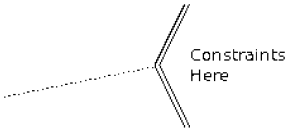

Fig. 4. Constraints Annotation for BPMN.

We add a new artifact called *Constraint Annotation* and represent it graphically as shown in Fig. 4. Since BPMN processes and activities/tasks may have such artifacts associated with them (OMG, 2003), and since we create such an annotation as an artifact, we consequently fulfil the requirement of global vs local constraints. Note that the format used to express the constraints is left up to the modeller and/or the application – we use the same as for Web service descriptions (c.f. Listing 1).

```
<Bundle  Id="BUNDLE_1" Name="Bundle Example">
 <Pools><Pool Id="MainPool" MainPool="true" BoundaryVisible="false">
   <Lanes><Lane Name="Main Lane" Id="MainLane">
     <SubProcess Id="MainProcess" SubProcessType="Embedded">
      <SequenceEdges>
       <SequenceEdge Name="Start to SHTL_MUN" Id="StartToSHTL_MUN"
                     TargetID="SHTL_MUN" SourceID="StartEvent" />
       <SequenceEdge Name="SHTL_MUN to End" Id="SHTL_MUNToEnd"
                     SourceID="SHTL_MUN" TargetID="EndEvent" />
      </SequenceEdges>
      <Artifacts Name="Process Annotations">
       <ConstraintAnnotation Name="SHTL_MUN Constraints" Id="ConSHTL_MUN">
        <Associations><Association TargetNodeId="SHTL_TASK" /></Associations>
        <Constraint>...</Constraint>
       </ConstraintAnnotation>
      </Artifacts>
      <ServiceTask Name="Shuttle Service" Id="SHTL_TASK">
       <DynamicShopServiceID ID="SHTL_MUN" Type="101.SKD"
                             URL="mailto:office@airport-transfer.com"/>
      </ServiceTask>
      <Events><Event Id="StartEvent" Name="Start">
        <OutgoingSequenceEdgesIDs>
         <ElementID>StartToSHTL_MUN</ElementID>
        </OutgoingSequenceEdgesIDs>
       </Event>
       <Event Id="EndEvent" EventType="End">
        <IncomingSequenceEdgesIDs>
         <ElementID>SHTL_MUNToEnd</ElementID>
        </IncomingSequenceEdgesIDs>
       </Event></Events>
     </SubProcess>
   </Lane></Lanes>
 </Pool></Pools>
```

Listing 4. ***An example of a concrete service bundle description in XML.***

Next we need to distinguish between abstract and concrete bundles. A bundle contains an ordered set of tasks and is graphically represented by a BPMN diagram with the extensions described above. It may take the form of a *template* or a *concrete/service bundle*. A *template* is a bundle whose tasks are not (yet) fulfilled by services – we also call a template an *abstract bundle*. On the other hand, a *concrete/service bundle*

is a bundle that has all its tasks fulfilled. The same definition of a bundle applies to its inner processes. Note that it is a *Service Task* that ultimately determines the nature of a process or a bundle. If *at least one* of such tasks does not have an implementation linking to a business service, it makes the bundle a template. A graphical distinction – using colors – is also recommended and is left up to the application.

We now describe the XML elements for representing bundles. XML enables an easy integration with OTA and consequently with our systems and external services. For easier understanding, we explain the XML elements by using an example. Listing 3 describes a process (with *ID* "MainProcess") whose main elements are the shuttle service in the *ServiceTask* and the start and end events (within the *Events* element). These three elements are connected via sequence edges and the shuttle task is annotated with a *ConstraintAnnotation* artifact. Note that since the shuttle task is "implemented" by the *DynamicShopServiceID*, and since there are no other abstract tasks, the whole bundle is concrete.

4 Related Work

Many works have been done in the research community in order to enable descriptions of services. These range from XML to logical based formalisms. WSDL (Chinnici *et al*., 2007) is an XML format for describing Web services. It defines the operations (together with their inputs and outputs) that are supported by the web service. Furthermore, these operations are bound to a messaging protocol such as SOAP. This representation format is therefore at a lower level than the actual elements that we are trying to capture, and we therefore use it directly for invocation purposes, when available from the service provider. The most prominent works regarding service descriptions within the semantic community are SAWSDL (Farrell, 2007), WSMO (Roman *et al*., 2005) and OWL-S (Martin *et al*., 2004). SAWSDL allows to link semantic annotations to WSDL documents, providing a very lightweight annotation mechanism. There is no restriction on the language of semantic annotation used – this is left up to the modeller and/or application. However, in most cases, RDF (Manola *et al*., 2004), OWL (McGuinness *et al*., 2004) or WSML (de Bruijn, 2010) are used. WSMO defines four pillars for describing web service aspects: Ontologies, Mediators, Web services and Goals. We are in particular interested in Web services. In WSMO, these are comprised of a capability and any number of interfaces. Capabilities describe the pre- and post-conditions of the service and interfaces describe the interaction mode via choreographies and orchestration. Web service descriptions are based on the WSML language, with the possibility to link interfaces to external descriptions. OWL-S builds on top of OWL and is comprised of two main blocks: a profile and a process model. The profile describes the inputs and outputs of the Web service and the process model describes the mode of interaction of that service. Both WSMO and OWL-S are based on logical languages. Although expressive enough to deal with a vast amount of scenarios, they have not been taken up by industry standards and their usage is slow. Furthermore, grounding these formalisms to existing technologies is an expensive and most of the time an inefficient and inaccurate process. WSMO-Lite (Fensel *et al*., 2010) is perhaps an attempt to overcome this problem. This format is based on RDF and

inherits some of the features for WSMO Web service descriptions. Still, there are very little tools and technologies that support RDF at an industrial level and introducing yet another layer in our system will increase complexity and hamper performance.

With respect to representing service bundles, few efforts are available apart from those that are fully-fledged process languages. As stated earlier, OTA provides a limited type for describing packages. Within industry, BPEL4WS (Andrews *et al.*, 2003) is the de-facto standard for specifying and executing processes. The main bottlenecks are that this format is also too low level, not extensible and does not provide an adequate graphical representation. Along BPEL4WS is WS-CDL (Kavantzas *et al.*, 2004) which enables to describe web service interaction from a global perspective. This format is very little used in industry and suffers from the same deficiencies as for BPEL4WS. From within the research community, YAWL (van der Aalst *et al.*, 2003a) is one of the most prominent languages and formally specified with Petri-Nets. The main aim of this language is to formalise all possible workflow patterns (van der Aalst *et al.*, 2003b). Recently, a suite of tools have been produced by YAWL[20] which are slowly being taken up by industry. Though the tools (and the language itself) are very powerful, they are rather complex for an average user to grasp and use. We aim at a simple notation that normal users can modify according to their needs without requiring extensive knowledge and training in the business process domain. From the semantic community, WSMO and OWL-S allow – to a certain extent – to semantically model processes and a further attempt was to ontologise BPMN using WSML (Abramowicz *et al.*, 2007). All these efforts inherit the same deficiencies as semantic web service descriptions.

5 Conclusion and Future Work

This paper presented a set of requirements for modelling business services and bundles in the e-Tourism context, followed by their respective model specification. In our future work, we will focus on specifying the integration pattern ontology for such services, enabling easier integration with the target business services. We will also look into the possibility of using the *GoodRelations Ontology* (Hepp, 2008) for describing the offers provided by business service and look deeper into the business processes community for possibly reusing some of its results. Finally, our ongoing work involves developing the platform where all these technologies are being implemented.

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The knowledge destination – a customer information-based destination management information system

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Abstract

Huge amounts of customer-based data, such as tourists' website navigation, transaction and survey data are available in tourism destinations, however, remain largely unused (Pyo, 2002). This paper presents the concept of a knowledge-based destination management information system (DMIS) that supports value creation through enhanced decision making. Information is extracted from heterogeneous data sources of the Swedish tourism destination of Åre and is categorized in explicit feedback (e.g. survey data) and implicit information traces (e.g. navigation and transaction data). Methods of business intelligence are applied to retrieve interesting data patterns, thus, to generate knowledge in the form of empirically validated models. The paper deduces new insights about the applicability of data mining techniques and related models at tourist destinations depending on the type of tourism data and concrete problem characteristics at hand (Pick & Schell, 2002).

Keywords: management information systems, business intelligence, data mining, tourism knowledge destination

1 Introduction

The competitiveness of tourism destinations depends largely on how information needs of stakeholders can be satisfied through ICT-based infrastructures and services (Buhalis, 2006). However, although huge amounts of customer-based data are widespread in tourism destinations (e.g. webservers store tourists' website navigation, data bases save transaction and survey data) these valuable knowledge sources typically remain unused. Thus, managerial competences and organisational learning in tourism destinations could be significantly enhanced by applying methods of *business intelligence* (Min *et al*. 2002; Pyo *et al*., 2002; Sambamurthy & Subramani,

2005). The latter method offers reliable, up-to-date and strategically relevant information about tourists' travel motives and service expectations, channel use and related conversion rates, booking trends, estimations about the quality of service experience and value-added per guest segment (Pyo, 2005).

Through the generation, management and access of relevant information, the knowledge level of tourism destination stakeholders can be increased and information asymmetries be reduced. Knowledge relevant to tourism suppliers (i.e. information about tourists and destination resources) fosters market cultivation and destination competitiveness is strengthened by enhancing service effectiveness using destination resources in a more sustainable way. However, it is less the knowledge base existing at any time per se, than a firm's ability to effectively apply (and learn from) existing knowledge to create new knowledge and to take strategic action that forms the basis for achieving competitive advantage. Thus, the major challenge of knowledge management is to make individual knowledge about customers, products, processes, competitors or business partners available and meaningful to others (Pyo *et al*., 2002). This makes also clear why ICT and methods of business intelligence are playing a crucial role in effectuating the knowledge-based view of the firm (Grant, 1996) when enhancing large-scale intra and inter-firm knowledge exchange.

The objective of the paper is to address the above deficiencies by conceptualizing, prototypically developing and validating a destination management information system (DMIS) that supports value creation through enhanced supplier interaction and decision making. Methods of business intelligence are applied to the Swedish tourism destination of Åre to retrieve relevant and previously unidentified knowledge from customer-based data. New insights about the applicability of data mining techniques in tourism destinations depending on the type of data and problem characteristics will be achieved. As a prerequisite for competence development, the proposed approach supports knowledge generation by enhancing knowledge transfer and absorption processes at the level of the destination management organisation (DMO) and small and medium enterprises (SMEs).

The paper is structured as follows. Section 2 presents the concept of a knowledge destination framework and describes the different aspects of customer-based knowledge generation and knowledge application in the form of a knowledge-based DMIS. Section 3 describes how the knowledge destination framework has been validated at the Swedish tourism destination of Åre. Section 4 summarizes the results and gained insights and provides an outlook on future research activities.

2 Knowledge Destination Framework

The conceptual foundation of the proposed DMIS is the *knowledge destination framework*. Accordingly, knowledge activities deal with extracting information from different customer and supplier-based sources as well as with generating relevant knowledge and applying it in the form of intelligent services for customers or

suppliers (i.e. destination stakeholders). Thus, the knowledge destination framework distinguishes between a *knowledge creation* and a *knowledge application layer*.

The *knowledge creation layer* extracts information from heterogeneous data sources and makes destination-specific knowledge available to tourists and destination suppliers. On the customer side, content is generated by tourists through feedback mechanisms providing sources of *structured* (guest surveys, evaluation platforms, etc.) and *un-structured* data (free-text, blogs, etc.). Moreover, implicit knowledge can be made explicit by visualizing tourists' information traces (web search, navigation) through online application tracking and web-mining (Liu, 2008; Pitman *et al*., 2010). Furthermore, valuable knowledge about buying behaviour is generated through mining transaction (booking) data. Finally, tourists' mobility behaviour may be traced by GPS/WLAN-based position tracking (Zanker *et al*., 2010). On the supplier side, knowledge about products, processes, competitors and strategic partners is extractible from existing data sources or websites, e.g. in the form of destination profiles or availability information (Ritchie & Ritchie, 2002; Pyo, 2005).

The *knowledge application* layer provides knowledge-based services for customers as well as destination suppliers and stakeholders. An emerging area of knowledge-based customer services lies in the field of location-based services (Berger *et al*., 2003), comprising services that automatically push context-sensitive messages to tourists, recommend destination services, support dynamic device adaptation and are sensitive to the users' context (Höpken *et al*., 2008). A second prominent application area lies in the field of community services typically used to learn from prior consumption experiences of others (Xiang & Gretzel, 2010). Examples are community sites (e.g. LonelyPlanet), review sites (e.g. TripAdvisor), blogs and blog aggregators (e.g. blogspot.com), social networking sites (e.g. Facebook) and media sharing sites (e.g. YouTube, Flickr). Finally, multi-modal human computer interfaces supporting interactive search services are crucial to enhance knowledge creation in tourism.

By contrast, knowledge-based supplier services mainly fall into the category of tourism-related business intelligence applications (Cho & Leung, 2002; Olmeda & Sheldon, 2002). Explorative data analyses, online analytical processing (OLAP) and data mining (i.e. predictive analytics, clustering, association rules and classification) allow the de-centralized (ad-hoc) generation, management and access of strategically relevant knowledge to the DMO as well as private and public destination suppliers (Fuchs & Höpken, 2009). Thus, crucial management functions that support strategic decision making are provided (e.g. business performance management, forecasting, multi-channel and online community management, dynamic pricing).

The paper proposes a knowledge-based DMIS where the knowledge application layer focuses on supplier-based knowledge application. Although, for knowledge generation both supplier and customer-based information is of principal relevance, the proposed approach restricts itself to customer-based knowledge generation.

2.1 Customer-based knowledge generation

Fig. 1 illustrates all components of the knowledge destination framework. The knowledge generation layer is comprised of the different customer-based data sources and components for data extraction, data warehousing and data mining described in more detail in the following sections.

Data sources: Since the uptake of CRS/GDS in the 1960s' a major part of tourism transactions are handled electronically. With the rapid growth of the WWW this portion further increased, and nowadays customers leave electronic footprints during all travel-related activities, like searching and trip planning, reservation & booking, service consumption (e.g. using mobile services and GPS/WLAN-based position tracking or loyalty programmes, like customer cards) and, finally, post-trip activities in community web sites.

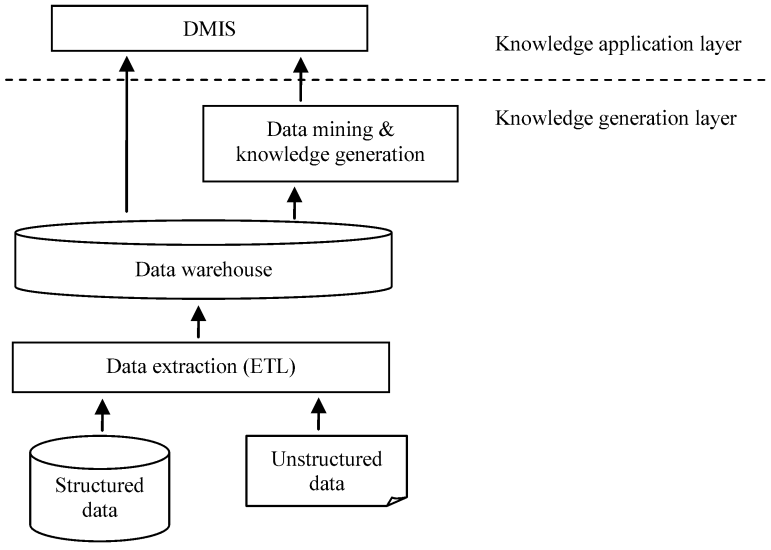

Fig. 1. Knowledge destination framework architecture

Thus, huge volumes of data on customer transactions (e.g. customer inquiries, bookings, payments processing), customer needs and behaviour are typically stored by different stakeholders of a tourism destination. Main added-value is not just a comprehensive collection of data from different sources but especially their combination to generate new knowledge, e.g. the continuous analysis of customer behaviour in all trip phases. Table 1 provides a systematization of data sources to be considered by the proposed knowledge destination framework.

Table 1. Potential data sources of the knowledge destination framework

Explicit tourists' feedback provided knowingly and intentionally	**Implicit tourists' information traces provided unknowingly and unintentionally**
- *Structured data*: e.g. online and offline guest surveys, ratings from web 2.0 applications, user profiles from web applications and online communities, etc. - *Unstructured data*: free text from E-mails and web 2.0 applications (e.g. blogs, e-comments/reviews), rich content (e.g. YouTube.com), etc.	- *Navigation data*: search behaviour on web sites and online portals, community sites, etc. - *Transaction data*: online requests, reservation and booking data, payment, etc. - *Tracking data*: GPS/WLAN-based coverage of tourists' spatial movements - *Observation data*: gathered in a laboratory context or through market observation

Data extraction: Obviously, different data sources require different techniques for the extraction of relevant information, dependent on the data format at hand. *Structured data*, regardless of whether being the results of customer surveys or customer transactions, typically exist in quite differing formats. Thus, a key challenge in the field of information extraction is the integration of heterogeneous data sources by using semantic, linguistic or constraint-based techniques of information integration (Dell' Erba, 2005). By contrast, *unstructured* (or semi-structured) *data* is considered in the form of free text or *html*-documents (e.g. written feedback, blogs or other community-based content). In the case of *html*-documents information extraction is achieved through wrappers, either created manually-based on static patterns or (semi-) automatically generated by means of (un-)supervised learning methods (Liu, 2008). In the case of unstructured data in the form of free text, information extraction is achieved by methods of text mining based on statistical language models (Manning, & Schütz, 2001) or approaches of natural language processing (Jurafsky & Martin, 2000). In order to conform to data privacy aspects, critical personal data (i.e. name, exact address) has to either be left out or obfuscated (Hastie *et al*. 2009).

Data warehousing: At the core of the knowledge destination is a central data warehouse (DW) that embraces all data relevant to tourism stakeholders (Cho & Leung, 2002). Thus, heterogeneous data from different data sources are mapped into a homogeneous data format and stored in a central DW. Only through this harmonisation process is it possible to carry out a destination wide and all-stakeholder encompassing analysis approach. Based on a tourism ontology and methods of semantic annotation and transformation, individual data sources are, first, transformed into a central data model and, finally, into a dimensional structure typical for a DW.

Data mining and knowledge generation: Based on the data collected in the DW, the main task is to generate relevant knowledge for destination suppliers and the DMO. By employing methods of data mining (i.e. techniques of machine learning and artificial intelligence) interesting patterns and relationships in the data are detected and knowledge will be provided in the form of validated models (e.g. clustering models, classification models or association rules). The presentation of these models and the underlying data (in the case of exploratory data analysis or online analytical processing – OLAP) clearly rests on the *knowledge application layer* (section 0). Beside the data itself stored in the data warehouse, the data mining models are the central output of the knowledge generation layer, either used as input to static reports

or, and this is the foremost case in the context of the knowledge destination framework, being interactively visualized within DMIS, described next.

2.2 Supplier-based knowledge application – a destination management information system (DMIS)

As suggested by literature, knowledge relevant to strategic decision making in tourism is subsumed as a) knowledge about *market cultivation* (e.g. how to use destination resources to attract most valuable customers and to provide information for effective marketing, etc.), and b) knowledge relevant for *destination management & development* (e.g. facilities to avoid congestion, environmental protection, development of product-market combinations for valuable segments, event management, training, private-public partnerships, etc. (Wang & Russo, 2007; Bornhorst *et al*., 2010). Accordingly, customer-based knowledge creation is achieved through customer segmentation and targeting, service performance evaluation and by measuring the degree of marketing efficiency (Ritchie & Ritchie, 2002; Pyo *et al*., 2002; Cho & Leung, 2002). Thus, data collected, stored, analyzed and visualized in the DMIS include demographic/geographic and psychographic characteristics, buying motives, price sensitivity, brand perception and loyalty as well as information and product consumption patterns, respectively. Table 2 provides a not exhaustive list of indicators relevant for a DMIS. Columns represent basic data mining methods while the rows display sources of customer-based data available in tourist destinations. The indicators have been deduced from the quoted literature.

Table 2. DMIS indicators

Explorative analyses (OLAP)	Clustering	Association rules / classification / prediction
Navigation based indicators • Web-navigation & channel use (page frequency, view time, path length, click-streams)	***Navigation based indicators*** • Web usage-based clusters (key-word, session or transaction-based) • Webpage-based clusters	***Navigation based indicators*** • Sequential navigational patterns • Visitor forecast based on online search volume
Transaction based indicators • Sales shift per accomm. type/ sending country/guest type • Booking patterns per tourist activity/ tourism service • Conversion rate per guest type / sending country	***Transaction based indicators*** • Valuable segments based on o demographics & consumption behaviour o mobility behaviour in the destination • Conversion rate/ segment	***Transaction based indicators*** • Cross-sales (market basket analysis) • Cancellation Behaviour • Occupancy trends & length of stay/ sending country/ guest type
Feedback-based indicators • Guest satisfaction, value for money assessment & loyalty per sending country/guest type • User generated content: Ø rating, % positive reviews	***Feedback-based indicators*** • Valuable segments based on brand comprehension, value for money assessment, satisfaction & loyalty • Social interaction clusters	***Feedback-based indicators*** • Social network dynamics based on UGC o lead users

3 Validation of DMIS Indicators

The knowledge destination approach has been prototypically implemented for the Swedish tourism destination of Åre in order to validate the DMIS indicators. Although including also small-sized suppliers, Åre is characterized by two large scale companies, Ski Star and Holiday Club. Next to Åre's DMO (Åreföretagarna), the listed companies are the partners of an EU funded project from which the proposed approach emerged (*acknowledgements*). The goal was to apply the idea of business intelligence at the level of tourism destinations by mining data bases usually not further analyzed through methods of artificial intelligence (Pyo *et al*., 2002).

3.1 Data sources, data extraction and data warehousing

The prototype provides an exemplary instantiation of all components of the knowledge destination framework (Fig. 1). Compared to all possible data sources (section 2.1) the prototype is restricted to *implicit* tourists' information traces (i.e. navigation and transaction data) constituting the most comprehensively available data sources for the destination of Åre, at the moment. More concretely, *navigation data* (i.e. web server log-file data) has been integrated from the platforms www.visitare.se, www.are360.se and www.holidayclub.se, as well as *transaction data* from customer data bases of Holiday Club and Ski Star.

Log-file data are typically provided in a standardized format, e.g. the *Common Logfile Format, Extended Logfile Format* or similar formats (www.w3.org/TR/WD-logfile.html). Thus, log-file-based navigation data from different sources are rather easily extracted and integrated into a homogeneous structure. Based on the user's IP address, navigation data is further enhanced by information on location (country, city, etc.) and the Internet provider (www.ip2location.com). For data preparation, in a first step, irrelevant page views caused by search engine robots or internal requests by developers have been removed. Secondly, page views have been mapped to meaningful page categories, corresponding to modules or user actions, relevant for further analysis. Finally, single page views have been grouped to sessions based on a simple time heuristic (maximal time between two consecutive page views within a session) and session-specific attributes, like session length and clicks per session, have been generated (Liu, 2008).

Compared to log-files, data extraction and data preparation for company-specific data bases containing transaction data is much more complex and cumbersome and may count for up to 60% of the overall data mining effort (Larose, 2005). Transforming heterogeneous data base structures into a homogeneous supplier-embracing structure for transaction data has been outside the scope of this prototype, thus, transaction data from different sources have been analysed separately. But, even when looking at single data sources, complex and normalized data base structures have to be transformed into flat tables to subsequently serve as input for data mining activities and data understanding and extraction still turned out to be complex and time-consuming. Data preparation has mainly dealt with removing irrelevant or highly correlated attributes or handling missing values and outliers. All steps of data

extraction and preparation have been executed with the data mining tool *RapidMiner* (www.rapid-i.com). The resulting data are available as *RapidMiner*-specific data files (example sets) as well as data base tables that all together constitute the central DW serving either as input for the *data mining and knowledge generation* task or directly for visualization purposes by the DMIS (fig. 1).

3.2 Data mining & knowledge generation

Following the DMIS indicators (table 1) and based on available data (section 3.1), data mining analyses have been executed, making use of explorative analyses, clustering, association rules and classification, thereby covering navigation- and transaction-based indicators (Hastie *et al*., 2009).

In the area of navigation-based indicators by explorative analysis typical web-navigation and channel use metrics, like page frequency, view time, session length, etc. have been generated. Table 3 and fig. 2 show examples of web-navigation metrics aggregated along the time dimension as well as clicks grouped per webpage category.

Table 3. Web-navigation metrics – sessions and clicks per time unit

Month (session)	Count(session)	Avg.(session_lenght)	Sum(clicks_per_session)	Avg.(clicks_per_session)
Dec	7210	2.042	2867	3.970
Jan	25445	2.190	104253	4.097
Feb	32315	2.173	129250	4.000
Week in year	Count(session)	Avg.(session_length)	Sum(clicks_per_session)	Avg.(clicks_per_session)
52	3380	2.005	13235	3.916
1	5314	2.114	21570	4.059
2	6222	2.045	23846	3.833
Day in week	Count(session)	Avg.(session_lenght)	Sum(clicks_per_session)	Avg.(clicks_per_session)
Mon	10645	2.177	43696	4.105
Tue	10144	2.147	40679	4.010
Wed	10037	2.427	43446	4.329

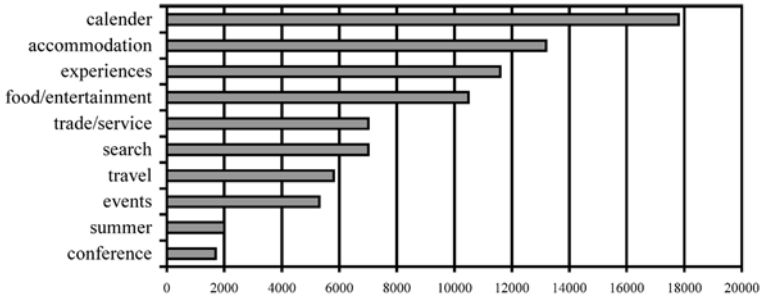

Fig. 2. Web-navigation metrics - clicks per webpage category

For the area of navigation-based clustering, table 4 shows a *k-means clustering* model based on web-usage characteristics, like visited pages (URIs mapped to meaningful page categories), clicks per session and session length. Based on cluster quality and interpretability, a five-cluster model has been chosen. Comparing these clusters enables a clear differentiation between *bookers* (cl. 1) and *lookers* (cl. 3 and cl. 4). In cluster 1, users enter the website with a clear booking intention searching for the right

accommodation. In cluster 4 users spend most of the time looking at panorama pictures and searching for accommodation information, but seldom enter the booking page. Thus, either they have not decided on the overall destination yet or have no concrete purchase intention. Appropriate (cross-selling) offers could increase the conversion rate of cluster 4 users.

Table 4. Cluster model - segmentation of website visitors

Cluster Model		**Attribute**	**cluster_0**	**Attribute**	**cluster_1**
		ownership	0.115	accommodation	1.512
Cluster 0:	3239 items	accommodation	0.141	accomm_hotel_room	1.227
Cluster 1:	564 items	whatson_start	0.121	accomm_appartment	0.922
Cluster 2:	1078 items	booking	0.107	acomm_booking	0.621
Cluster 3:	736 items	directions	0.103	offers	0.583
Cluster 4:	82 items	activities_summer	0.091	booking	0.498
Total number:	5699 items	restaurant_bar	0.091	accomm_suite	0.389
		restaurant_bar_sports	0.076	offers_private	0.259
Attribute	**cluster_2**	**Attribute**	**cluster3**	**Attribute**	**cluster_4**
offers	1.308	pool_saunaworld	1.037	panorama_pictures	8.378
offers_privat	0.663	pool_sauna_pool	0.887	ownership_pan_pict	1.866
accommodation	0.319	spa	0.764	media	0.841
activities_summer	0.218	spa_treatments	0.516	accommodation	0.780
booking	0.186	pool_sauna_sauna	0.420	accomm_appartment	0.634
ownership	0.161	activities	0.295	pool_saunaworld	0.439
accomm_package	0.153	accommodation	0.245	offers	0.427
activities	0.118	offers	0.236	pool_sauna_pool	0.402
Cluster	**Avg(session_length_minutes)**		**Avg.(clicks_per_session)**		
cluster_0	0.869		2.471		
cluster_1	5.128		10.454		
cluster_2	2.407		4.995		
cluster_3	3.618		7.844		
cluster_4	9.020		18.224		

In the area of navigation-based indicators through association rules / classification, association rules have been developed to identify navigational patterns and understand the booking behaviour of website visitors through session characteristics. Table 5 shows association rules based upon the *a-priori algorithm* (Larose, 2005, p. 180f) representing associations between session characteristics (premises) and "visited the booking sub-site" (conclusion). These rules identify session characteristics influencing the likelihood to visit the booking page. More precisely, heavy users with sessions longer than 5 minutes and more than 11 clicks visit the booking page 3.5 times more often than average users. Interestingly enough, visiting the booking page is more likely during evening/night hours and during weekdays than during daytime and/or on weekends.

Table 5. Association rules - booking behaviour

Premises	**Conclusion**	**Lift**
session_length=heavy user(5-x minutes), clicks/session=heavy user(11-x clicks)	accomm_booking=visited	3.576
clicks_per_session=heavy user(11-x clicks)	accomm_booking=visited	3.105
origin=key country(SWEDEN), cliks_per_session=heavy user(11-x clicks)	accomm_booking=visited	3.063
day in week=during week(Mo-Fr), clicks_per_session=heavy user(11-x clicks)	accomm_booking=visited	2.994
hour in day=during day(5-17h), clicks_per_session=heavy user(11-x clicks)	accomm_booking=visited	2.886
session_length=heavy user(5-x minutes)	accomm_booking=visited	2.741
day in week=during week(Mo-Fr), session_length=heavy user(5-x minutes)	accomm_booking=visited	2.591
hour in day=during night(18-4h)	accomm_booking=visited	1.192
day in week=during week(Mo-Fr), hour in day=during night (18-4h)	accomm_booking=visited	1.184
origin=key country(SWEDEN), hour in day=during night(18-4h)	accomm_booking=visited	1.178

In the area of transaction-based indicators by explorative analysis booking and sales patterns have been analysed. Table 6 shows aggregated information on customer segments and room categories (capacity) in relation to number of bookings, number of visiting days, visiting persons and booked rooms. The figures confirm Åre's focus on domestic customers which should be viewed in relation to marketing activities towards foreign visitors. Fig. 3 shows the relationship between date of booking and date of arrival and unveils a strong correlation between booking behaviour and type of season (high season like December to April; low season like May, September or October). This might be caused by the fact that in low season customers typically postpone their booking since they expect the destination not to be fully booked.

Table 6. Bookings per customer segment

Segment	Bookings	Days	Avg. days	Persons	Avg. persons	Rooms	Avg. rooms
individual_domestic	6887	16168	2.348	20394	2.961	7946	1.154
individual_foreign	2660	5238	1.969	8740	3.286	3178	1.195
company_domestic	1486	3224	2.196	8060	5.490	5104	3.477
TS guests	1450	3287	2.267	4994	3.444	1460	1.007
company_foreign	1433	3030	2.114	8927	6.230	4916	3.437
recurrent private	1051	2223	2.115	3530	3.359	1104	1.050

Transaction-based clustering focuses on identifying valuable customer segments based on demographics (e.g. gender, age, country, customer type) and consumption behaviour (e.g. product type, lodging period, booking source, booking status) (Hastie *et al*., 2009). Table 7 shows the results of a cluster analysis based on a customer relationship database of customers of Åre. Cluster 0 is the typical private leisure traveller, booking accommodation for a longer period by phone and web, but cancelling quite often. Cluster 1 is the typical business traveller booking accommodation for a short period, interestingly, mostly by phone. Cluster 2 represents private customers booking ski rental mostly by phone.

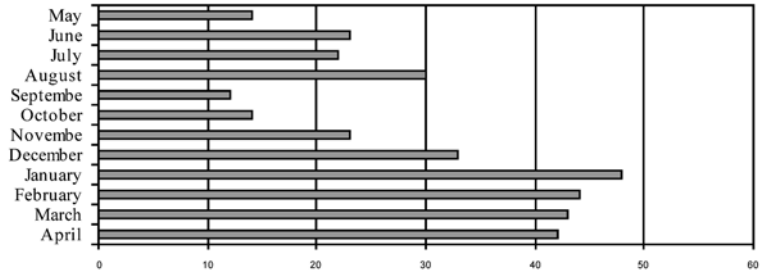

Fig. 3. Duration between date of booking and arrival (in days)

As these customers do not book any accommodation and do not register for a regular use of the system, it can be assumed that cluster 2 contains customers either have their own accommodation or book on a private basis. Questions arise as to why customers in clusters 1 and 2 do not book via the Internet and how the online platform could be

improved to attract such customer segments. This is especially important for cluster 2, since customers booking no accommodation at all or on a private basis will not appear in any destination statistic as long as they don't buy additional services. Thus, attracting these customers to use the online platform would greatly increase their visibility for destination management.

Table 7. Customer segments by demographics and consumption behaviour

Cluster 0 (31343)	Cluster 1 (29774)	Cluster 2 (38883)
Lodging period = week Customer type = private Booking source = phone + web Booking status = cancelled Product type = lodging Profile: private customer, booking a one week lodging via web and phone, often cancelling	Lodging period = short week / weekend Customer type = company / N/A Booking source = phone Product type = lodging + other Profile: short trip company customer, booking lodging + other products via phone	Lodging period = N/A Customer status = (non-registered) customer Customer type = private Booking source = phone Product type = ski rental Profile: not registered private customer, booking ski rental via phone

Finally, in the area of transaction-based indicators through association rules / classification, customers' cancellation behaviour has been analysed using *decision tree* based classification models (with target attribute booking status and input attributes departure/arrival/booking date, gender, age, country, customer type, product type, lodging period and booking source) (Larose, 2005, p. 107f).

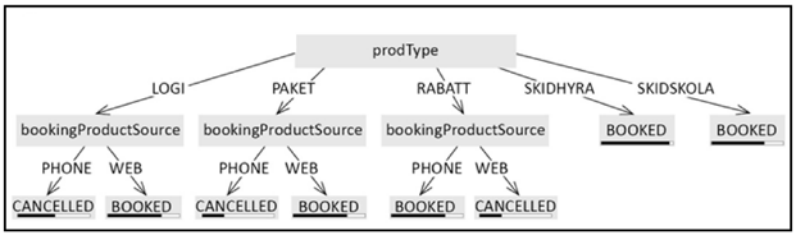

Fig. 4. Decision tree for cancellation behaviour

Fig. 4 clearly shows that the cancellation behaviour differs for different product types with ski equipment (*skidhyra)* and ski school (*skiskola*) showing a low cancellation rate, whereas accommodation (*logi*) and package (*paket*) are showing high cancellation rates. Interestingly, for accommodation and package the cancellation rate depends on the booking source and is particularly high when booked via phone and quite low when booked via the Internet. Overall, the presented decision tree model can predict the cancellation behaviour with an accuracy of 92.9%.

4 Conclusion and Future Work

The proposed DMIS fully builds on destination data stored in a DW and knowledge generated from that data in form of data mining models. Moreover, the data and data mining models are interactively visualized in an appropriate form for destination managers. Customer-based data is displayed by methods of exploratory data analysis

and validated models, like *decision trees* (e.g. showing the factors determining cancellation behaviour) or *cluster models* (e.g. describing segments of website users) and are visualized by simple but effective visualization techniques (e.g. simplified decision rules and tree structures). Most importantly, however, the gained insights clearly demonstrate that data typically available within tourism destinations, like in the case of the Swedish destination of Åre, enable the computation of navigation- and transaction-based DMIS indicators. Thus, the proposed knowledge destination framework and the DMIS indicators constitute an appropriate and validated base to apply business intelligence and knowledge generation methods at the level of tourism destinations.

Compared to potential data sources listed in Table 1, only a limited range of different data sources has been considered, so far. Thus, one important future activity is to include all possible types of data sources, especially feedback-based data, like survey data, web 2.0 ratings or user profiles as well as unstructured data, especially in the form of free text from web 2.0 applications. Additionally, knowledge generation has to be extended to the area of supplier-based knowledge generation, thus, generating knowledge about products, processes, competitors and strategic partners. Similarly, the knowledge application layer will be extended by the area of customer-based knowledge application and generated knowledge will particularly serve as input for recommender systems or social media aggregators. Thus, also customer demand is satisfied in an intelligent and collaborative manner and the destination offer will continuously be improved, based on customer needs and market knowledge.

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TTR Tirol Tourism Research – A Knowledge Management Platform for the Tourism Industry

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Abstract

The use of knowledge has long been of interest to academics and practitioners, but research on it has been underdeveloped in tourism. The last years have consistently led to new challenges for tourism destinations. This is due to the growing world-wide competition of tourism regions, changing demand patterns, the claim for better products and offers, as well as the decreasing attractiveness and increasing uniformity of offers. With these developments, employees are confronted with new tasks acquiring new skills and competences, which also include the sharing of knowledge amongst each other. Despite the increasing conceptual studies on knowledge management in tourism in the last years, this research reports a quantitative study among the tourism industry about the need of a technology-based knowledge management solution and presents the knowledge platform TTR Tirol Tourism Research, which was developed as a result of the quantitative research. Its aim is to provide a platform for screened, filtered and user-friendly presented up-to-date information on Alpine and Tirolean tourism especially.

Keywords: TTR Tirol Tourism Research, knowledge management, knowledge platform

1 Introduction

Research in knowledge management in general has grown rapidly since the last decades (Bouncken/Pay, 2002). Although the role of knowledge has long been recognized, tourism has only been slow in adopting this approach (Cooper, 2006). However, also the tourism industry has recognized that knowledge is a strategic asset if tourism destinations wish to remain competitive. Specifically, social, technological and economic developments in tourism present new challenges to the knowledge management in destinations and show the need for capturing relevant knowledge, dispersing it correctly and at appropriate times. New information and communication technologies (ICT) ease the process of generating and transferring knowledge in tourism. Hence, technology plays a crucial transformational role in knowledge management (Gurteen, 1999). This study presents a quantitative research which aimed at revealing the need of the Tirolean tourism industry for developing a technology-based solution for knowledge management.

2 Theoretical Background

Literature in knowledge management is vast; therefore, the paper first undertakes a review of the relevant literature on the concept of knowledge, knowledge management and the development of knowledge management in the field of tourism.

2.1 The concept of 'Knowledge'

In general, authors distinguish between the terms data, information and knowledge. While data is a combination of symbols according to a syntax (e.g. letters in a word) which are materially perceivable, can be saved in information technological systems, and can be multiplied and deleted as desired, information refers to data which is put into a learned and understood context established by mankind. Consequently, data becomes information if someone recognises its relevance for his or her current need. Therefore information is an immaterial or intangible and dynamic quality of data which originates when a subject can exploit the data. Knowledge as the next step is understood as an active process of thinking where someone apprehends and recognises the information potential of data. Therefore the ability of mankind to combine existing knowledge and analyse the current need is essential for the development of a knowledge culture. By combining new information with existing knowledge, someone can create new knowledge. Hence knowledge is intangible, immaterial, subjective and only exists in the head of mankind (cf. Hasler Roumois, 2007).

Fig. 1. Data, information, knowledge and wisdom framework
(Source: Bierly, Kessler and Christensen, 2000, p. 602)

Bierly, Kessler and Christensen complete this concept with the term of wisdom in their data, information, knowledge and wisdom framework (see Figure 1). They define "…wisdom as the ability to best use knowledge for establishing and achieving desired goals and learning about wisdom as the process of discerning judgments and action based on knowledge" (Bierly, Kessler & Christensen, 2000, p. 601).

Coming back to the term of knowledge, the notion has seen a number of different interpretations with the difference mainly resulting from the various types of

organizations authors address when they discuss knowledge. Basically, knowledge has been linked with terms such as data, information, intelligence, skill, experience, expertise, ideas, intuition, or insight, which all depend on the context in which the words are used; i.e. that knowledge has been studied in varied disciplines such as philosophy, psychology, sociology, or business sciences (e.g. Jasimuddin et al., 2005; Nonaka & Takeuchi, 1995; Popper, 1972; Berger & Luckmann, 1966; Polanyi, 1966). Generally, knowledge can be explicit or implicit (Polanyi, 1966). While explicit knowledge possessed in an individual refers to e.g. formal training and education, personal notes and documentations, explicit knowledge refers to mutually agreed upon and documented business rules and registered patterns. On the other hand side, implicit knowledge, posessed in an individual relates to e.g. problem solving skills, communication skills or negotating ability (Caddy, 2001). To sum up, implicit or tacit knowledge is regarded as action-based and unformulated, highly personal and hard to transfer, while explicit knowledge is formalized and written knowledge. Knowledge within an organization is information pooled with the experience of employees in terms of their implicit and explicit knowledge (Von Krogh et al., 2000). This implies that organizational knowledge not only refers to the knowledge of the organization, but also to the knowledge of the individual within the organization. If both explicit and implicit of the individual and the organization merge, the knowledge of the organization starts becoming a strategic asset of the organization (Bolinger & Smith, 2001).

2.2 Information and Knowledge Management

There have been a number of different perspectives from which researchers and practitioners have approached the management of information and knowledge. Information management is defined as the economic (efficient) planning, procurement, processing, dstribution and allocation of information as a resource for the preparation and support of decision-making as well as the development of the necessary framework (Voss/Gutenschwager, 2001, p. 70). Choo describes in the information management cycle as a six-staged process (see Figure 2). After identifying the information needs, the right information as to be acquired, organized and stored in order to develop information products and services which can then be distributed and used. (Choo, 2002, p. 24f)

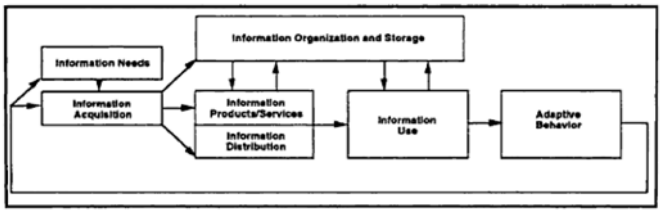

Fig. 2. Information Management Cycle
(Source: Choo, 2002, p. 24)

Although definitions and schools of knowledge management vary in their description of knowledge management, there seems to be a consensus that knowledge management is a process of capturing and sharing knowledge among people to create additional value (Dunning, 1993). Gurteen defines knowledge management as a

"business philosophy … a set of principles, processes, organizational structures, and technology applications that help people share and leverage their knowledge to meet their business objectives" (Gurteen, 1999, p. 3). Thus, knowledge management essentially consists of processes, instruments and tools to effectively capture and share data as well as use the knowledge of individuals within an entity. Knowledge management therefore discusses the need to identify, generate, use, exchange and collect the knowledge necessary to respond in a flexible way to market changes and new challenges.

2.3 Infrmation and Knowledge Management in Tourism

According to Cooper (2006), tourism has been slow in adopting the knowledge management approach. However, the generation, use and sharing of knowledge is critical for the competitiveness of the hospitality and tourism industry (Bouken and Pyo, 2002; Hjalager, 2002; Davenport and Prusak, 1998) as well an essential element for innovation (Awad and Ghaziri, 2002). "Effective knowledge management contributes in establishing competitive advantages over competitors in the hospitality and tourism industry. Reuse of already proven knowledge and readiness of knowledge to use are the major benefits of knowledge management" (Bouken and Pyo, 2002, p.1). Earlier, Faulkner et al. (1994) refer to the 'knowledge culture' that needs to be developed in the services industry, which relates to the thinking that tourism providers need to know what kinds of knowledge activities are inherent in tourism service providers (Von Krogh et al., 2000). This then allows to generate, use and transfer knowledge efficiently. Especially, the process of knowledge generation is crucial, as the number of persons included in the process of providing the tourism product is multiple and mutual interaction leads to an increase in knowledge (Nonaka and Takeuchi, 1995). Knowledge management furthermore needs an open and decentralized environment in which knowledge is shared instead of being hoarded (Davenport & Prusak, 1998). Bieger (1998) postulates that knowledge increase in destinations depends on size, which might be one of the key disadvantages in building knowledge among the small and medium-sized tourism structure in Europe (Hallin & Marnburg, 2008; Yang, 2007; Claver-Cortés et al., 2006; Orfila-Sintes et al., 2005; Jacob et al., 2003; Pechlaner & Tschurtschenthaler, 2003; Siguaw et al., 2000). Therefore, tourism literature has seen an emerging amount of papers on knowledge management, but much of that work is conceptual rather than empirical (Shaw & Williams, 2009; Brackenbury, 2006; Decelle, 2006; Cooper, 2006; Hjalager, 2002; Poon, 1993). "Although tourism and hospitality, with their geographically dispersed units, can profit from an enhanced knowledge management system, only a small number of firms have implemented knowledge management up till now" (Bouken & Pyo, 2002, p. 2) Therefore applications of knowledge management in tourism are still missing (Cooper, 2006).

3 TTR Tirol Tourism Research

According to the tourism strategy of the Tirol (Tyrolean Path 2008-2012) the regional tourism board defines market research as one of the key activities of their business. In order to create and distribute knowledge in the tourism sector, the Tirolean Tourism Board and the MCI Tourism (Tourism and Leisure Business Studies) at the MCI

Management Center Innsbruck started a common project called TTR Tirol Tourism Research. Together with the Tirolean Tourism Board the aim of the project is to strengthen the cooperation of different research institution within the federal state and coordinate their research activities as well as sensitize the tourism industry for market resource and providing them an easy access to systematically screened, filtered and user-friendly presented up-to-date information.

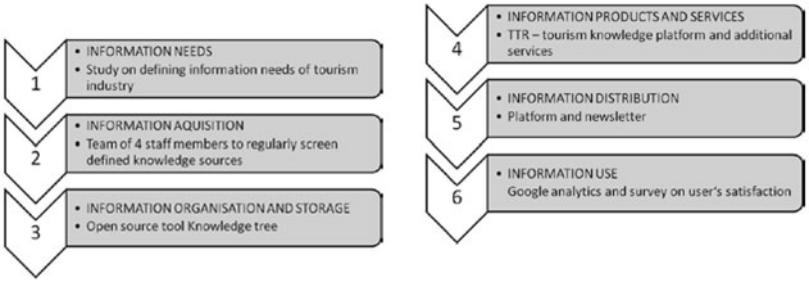

Fig. 3. Development of TTR project in following the Information Management Cycle (Source: Choo, 2002, p. 24)

The project starts in 2008 and is developed according to Choo's six-staged Information Management Cycle (see Figure 3). In order to create a knowledge platform for the Tirolean tourism industry information needs have to be defined.

3.1 Methodology

In order to analyse the information needs of tourism professionals and to see whether there is a need for a technology-based knowledge management solution, an empirical study was carried out using a standardized online questionnaire programmed with the open source tool LimeSurvey. In August 2009, the link to this online-questionnaire is sent out to 246 tourism providers in the Tirol such as hotels, leisure businesses, cable car operations, tour operators, and gastronomy as well as tourism organizations. For this purpose existing information about contact details of partners from the Tirolean Tourism Board are used. A reminder is sent out four weeks later producing a response of 110 questionnaires, i.e. a response rate of 45%. The questionnaire aims at finding out how different tourism providers search for and use knowledge and which expectations they have towards a future knowledge platform. Therefore the questionnaire includes information on the relevance of market research in general, the use of market research within the own business/organization as well as preferred information sources and contents. Furthermore, the questionnaire includes the idea of a common knowledge platform of tourism and the expectations that the industry has concerning such a technology-based knowledge instrument.

3.2 Findings

The following paragraphs show the most important findings where authors use the SPSS statistics and Microsoft Excel packages for data analysis.

Respondent

Amongst the 110 respondents are 35% from regional tourism organisations, 30% from accommodation providers, 9% from leisure businesses, 7% each from gastronomy, cable car or tour operator businesses and 2% each from snow sport instruction schools or outdoor providers. The majority of these businesses can be considered as small and medium sized companies. 20% are micro enterprises and have less than 10 employees, 55% are small enterprises (11-50 employees), 22% are medium-sized enterprises (51-250 employees) and only 3% can be considered as large-scale enterprises (more than 250 employees).

Importance of market research for the tourism industry

On a 5-point Likert scale[21], 60% of respondents consider market research as highly important or important for their tourism business. Market research data is used in the companies or organisations mainly for strategy planning (73%), product development (66%), marketing planning (63%) and the positioning of their own company (47%). Within the company it is the marketing director who is primarily responsible for market research (78%) – in 10% of the cases it is the marketing department. Furthermore, companies which are not actively doing market research state that the main reasons for this is a lack of time (50%), money and personal resources (44% each). 40% of the interviewed companies furthermore carry out market research themselves by e.g. conducting guest satisfaction studies, analysing page views on their own website, conducting advertising impact analysis or competition analysis.

Knowledge search

In order to provide tourism entrepreneurs with a high-quality service it is important to analyze the process of knowledge acquisition amongst interviewees. The most popular sources of information in the field of tourism are the internet (80%), the Austrian Tourism Board (Österreich Werbung) (67%), the Tirolean Tourism Board (59%) and magazines (51%). Furthermore relevant German speaking websites for information gathering are ranked by interviewees with the following result: the website of the Tirolean Government – department of statistics (for the latest tourism statistics) (53%), the information platform of the Tirolean Tourism Board for B2B partners (Tourismusmanager Tirol) (44%), the statistics platform of the University of Vienna, Department of Economics called TourMIS (20%), the homepage of the Austrian Tourism Board (20%) as well as of the association of Austrian tourism professionals (BÖTM) (16%). Also the use of regular market research is studied. 30% of all tourism enterprises regularly obtain the source market information of the Tirolean Tourism Board, 24% the country studies from the Austrian Tourism Board, 23% the guest survey T-Mona (Tourismus Monitor Austria), 22% the source market information of the Austrian Tourism Board and 16% the advertising analysis – likewise from the Austrian Tourism Board. Also magazines are a popular source of information. 65% read the tourism magazine from the Tirolean Tourism Board called "Saison", 58% the one from the Austrian Tourism Board called Bulletin, 45% the FM

[21] 5-point Likert scale: 1=very high, 2=high, 3=medium, 4=low, 5=no importance

(Fach-Magazin für Touristik, Gastronomie und Hotellerie), a professional trade magazine for the tourism, gastronomy and hotel industry, 37% the professional trade magazine called "Hotel & Touristik" and some others (A3 Gast, TAI, FVW, etc.).

These results show that both national and regional tourism boards have high importance and play a major role in conducting as well as distributing market research data. On the decisive question which body should play the main role in conducting and distributing market research in tourism, 79% answer that it should be the responsibility of the Tirolean Tourism Board, 50% the Austrian Tourism Board, 40% the Regional Tourism Organizations and 21% the tourism service providers themselves.

Knowledge fields

Furthermore the study analyzes the most important fields of knowledge that tourism experts are looking for in their professional life. 70% consider information about target groups, 66% about benchmarking, 66% about touristic performance and 63% about relevant source markets as highly relevant. Amongst the target groups, entrepreneurs are looking for data on families (66% highly important), senior travelers above 50 year's old (60%), as well as young people (32%), business travelers (30%) and information on Sinus Meta Milieus (24%). Concerning benchmarking interviewees are interested in the competitive field of the Alps' region (64%) or between destinations within the Tirol (63%). Furthermore, 49% consider benchmarking on national basis (Austria) as highly relevant and 45% on an international level. Moreover people are looking for analysis of value creation (72% highly important) and image (64%) as well as tourism statistics (62%). The most important source markets are Germany (82% highly important), Austria (73%), Switzerland (72%), Benelux (61%), Central- and Eastern Europe and UK (41% each). Amongst the most interesting topics are skiing (77%), hiking (68%), mountain biking (51%), snowboarding (49%), outdoor (46%) and health (42%).

Need for knowledge platform

According to the survey, 70% of tourism professionals are in favor of a service center for tourism information and knowledge. 77% of those prefer to acquire information via a website, 64% via E-mail and 24% via telephone. Interviewees indicate that it is important that information documents are kept smart and simple and do not exceed a length of 1-2 pages (73%) to prevent from an information overload. Additional services should include a newsletter (81%), links to relevant websites (57%), online surveys (55%) and discussion platforms (43%). Nearly three quarters would also be interested in a symposium where institutions present current research results. There is also an interest in sharing knowledge with others. 74% claim that they would share their knowledge with users of a common network. 60% would also participate in joint research projects.

3.3 Knowledge platform www.ttr.tirol.at

The results of this survey are then used in order to create a knowledge platform called TTR Tirol Tourism Research (www.ttr.tirol.at) which meets the expectations of industry needs (stage 1: information needs). The study shows high acceptance of the regional tourism board taking over the coordination and also financial resources of such a knowledge platform project. Therefore the Tirolean Tourism Board together with MCI Tourism decided to realize this platform. In an initial phase, the project is funded by the Tirolean Science Fund (Tiroler Wissenschaftsfonds). After the end of that funding the two cooperating institutions fully take over the costs to continue and further develop the project.

In order to acquire necessary content for the platform relevant sources of information (websites, tourism research institutes, etc.) have been defined which are screened regularly by the editorial team which is composed by two staff members of each organization (stage 2: information acquisition). In a next step an open-source document management system called knowledge tree is introduced to organise and store all information (stage 3: information organisation and storage). The survey shows that in the age of information overflow tourism operators suffer from the lack of time and face the challenge of finding and selecting relevant information. Furthermore, Stamboulis and Skayannis (2003) state, that there is a missing linkage between academic research and the industry and Jenkins (1999) goes a step further by saying that academic research seldom influences the real world of practice. Hence, it is essential that academic tourism institutions learn to transfer their knowledge into the tourism industry (Faulkner et al., 1994). Therefore market research products (e.g. market fact sheets, product development fact sheets, etc.) are created in order to concentrate the most important information on certain topics for consumers (stage 4: information product and services).

To make these information products and services easily accessible for all tourism professionals, the website www.ttr.tirol.at is established and launched in September 2009 (stage 5: information distribution). Since then it has attracted 11.970 visits, reached 68.110 page views and 5.650 unique visitors (Status: September 16, 2010). Until March 2010 the website is accessible only by registration for tourism operators from the Tirol region. By then the access is opened to the public. TTR users come mainly from Austria (88%), some from the neighbouring countries of Germany (7%), Italy (1%), Switzerland (1%) as well as other European countries (UK, Netherlands, Poland, France, Belgium, Spain, etc.) (stage 6: information use).

Additionally to the TTR platform, individual services were rendered. In the initial survey 70% of tourism operators stated that they are looking for this personal service. Amongst the users (n=1.100) are 235 accommodation providers, 222 staff members of regional tourism organizations, 211 students, 112 people working in marketing, PR, communication agencies or consulting, 84 in tourism-associated industries (e.g. banking, finance, health or press), 49 from the Tirolean Tourism Board itself, 48 from

the education sector, 33 from gastronomy, 32 from travel agencies or tour operators, 24 from the leisure industry, 17 from public entities, 16 from the cable-car industry, 11 from MCI, 5 from the sporting goods industry, 3 from the MICE sector and marketing associations and 2 from snow sport schools.

For enquiries operators can contact the editorial team via the website posting a message, per e-mail or by phone. As stated in the initial goals of the project, one of the aims is to foster the cooperation between research institutions and coordination of their research activities. During the first two years of the project there have already been a number of common research projects like a study on youth travel groups in the Tirol, a strategy paper for the Tirolean Tourism 2008 – 2012 (Tirolean Path) and the Tourism Satellite Account for the Tirol. Further research projects are in the planning stage.

4 Conclusions and Further Research

Knowledge management is a relatively new field of study and has not been applied to tourism to the necessary extent. This study aims at analysing the needs of tourism experts in the Tirol in order to create a knowledge platform. The results of the study show that there is an enormous need for such services as experts from the field do not have the necessary time, financial resources or knowledge to filter information in times of information overload. Furthermore, it is explored that, according to the interviewed tourism experts, the Tirolean Tourism Board would be the appropriate body to implement such a project, which has actually happened in collaboration with MCI Tourism when creating the TTR Tirol Tourism Research (www.ttr.tirol.at) for all interested tourism experts in 2009. The knowledge platform provides the tourism industry with tourism-relevant and up-to-date information about source markets, product development, potential target groups and segmentation strategies, tourism-related trends, regional, national and international tourism statistics as well as information on upcoming and past events, funding, blogs and links. Within one year of existence, the platform registers more than 1.000 users and is constantly in progress to transfer pre-selected information amongst tourism professionals in order to foster the knowledge creation process in the tourism industry. The TTR project is seen as work in progress and the development of the website depends highly on the feedback of the users. Therefore a user survey on usability is planned by the beginning of 2011.

To sum up, it can be stated that the TTR project provides organisations and companies in the field of tourism with an open access to tourism-relevant knowledge, but it cannot influence in any way the knowledge process within those entities. Moreover, the research aims at stimulating others to carry out research on related issues.

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Understanding the Statusphere and Blogosphere: An Analysis of Virtual Backpacker Spaces

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Abstract

The continued commoditization of attention suggests that researchers shift their questions to focus on how information is consumed, shared, created, and applied. In this context, a greater understanding of the virtual infrastructure could provide some insights into the mediation of the tourist experience by social media, the uses and meanings associated with certain types of social media, could have great implications for tourism marketing and management. The main objective of this paper was to understand the spatial structure of the virtual space of backpacking through the mobile-virtual ethnographic examination of four types of social media (Facebook, blogs, YouTube, and Twitter) by eight tech-savvy backpackers. The findings are discussed within the context of two main virtual spaces: the Statusphere and the Blogosphere.

Keywords: Social Media; Web 2.0; Flashpackers; Virtual Methods; Social Graph; Attention Age

1 Introduction

During the last two decades of the Information Age, information became a main "economic commodity." Now companies like Google, Apple, Microsoft, and social media platforms Facebook, Twitter, and YouTube all provide users with access to limitless amounts of information. Web 2.0 and social media have given rise to user-generated content allowing for individuals anywhere, to create and disseminate information to wide audiences. YouTube, Facebook, Twitter, Wikis, Blogs, Trip Advisor, etc, are all results of this. Information thus is now de-commoditized as individuals' attention has become the most important commodity. People are technologically connected. Many individuals, particularly those of Gen X and Gen Y, spend time connected to multiple networks at the same time through multiple means. These technologies have allowed many people to maintain intermittent co-presence with these networks. Co-presence is further enhanced by 'virtual travel' as many social interactions need to take place over long distances, where corporeal travel is not as easy. This virtual proximity is proliferated by advances in cyberspace, including email, social networking sites, blogs, and other virtual extensions of personal identity. The virtual proximity of an individual's multiple networks allow them to shift easily between or simultaneously interact with more than one network. In the increasingly complex world, where people need to maintain close networks over large geographical distances, virtual mobility allows for the strengthening of interactions (Urry, 2002).

Within the context of tourism, individuals are increasingly able to contact their networks via social media, internet smart phones, laptops, Wi-Fi and Wi-Fi enabled devices. Hotels, restaurants, transportation systems, and attractions are all implementing technologies in accordance with the demand of the modern tourist. The tourism industry is also implementing technologies to enhance the tourist experience, including things like Wi-Fi on airplanes and GPS tour guides at attractions. Increasingly, the tourism experience is mediated by information and communications technologies (Xiang and Gretzel, 2009; Tussyadiah & Fesenmaier, 2009). This mediation occurs before, during, and after an individual's trip (Paris, 2010a). Tourism products are booked and information is collected via social media and e-word-of-mouth (Litvin, Goldsmith & Pan, 2007) prior to the trip (Xiang & Gretzel, 2009). Individuals maintain connections with home, collect information, book travel, upload photos, blogs, twitter, Facebook, and download travel guides while traveling. After the trip, individuals also use social media and other technologies to portray, reconstruct and relive their trips (Xiang & Gretzel, 2009; Pudliner, 2007). Some have argued that technology can detract from tourist experiences, which are emphasized by the contrast to everyday life (Uriely, 2005). The distinction between tourist experiences and home experiences has blurred, and now experiences are more liquid as tourists experiences can flow through virtual networks and thus are accessible even during everyday life without the necessity of physical movement (Uriely, 2005; Urry, 2007). The role of consumer generated media for tourism has received considerable attention lately, as it has tremendous implications for the future of the tourism industry, particularly in understanding how tourism marketers can leverage social media (Gretzel, 2006), better organized travel information for search optimization (Xiang & Gretzel, 2009), to understand the influence and implications of eWOM (e-word of mouth) (Litivn, Goldsmith & Pan, 2008), and the use of mobile devices and connectivity while traveling.

For this study, backpacker tourists were focused upon. Understanding the consequences of technological developments for both backpackers and business has been an increasingly important direction for academic backpacker research (Pearce, Murphy, Brymer, 2009). Furthermore, the importance of examining the impacts of technology on the backpacker experience has been identified as one of the three main future directions that backpacker research needs to address (Pearce, Murphy, Brymer, 2009).

Another important reason for understanding the ways in which the different types of social media are used and how information is spread between virtual spaces and to virtual audiences is the increasing importance of consumer-generated media (CGM) in promoting backpacker businesses and the development of brands. Christodoulides (2008) suggests that there is a shift from the top-down marketing communications to a new-age branding built from an emphasis on relationships between businesses and consumers. Successful businesses now are adapting to the movement towards user-generated branding in which consumers are partners in collaborative relationships that seek to create mutual value and brand meanings (Burmann & Arnhold, 2008). There are a few examples in tourism of the power of this co-creation of branding. Websites like TripAdvisor, Kayak ratings, and Google Pages, and for the backpacking

industry—Hostelworld.com, have become tremendously powerful spaces in which consumer branding and decisions are simultaneous created. Tourism businesses are quickly realizing the potentially negative and positive influences on consumer decisions that social media sites can have. Poor quality products or services can now 'go viral' and be instantly spread to entire markets. Successful businesses have been able to adapt and embrace the technological advancements. While being proactive about adapting to the changes is a necessity, doing so nearly blindly without proper understanding of the medium can be both inefficient and harmful for the businesses.

The proliferation of connections and overwhelming amount of information availability and choices that these recent technological innovations have created is also shifting society into a 'new' age. This new age was recently referred to as the Attention Age and has emerged from the late information age as a result of Web 2.0 technologies (Attention Age, 2010). The Attention Age derives its name from Attention Economics (Davenport & Beck, 2001; Simon, 1971). As information systems have been constructed for the efficient production and dissemination of information, information overload has started to occur. Recently, there is now a need for information systems to be developed that allow individuals to apply their attention more efficiently. Information is no longer the commodity. High-quality, valuable information is now not only abundantly available, but it is instantly available, producible, and sharable.

Each individual only possesses a limited amount of *attention*. Individuals are forced to ration their attention. Social networks, real-time activity streams, and increasingly complex mobile devices have resulted in an extremely complex situation in which information must be processed from a variety of different sources. As the world transitions into the Attention Age, research needs to focus on systematically understanding the role that new technological developments play in individual's lives, as well as the meanings and uses that individuals associate with each technology. The continued commoditization of attention suggests that researchers shift their questions to focus on how information is consumed, shared, created, and applied. In the context of tourism, a greater understanding of the virtual infrastructure could provide some insights into the mediation of the tourist experience by social media, the uses and meanings associated with certain types of social media, and the implications for tourism marketing and management. The main objective of this paper is to understand the spatial structure of the virtual space of backpacking through a manual link and content analysis that was part of a larger mobile-virtual ethnographic examination, which also included in-depth interviews, a survey, and participant observations (see Paris, 2010b), of four types of social media (Facebook, blogs, YouTube, and Twitter. This study focuses on the social media use of eight tech-savvy backpackers.

2 Method

Using a link and content analysis approach, eight backpackers were 'followed' as they traversed their multiple virtual moorings. The connections between their virtual spaces were examined in order to gain a stronger grasp of the four different types of

social media. The manual link and content analysis approach of this study was mean to examine the relationship between each of the four types of social media of each of the individuals.

Ethnographic research has evolved since its early colonial origins, especially when taking into account the emergence of globalization, technological innovations, and a 'more networked' daily life of individuals today. Today, ethnographic methods have become more multi-faceted and multi-sited. The ethnographic methods employed in this study are mindful of the mobilities paradigm (Sheller & Urry, 2006), and thus differ from the classical understandings of ethnographic research. Traditional ethnographic research is generally localized and a-mobile (Larsen, 2008). Humans and technologies are increasingly mobile, and therefore it is vital that ethnographic approaches engage with mobilities that connect the 'fields' or localized spaces of interest across distances. Recent studies employing virtual ethnography or cyberethnograpy have moved away from the bounded/exotic elsewhere of traditional ethnographic studies in an effort to study populations that are not easily 'located' and that only have moments of 'common fixedness' virtually through spaces like online communities (Fay, 2007). Virtual ethnography has emerged recently as the need for methods to understand the significances, implications, and meanings associated with developments in computer-mediated communications. Technological developments leave the Internet and other communication technologies in a constant state of flux that challenges researchers to adapt to new research methods (Toulouse, 1998). Research is moving from research about the Internet to Internet research (Mann & Stewert, 2000) capturing the complex interface between technology and society (Sassen, 2002). As Hine (2000, p. 34) stated, "virtual ethnography aspires to give a distinctive understanding of the significance and implications of the Internet."

A multi-sited (Marcus, 1995) or mobile ethnography (Sheller & Urry, 2006) involves participating in patterns of movement while conducting ethnographic research. There has been a call for mobile ethnographic research in tourism, as tourism is a mobile phenomenon, which involves following tourists' movement, instead of just observing them at a stationary site. Similarly, to understand fully the virtual spaces and mobilities of backpacking, a mobile ethnography of the content, communications, and networks must be employed that follows the digital 'objects' through the virtual spaces.

2.1 Sampling and data collection

Potential individuals were contacted using a snowball sampling procedure. The initial key informant was asked to recommend other backpackers who were tech savvy and actively contribute to the production of online content. Five additional individuals were contacted and asked to participate and recommend other potential participants, who then recommended a total of 10 other individuals. All fifteen individuals were screened, with only individuals who actively maintained a minimum of three of the following were invited to participate: a blog, Facebook profile, Twitter and YouTube account. All of the individuals maintained a Twitter account and a Blog. The

participants' Twitter accounts were used as the starting point for the analysis. The 60 most recent tweets were examined.

First, the content of each Tweet was examined to see if it was a 'status update', a tip, a news article, or a link to a blog post, YouTube Video, Flikr picture, etc. Next, each individual's level of interaction with other Twitter users was determined by his/her use of RT, @, and #. Individual's use the RT (re-tweets) was used to forward on someone else's Tweet to their own followers. The @ symbol is used to respond directly to another individuals tweet, with the response visible to all of that person's followers. The hash-tag symbol, #, is used to categorize the tweet and link it to some other general topic, group, and/or geographical location. Global tweets for each hash-tag can be viewed by any individuals. Thirdly, the method that the individual used to post a tweet was examined. This could occur through a variety of methods including directly through Twitter using a web browser or a mobile phone application, through a integration site (that would update an individual's multiple social media profiles from one centralized platform), through a Facebook application that would simultaneously update an individual's Twitter through his/her Facebook status update function. After the content of the individual's Tweets was examined, links were then followed. The destination of each of the links was documented, and focus was placed upon those that linked to Facebook, YouTube, or a blog. The frequency of these links was documented. A content-link analysis was continued starting from each individual's YouTube, Blog, and Facebook. Notes from the observations for each individual were then used as a basis for constructing maps of each person's online social movements and the integration of their social media.

3 Results

All of the key informants were heavy social media users with strong connections to the backpacker culture. Even so, there were major differences in the group in terms of the ways that individuals used the types of social media, where they focused their attention, what they used the types of social media for, and who the content they created was targeted to.

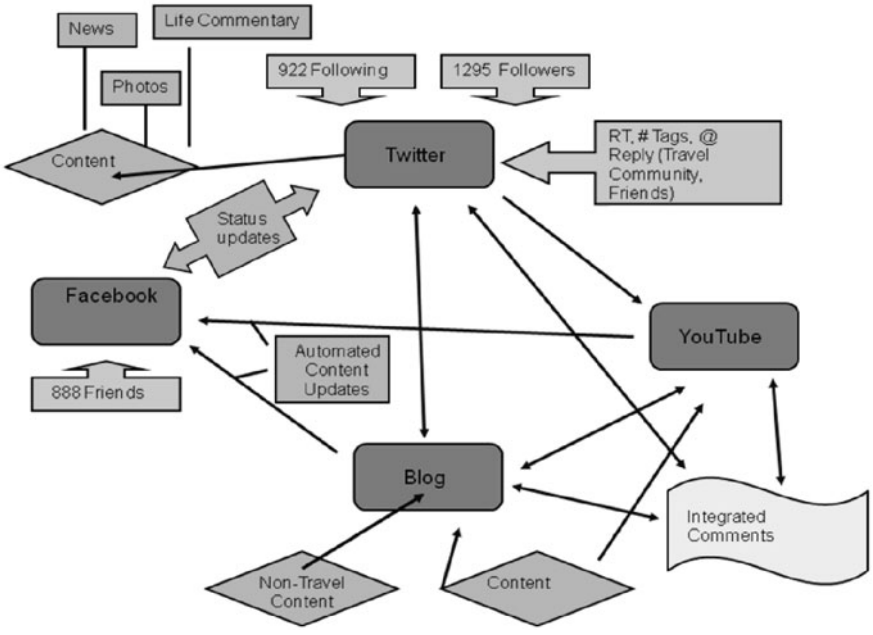

Fig. 1. Simplified Social Media Map for Respondent 5 'Alan'

Each of the eight maps show the pathways connecting the four different types of social media, where and what kind of content is produced, the number of people that are directly interacting with the individuals, and the integration of the social media outlets. Because of space limitations in this paper, only one simplified map is included (Figure 1, see Appendix D of Paris (2010b) for more) as an example. While each of the individual's social media maps are different, several trends did emerge in terms of individuals level of influence, level of integration, type of content, blurring of personal and 'professional' profiles, and the type of social media on which the online behavior of the individual was centered upon.

All of the individuals had larger Twitter networks than Facebook networks. This could suggest that Twitter is used to connect to a wider audience, whereas Facebook is used to connect with a more intimate group of people. Table 1 includes the size of each individual's Twitter and Facebook networks, blog visits and ranking, and YouTube video views. Most of the individuals had relatively large networks, visits to their blogs and views of their videos, suggesting that the information and content they create and share could be very influential within the online backpacker community.

Table 1. Social Media Influence of Each Individual

	Twitter		Blog		Youtube	Facebook
	Following	Followers	Visitors last month	Ranks	Total Views	Friends/Fans
Greater Influence						
Mike	4444	8112	42231	42633	55048	1918
Chris	5182	5403	14629	110583	9569	527
Don	3325	3302	7793	190457	38021	814
Sara	924	1780	8078	184783	n/a	162
Alan	922	1295	3974	337038	55291	888
Lesser Influence						
Brandon	308	560	2582	493069	n/a	473
Tara	522	54	618	1774928	221	217
Jess	10	31	n/a	n/a	3998	141

A review of the social maps suggests that some of the individuals' online behavior was centered on a particular social media, while others were not. Alan (respondent 5), for example, has the 'least' active blog of the most active group and his Twitter network is the smallest, but his Facebook network is the second largest and he has the most video views on YouTube. Mike (respondent 1) centered his online activities on his Blog as a center for content, Twitter as his communication outlet, and Facebook as a platform to interact on a more intimate level, as well as a platform to access the other types of media. Mike (respondent 1) had the most visited blog, most Facebook Fans, and largest Twitter network. While Mike (respondent 1) had a tri-modal focus, the bi-modal behavior was the most common for the sample. The online behavior of six of the individuals was focused on two of the virtual moorings, their blogs and Twitter. The blogs were the center of their content and Twitter was used to disseminate most content (blogs, YouTube, Podcasts, etc), and provide status updates (at home and while traveling). Jess (respondent 8) was the only individual whose online behavior focused upon one type of social media, her blog. The process of mapping individuals' online behavior in this study suggests that while individuals do have differences in how they use social media, usage patterns have emerged.

While this study was not meant to go into details of the actual content, a brief discussion of what kinds of content are produced and disseminated through each type of social media as well as the differences and similarities for each group is warranted. The majority of content for all individuals was presented through blog posts. Most blogs contained embedded photos from Flikr.com and other sites and embedded videos from YouTube. The blog posts included personal content that the individual wrote. This content often included a current or historical account of a travel experience, a review of a destination/product/service, a 'top-ten' list, and/or travel tips. Three of the individuals had what could be considered 'commercial content.' These included podcast travel guides (Chris (respondent 2)) and eBooks on backpacking (Mike (respondent 1)). All three individuals used their blogs as a central aspect of their personal branding as backpacking experts. During a discussion with the three individuals, they indicated that they used the websites as primary sources of

income. Mike (respondent 1) and Chris (respondent 2) have been traveling for more than two years, using the websites to generate income to prolong their travels. The blogs from Chris (respondent 2) and Don (respondent 3) both include a large number of posts from contributing authors. While Chris (respondent 2) and Don (respondent 3) both author a great number of the posts, the addition of the other contributors give both blogs an almost e-Magazine feel. Twitter was used by most of the individuals to communicate with their networks. The content that was posted through Twitter varied with each individual. One popular use of Twitter was to provide updates every time they made a new post or uploaded new content to their blog or YouTube account. Twitter was also widely used to provide 'status' updates of what the individual was doing or thinking. Other types of content were updated through Twitter using other applications available in the Twitterverse (Solis, 2009, May 27). The most popular is one that allows individuals to upload a picture from their mobile phone or other mobile application. Similarly, updates to Facebook status and the use of Facebook mobile photo uploaders were used by several of the individuals.

Web 2.0 advancements have provided tools for the integration of individuals' social media. These tools allow individuals to increase the mobility and close the virtual distance between their multiple virtual moorings. The individuals in this study had varying levels of integration. Alan's (respondent 5) Twitter, Facebook, Blog, and YouTube were all highly integrated. Every content update he added to his blog or YouTube account produced an automated status update for his Facebook profile. His Facebook status and Twitter status were also coordinated, so that anytime he updates either (manually or automatically) the other also updates, thus maximizing his connectivity with his multiple networks. This integration connects his two networks. When he Re-Tweets or Replies @ to a message on Twitter, it also shows up on his Facebook Profile, along with the message he sent, thus allowing his friends of friends to connect across the two social networks. Several of the other individuals had similar auto-updates connecting their blogs or YouTube accounts with their status updates. Mike's (respondent 1) social media outlets were all highly integrated as well. His Twitter and Facebook Page status updates were integrated. Additionally, Mike (respondent 1) used Facebook Applications to provide an extra Tab on his Facebook Page for both his YouTube and Twitter. This allowed individuals to visit these other sites without leaving their Facebook Page. Alan (respondent 5) also had one more level of integration. His blog comments were all integrated. Anytime a blog update on his Facebook or Twitter status was responded to or commented on, the comment would also appear on the original blog post along with the direct comments. This final level of integration represents the completed circuit of the integration between his blogosphere and statusphere.

Another aspect of integration that seemed to be a part of some of the individuals was the 'blurring' of personal and professional identities. Social media is the basis for several of the respondents' main source of income. Chris (respondent 2), Don (respondent 3), and Mike (respondent 1) all use social media to create a backpacker brand, but some of these brands are blurring what is personal and what is professional for each of these individuals. Don (respondent 3), for example, has a branded backpacking blog, Facebook profile, and YouTube account, but uses a personal

Twitter account. Chris (respondent 2) maintains his 'professional profile' that is integrated with his other social media, as well as a personal blog, that is essentially a travelogue of his current journey. All of the individuals have created some sort of personal backpacking brand of themselves as experts; otherwise they would not have the authority to grow the large networks that they have. The following section provides a deeper discussion of the findings.

4 Discussion

This study focused on the social media of 8 tech-savvy backpackers. The content produced and shared by these individuals can be extremely influential to other backpackers in terms of where they travel to, what products they consume, and what behavior they exhibit at destinations. The influence of online word-of-mouth plays an important role in consumer behavior, even more so in the tourism industry as the product that individuals purchase is experience based. The advice from other travelers who have had previous experience with a tourist product is considered the preferred and most influential source of pre-purchase information (Crotts, 1999). Several studies have examined the impact of blogs on marketing in the travel and tourism industries (Pan, MacLaurin & Crotts, 2007; Mack, Blose & Pan, 2008; Litvin, Goldsmith & Pan, 2008). Previous literature in this area has focused primarily on blogs as the source for eWOM (Litvin, Goldsmith & Pan, 2008), but the current findings suggest that individuals have varying levels of influence across different types of social media, and therefore researchers and tourism marketers should study the pre-purchase influence of individuals across the varying types of social media. Many of the individuals created and cataloged content through their blogs, YouTube, and Facebook. On the other hand, they interacted with their networks and shared their content using Twitter and Facebook status updates.

Twitter and the Facebook status represent what has been referred to as the statusphere. The statusphere, is the "the state of publishing, reading, responding to, and sharing micro-sized updates" (Solis, 2009, March 10). Solis (2009, March 10) suggests that as we progress into the Attention Age, the traditional ways of measuring a blog's authority are outdated. This rise of the statusphere reflects the ongoing reshaping of the Internet by the online social graph; in essence the rise of the statusphere is the result of individuals' filtering of online information through their online social graph (Shih, 2009). This rise of the statusphere, which is dominated by Facebook and Twitter, has changed the way that that the online interactions and conversations are taking place. Instead of focused on the host site, they are occurring through syndication. Content is now spread and curated by peers through the statusphere. Individuals are now empowered in the dissemination of information and the evolution of connectivity throughout their social graph using tools like Twitter's RT and Facebook's 'likes' and comments. While the amount of traffic and interaction in the blogosphere is declining, it can also be argued that the influence of the blogosphere is increasing. Essentially, the statusphere provides the space for which social interaction can be maximized.

The results of the link and content analysis in this study support the notion of the emergence of two distinct virtual spaces: the statusphere and the blogosphere. Figure 2 provides a visual representation of the relationship between these two spaces. The statusphere provides a mediator between users and the content of the blogosphere. As the developments of social media have allowed a dramatic increase in the amount of consumer-generated content, certain technologies have developed that allow individuals to manage their attention more efficiently, allowing them a more direct way to the information they want. In this study, Twitter and Facebook provide this buffer to the content provided on blogs and YouTube. This finding was also echoed by Technocrati's CEO Richard Jalichandra during the 2010 annual State of the Blogosphere presentation of findings that Twitter and Facebook are by far the largest drivers of traffic (Schonfeld, 2010). Many other tools are also available in the statusphere including: RSS feeds, friend feed, recommender systems, and even Google's efforts for personalized searches. Similarly, the blogosphere is a title given to the content of the Internet, which is not limited to just YouTube and blogs. For this study, however, the relationship does emerge through the analysis of the four types of social media. The statusphere provides the means for content in the blogosphere to reach more people, more effective and efficiently. This is an important thing for tourism businesses to recognize. Instead of just blindly creating social media or online marketing plans, they should realize that these two distinct spaces exist.

A backpacker hostel, for example, could design a blog on which it provides destination information, tips, specials, etc. This would be their presence in the *blogosphere*. Next, the hostel would then maintain a presence in the *statusphere* through Twitter and/or Facebook, with the purpose of building relationships and drawing individuals back to the source page through back linking. The online behavior maps of the 8 individuals in this study support this two-sphere phenomenon that is emerging. All of the individuals in this study maintained a blog and used Twitter and/or Facebook to link people to the original blog post and to facilitate discussion.

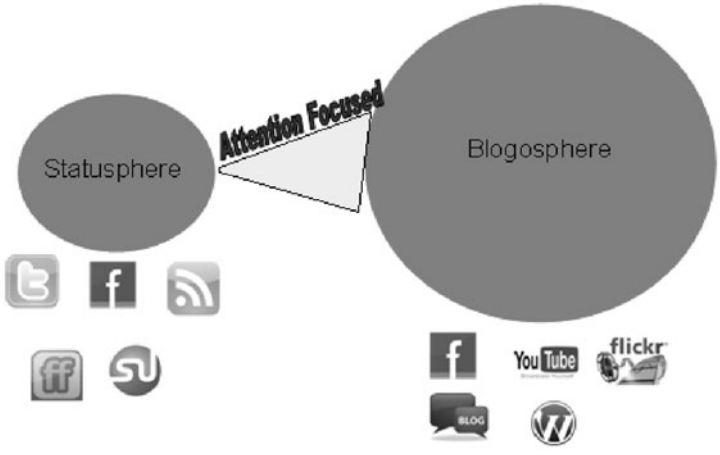

Fig. 2. Statusphere and Blogosphere

Using this integration example for the backpacking hostel, the hostel that has both the blog and the Twitter/Facebook account, can then integrate them so that all the comments are aggregated on their blog profile. The user-generated content, such as comments or user reviews, are the information that is most trusted by other consumers. If a tourism business is able to centralize this feedback from multiple sources, it has the opportunity to maximize the benefit of this eWOM. The blurring of personal and professional social media, echoes what is going on in society at large, as a more networked pattering of life has emerged in which the boundaries between home and away and work and leisure have become increasingly fluid. Understanding that this blurring does not mean that individuals want to be 'friends' with a hostel, for example, just because they added them as 'friend' or became a Fan on Facebook, is crucial in understanding how tourism businesses must approach the online B2C (business-to-customer) interactions. Also understanding that whatever B2C interactions occur, there must be a level of mutual benefit and reciprocity for a relationship to develop (Paris, Lee & Seery, 2010), and that virtually all B2C interactions online are mediated by C2C (customer-to-customer) interactions. This is more obvious in the tourism industry with the rise of review websites like TripAdvisor and Hostelworld.com, but the C2C interaction that occurs through social media is less obvious.

In the future this study should be repeated with individuals who are not as active as the individuals in this study. The findings here could that most people focus the majority of their online attention on two types of social media. While they may participate in 'lower-rung' activities as 'spectators' or 'joiners' (Bernoff, 2010) using a variety of social media, higher-level online behaviors might be the focus of only a few particular types of social media. Having a better understanding on the types of social media those individuals of a particular tourist segment focus on and how those consumers use them would allow tourism marketers to properly channel their resources to be more efficient and effective in targeting those segments.

5 Conclusion

This paper presented initial observations resulting from a mobile-ethnography of eight individuals' use of Twitter, Facebook, YouTube and blogs. Transformations that can be attributed to the development of Web 2.0 and the emerging Attention Age create a necessity for the tourism industry to incorporate social media as a means of communicating with potential and actual tourists. Up until now much of this has been done blindly, with little understanding of the differences in how each type of social media is used, how the different types of social media are integrated, as well as the emerging space of the statusphere. This paper has provided some insights into what is occurring and discussed how these eight individuals behave online. While these eight individuals in this study were much more engaged, virtually, then most tourists, they do help in developing a useful understanding of the role of social media in the tourist experience. The individuals here are some of those responsible for the curating of the online backpacker culture and the production of content that is consumed by other independent travelers. They are the 'Creators' and 'Conversationalists' (Bernoff, 2010) that help to maintain the structure and content of the online backpacker

community, facilitate many of the social interactions that occur online, and influence the consumer behavior of other independent travelers. The findings of this study also provide greater insights for the tourism industry into the structure of the virtual spaces of backpacking, allowing for a more informed, efficient, and effective use of social media.

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Credibility Assessment Model of Travel Information Sources: An Exploratory Study on Travel Blogs

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Abstract

Understanding how information consumers assess the credibility of travel information sources is important since credibility is a receiver-based judgment and tourism products are experience goods. This exploratory study uses Decision Making Trial and Evaluation Laboratory method to construct cause-effect non-recursive model to show how the various credibility dimensions and measurements are related and assessed. Two types of travel blogs: blogs set up by travel companies and blogs set up by frequent traveller writers (travel experts or "da ren") are studied. This study shows that using non-recursive models is necessary and insightful. It also shows that there is no "one size fits all" answer as to how the credibility of a source is assessed. Travel blogs cannot be treated as a monolithic type. Credibility transfer, celebrity factor and whether a medium is well established can affect the process and outcome of credibility assessment.

Keywords: credibility; travel information source; travel blogs.

1 Introduction

Credibility of travel information sources is important since tourism products are experience goods. Such products are also often viewed as high-risk purchases (Litvin, Goldsmith & Pan, 2008). Hence, tourists conduct information search to enhance quality of the trip and lower uncertainty. Tourists use a combination of travel information sources to reduce information asymmetries (Zehrer, Crotts & Magnini, 2010). Information may also be sought for hedonic purpose. Hence, information is the lifeblood of tourism industry (Sigala, 2010).

Despite being widely discussed, there is no single definition of credibility (Flanagin & Metzger, 2008). Credibility is a complex concept with "dozens of other concepts and combinations" (Self, 1996, p. 421). Conceptually, credibility is often classified as source, message and medium credibility (Eysenbach, 2008). Though conceptually tidy, credibility dimensions may overlap (Chaffee, 1982). Information consumers often do not differentiate between these dimensions (Flanagin & Metzger, 2008). Many studies also do not make clear distinctions among these dimensions or focus on one or two of them selectively. Recursive model with unidirectional causal effects is frequently adopted in these studies. However, such an approach may be restrictive (Kline, 2005) since feedback loops do exist in many causal processes.

Understanding how information consumers assess the credibility of an information source is important. This exploratory study explores how information consumers assess overall credibility of travel information sources through various credibility dimensions and measurements. This study suggests the existence of reciprocal causal relationships between these dimensions and measurements. To test for such an existence, Decision Making Trial and Evaluation Laboratory (DEMATEL) method (Fontela & Gabus, 1976) is used to construct cause-effect non-recursive models to show how the various credibility dimensions and measurements are related and assessed. This study also suggests that there is no "one size fits all" answer as to how information consumers assess credibility. It will depend on the types of information source and even travel blogs cannot be viewed as a monolithic type. This idea is tested using two types of travel blogs which are popular in Taiwan: blogs set up by travel companies and blogs set up by frequent and experienced traveller writers (travel experts or "da ren"). These two types are chosen because being traditional travel information providers, blogs set up by travel companies are natural candidate of information source. Personal experience of travel experts, in the form of electronic word-of-mouth, meets the functional and hedonic needs of information consumers.

2 Literature Review

Information seeking refers to the purposive seeking for information to satisfy some goals (Wilson, 2000). Travel information is obtained for functional reasons (Vogt & Fesenmaier, 1998). One may also seek information to create feelings, experiences and emotions (Hyde, 2009). The search can lead to easier and more reliable purchase decisions, improves trip quality and lower risk (Sigala, 2009). Information consumers can use the information to build destination image which is the sum of knowledge, beliefs, ideas, prejudice and impressions a person has of a destination (Crompton, 1979). Tourists are also likely to choose destination which they possess positive image (Ritchie & Crouch, 2003). A myriad of information sources is available to information consumers. Brochures, traditional word-of-mouth and personal experience are highly rated sources. Television is also one of them (Sparks & Pan, 2009). Travel agent is a major source, particularly for complex itineraries (Castillo-Manzano & Lopez-Valpuesta, 2010). The Internet offers many online sources for tourists to learn about tourist destinations, research options, conduct trip planning and seek out the best value (Pan, MaClaurin & Crotts, 2007). Travel information is now one of the most popular online content areas (Carson, 2008) and travel blog is an important vehicle for information (Wenger, 2008).

Information consumers are also concerned with information credibility. Credibility is useful for evaluating experience attributes (Jain & Posavac, 2001). It is also a determinant of strong persuasion and creates attitude change (Park & Lee, 2009). Information adoption model argues that information quality and source credibility are determinants of information usefulness (Sussman & Siegal, 2003). Credibility is a chief aspect of information quality (Hilligoss & Rieh, 2008). Online participatory culture has led to many online travel information sources and user-generated content. The credibility of such content is often doubted since it can be easily created by anonymous authors, altered, and not subjected to the traditional forms of

"gatekeepers" (Johnson & Kaye, 2000; Metzger *et al*, 2003; Rains & Karmikel, 2009). Markers available in traditional media that can act as cues to the credibility of a website are also not readily available (Rains & Karmikel, 2009).

Credibility is evaluated via multiple dimensions (Fogg *et al*., 2001). Its definition and focus of study can be field-specific. Information science discipline tends to focus on message credibility while social psychology and communication field focus on source credibility (Flanagin & Metzger, 2008). Among the three traditional dimensions of credibility, source credibility seems to be the most widely studied. It refers to the characteristics of persuasive sources (Metzger *et al*., 2003) and contributes to the effectiveness of advertisement. Its underlying measurements are trustworthiness, expertise, and sometimes attractiveness (Ohanian, 1990). Message credibility deals with how message characteristics influence believability perception. Its measurements are message structure, language and delivery, and message content (Flanagin & Metzger, 2008). Digitisation further increases the complexity of messages which can now "be a multimedia combination of texts, photos, sounds, movies and even animated infographics" (Opgenhaffen, 2008, p. 495). Hyperlinked structure is common. Cues on credibility of websites now lie mainly within the interface (Clewley, Chen & Liu, 2009). Structural characteristics such as carefully edited text, typographical errors and aesthetic treatment of websites (Robins & Holmes, 2008) can affect credibility. The issues related to content may include use of evidence and citations, accuracy, comprehensiveness, and currency (Flanagin & Metzger, 2008). Media credibility is the perception of believability of media channels through which a message is sent. A major finding in the field of journalism is the more people rely on a medium for news, the more credible they believe that medium to be (Flanagin & Metzger, 2008). Gaziano and McGrath (1986) suggested that accuracy, believability, lack of bias, and depth (completeness) are the most important measurements of media credibility. A study conducted by Johnson and Kaye (1998) suggested that believability, accuracy, bias, and depth or completeness form a robust measurement structure. There are also researchers who proposed different models on how information consumers evaluate credibility. Hilligoss and Rieh (2008) suggested there are three levels of credibility judgments: construct, heuristics, and interaction. Evaluation of credibility can also be in the form of a credibility checklist, such as the Stanford Guidelines for Web Credibility (Fogg, 2002).

3 Research Questions and Methods

3.1 Research Questions

However, "while conceptually tidy, Chaffee (1982) argued that various dimensions of credibility overlap, and that many information consumers do not distinguish, for example, between the source of a message and the channel through which they receive the message" (Flanagin & Metzger, 2008, p. 9). Media convergence also makes credibility assessment more difficult. Many studies tend to focus on one or two of the dimensions. Hence, Flanagin and Metzger (2008) remarked that "source, message, and medium credibility are overlapping concepts in many instances, and research designs that do not always enable clear distinctions among these components complicate our current understanding of online credibility" (p. 9). More studies are

needed to know the complex dimensions and measurements of credibility. While information consumers looking for travel information generally appreciate the importance of credibility, it is less obvious as to how they evaluate the credibility of such information sources. However, this is an important issue since credibility is a receiver-based construct (Gunther, 1992) and is based on user's judgments. This study explores how information consumers evaluate overall credibility of travel information sources through the different credibility dimensions and measurements. To find the answer, the traditional classification of credibility, which is conceptually known as source, message and medium credibility, is adopted as it is widely accepted. Unlike many studies which focus on one or two credibility dimensions, this study examines them simultaneously. This study further recognises that while conceptually tidy, these three credibility dimensions are overlapping concepts in many instances. Since credibility assessment is complex and it is known that feedback loops do exist in many real-life causal processes, this study further suggests the existence of reciprocal causal relationships in credibility dimensions and measurements. Hence, instead of the usual but more restrictive recursive model with unidirectional causal effects, this study tests the validity of non-recursive model by using the Decision Making Trial and Evaluation Laboratory (DEMATEL) method to obtain a cause-effect non-recursive model that shows how these dimensions and measurements are inter-related.

This study also argues that there is no "one size fits all" answer as to how information consumers evaluate credibility. Types of travel information sources do matter. Johnson and Kaye (2009) mentioned that researchers typically treat the Internet as a single entity even though it comprises different components. They further advised that "all of which may be judged differently in terms of credibility" (p. 175). This study adopts this position and further argues that even travel blogs cannot be treated as a monolithic type. This idea is tested using two online sources: blogs set up by travel companies (travel company blogs) and blogs set up by frequent and experienced traveller writers, also known as travel experts or "da ren" (travel expert blogs). Travel blogs are suitable information sources since they contain tourists' description of trip experience and views on destination, accommodations and dining (Pan, MaClaurin & Crotts, 2007). They are particularly useful in the anticipatory and reflective phases of tourist experience (Tussyadiah & Fesenmaier, 2009). Some have argued that blogs are less credible because anyone can post content, not being subjected to editorial scrutiny, and their content may be quite opinionated (Mack, Blose & Pan, 2008). However, there are also views that blogs show the "real" thoughts and feelings of consumers (Rak, 2005). As electronic word-of-mouth, there is lesser commercial influence and subjected to certain ethical code of conduct. Travel expert blogs are more aligned with the spirit of Web2.0 and come in the form of personal diaries. The initiators are experienced individuals who travel frequently and have interest and flair in writing. Travel agencies also set up travel blogs. They are major information source in destination selection (Baloglu & Mangaloglu, 2001) and belong to a group of overt induced, formal yet social information source (Frias, Rodriguez & Castaneda, 2008; Gartner, 1993). Threatened by Internet, tour agencies have strengthened their advice-offering capability (Frias, Rodriguez & Castaneda, 2008; Huang, Chen & Wu, 2009). Hence, such type of travel blogs can be treated as an extension of their traditional role of information providers but now in the context of Web2.0.

3.2 Research Method

DEMATEL is very suitable for studying and analysing complicated and intertwined problems. It classifies factors of the problem into cause group (factors that have more effect on others) and effect group (factors that receive more influence from others). It also identifies the interdependence among factors. Using digraphs (rather than directionless graphs), it allows one to visualize the structure of complicated causal relationships through an intelligible cause-effect structural model (Hung, Chou & Tzeng, 2006; Tzeng, Chiang & Li, 2007). The procedure is as follows: Step 1 - Assume there are n factors under consideration and there are H respondents. Each respondent is to state the degree a factor i affects factor j through a score of 0 to 4, with 0 as "no influence" and 4 as "very high influence". Using the nxn answer matrix X^k with $1 \le k \le H$, the initial direct relation matrix A is obtained as below:

$$a_{ij} = \frac{1}{H}\sum_{k=1}^{H} X_{ij}^{k} \tag{1}$$

Step 2 - The normalised initial direct-relation matrix D is obtained by normalising matrix A: $D = A/s$ where:

$$s = \max\left[\max_{1\le i\le n}\sum_{j=1}^{n} a_{ij}, \max_{1\le j\le n}\sum_{i=1}^{n} a_{ij}\right] \tag{2}$$

Step 3 - The next step is to obtain the total relation matrix T. A continuous decrease of the indirect effects of problem along the powers of matrix D, for example, D^2, D^3, …, D^∞ guarantees convergent solutions to the matrix inversion similar to an absorbing Markov chain matrix. The nxn matrix T is defined as in equation (3) as m approaches ∞ and I is a n x n identity matrix.

$$T = D + D^2 + \cdots + D^m = D(I - D)^{-1} \tag{3}$$

Step 4 - The sum of rows r and the sum of columns c of matrix T is obtained as in equation (4). The sum $r_i + c_i$ represents the total effects both given and received by factor i. The difference $r_i - c_i$ shows the net effect factor i contributes to the problem. If the difference $r_i - c_i$ is positive, factor i is a net causer. When $r_i - c_i$ is negative, factor i is a net receiver. Finally, a threshold value is set to draw the influence map.

$$R = [r_i]_{nx1} = \left[\sum_{j=1}^{n} t_{ij}\right]_{nx1}, C = [c_j]_{1xn} = \left[\sum_{i=1}^{n} t_{ij}\right]'_{1xn} \tag{4}$$

4 Analysis and Discussions

An extensive literature review was conducted to obtain a concise description of the credibility dimensions and measurements. The wordings were then modified to better suit this study and translated to Chinese since the survey participants were Taiwanese. Discussion with experts and postgraduate students was done to identify ambiguous wordings and re-phrased. The key parts of the survey are four entry matrices per

information source. The first 4x4 matrix with 12 entries is for overall, source, message and media credibility. Another 4x4 matrix has 12 entries and is for source credibility and its related measurements (trustworthiness, expertise and attractiveness). The third matrix is a 3x3 matrix with 6 entries and is for message credibility and two measurements (message structure and message content). The last matrix is a 5x5 matrix with 20 entries and is for media credibility and its four measurements (trust, accuracy, non-bias & fairness, and completeness). Hence, there are 50 entries per source. For every entry, respondents were asked to state the degree a factor *i* affects factor *j* through a score ranging from 0-"no influence" to 4-"very high influence".

Convenience sampling method was used. The respondents must be 20 year old or above and general information consumers. They were shown a list of popular travel company blogs and travel expert blogs with their associated website. They were free to choose any of the two types of sources to complete the entry matrices but they must have experience using the chosen source. Time-consuming face-to-face interviews instead of online survey were used to guide them to improve the accuracy and reliability of the returns. The key reason for such an approach is DEMATEL survey is not easy to understand, tedious and mind-boggling. Getting inputs from respondents was challenging and need guidance because they must be general information consumers instead of experts in the field. The survey took place from June 2010 and lasted for 2.5 months. Two hundred forty-four (244) valid returns were received, 125 returns for travel company blogs and 119 returns for travel expert blogs. About 56% of the respondents were male, 63% had received university education, 74% were 25 year old and above with the biggest sub-group (43%) being in the age group of 25-30.

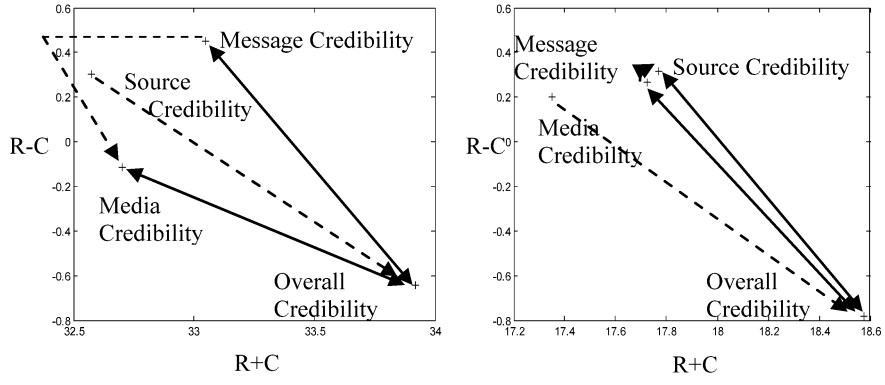
4.1 Influence Maps: Source, Message, Media and Overall Credibility

The influence maps (Fig. 1) show that source, message and media credibility of both sources contribute to perception of overall credibility. It is thus consistent with many recursive credibility models. The non-recursive model further affirms this result as overall credibility is a net receiver factor (i.e. with the most negative *R-C* value).

It also reveals that overall credibility of travel expert blogs can in turn contribute to source credibility. Since travel experts are individuals whose activities often revolve primarily around their blogs, reputed credibility from other activities is not present or strong. In addition, information consumers may still be in the process of assessing these travel experts. Hence, having good overall blog credibility (a more multi-faceted component than source credibility) is a plus point for the credibility of travel experts. Message credibility deals with credibility at the level of blog article. Interestingly, the non-recursive model shows that overall credibility of both sources influence message credibility. If the readers are pleased with overall credibility, such positive feeling can "flow" (credibility transfer), resulting in a positive view of the message structure and content of blog article. Building media credibility is a collective effort and is painstakingly accumulated. It is not the property of a single travel company or travel expert. Overall credibility influences media credibility of travel company blogs but not the travel expert blogs. Hence, it confirms our view that blogs cannot be treated as

a monolithic type and information consumers view travel company blogs and travel expert blogs differently. For the former, information consumers view the media as an extension of the traditional informational role played by travel companies. Hence, this type of blog media is not new. However, information consumers view the media of travel expert blogs as a new media and are uncertain about its credibility.

While the results of recursive models are valid in most cases, the non-recursive model further shows that source and message credibility influence one-another in travel expert blogs. This outcome is contributed by the celebrity factor. As travel experts may be celebrities, information consumers who believe in the credibility of travel experts (source credibility) will also tend to view the article written and presented by them (message credibility) more favourably. Similarly, a well written-article can enhance the credibility of travel experts. Since travel companies are often not celebrities, judgment of message and source credibility can take place independently.



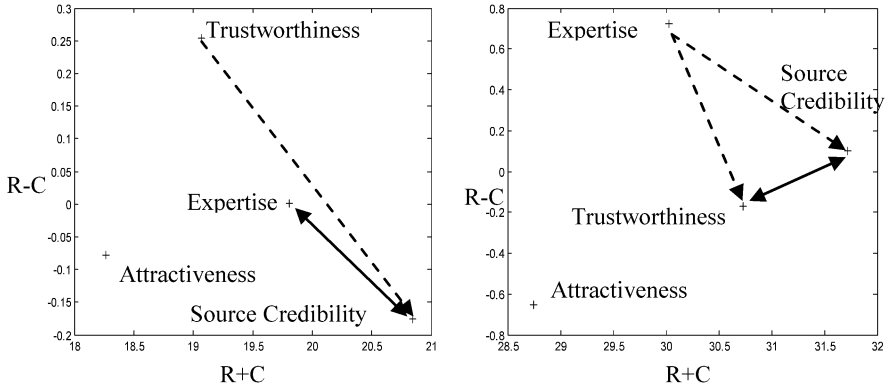
(a) Travel company (b) Travel Expert

Fig. 1. Influence Maps: Overall, Source, Message and Media Credibility Dimensions

4.2 Influence Maps: Source Credibility and its Underlying Measurements

As shown in Fig. 2, only trustworthiness and expertise add to source credibility. This is consistent with the non-recursive credibility models since not all items necessarily affect source credibility. Surprisingly, attractiveness does not add to the source credibility of travel expert blogs. An explanation is the close-to-anonymous nature of such type of blogs. The non-recursive model further reveals that source credibility of travel company blogs can contribute to expertise. The reason is since travel companies have many travel-related activities to enhance their credibility; credibility transfer can take place and enhance the expertise of the blogs. However, travel experts do not have such an advantage. Source credibility of travel expert blogs contributes to the trustworthiness of travel experts. Furthermore, their trustworthiness can be enhanced by the expertise of travel experts. This is an indication that such travel blogs

are in the process of building up their source credibility and enhancing their trustworthiness.

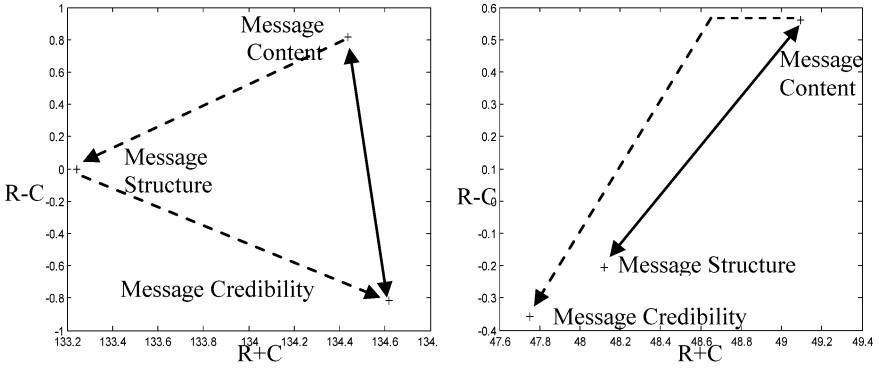


(a) Travel company (b) Travel Expert

Fig. 2. Influence Maps: Source Credibility and its Underlying Measurements

4.3 Influence Maps: Message Credibility and its Underlying Measurements

Message structure and content contribute to the message credibility of travel company blogs (Fig. 3). However, only message content adds to the message credibility of travel expert blogs because recognising that travel experts are individuals, information consumers are more willing to accept the more "free-and-easy" style of writing with articles being structured as personal diary. On the other hand, information consumers view travel companies as gatekeepers and expect them to "set" the rules on content presentation. However, it is too radical to say that message structure is not important for travel expert blogs since it does have an impact on message content and vice versa.



(a) Travel company (b) Travel Expert

Fig. 3. Influence Maps: Message Credibility and its Underlying Measurements

4.4 Influence Maps: Media Credibility and its Underlying Measurements

Trust, accuracy and completeness measurements (except for non-bias and fairness) add to the media credibility of travel company blogs (Fig. 4). The non-recursive model reveals that such relationships are mutually reinforcing. As mentioned above, media credibility is not the sole property of a blog owner. It is a collective perception accumulated through the action of many bloggers at the media level. Hence, medium credibility can cascade down to the individual measurements. Non-bias and fairness is not relevant here because information consumers have the pre-conceived idea that such travel blogs are set up to serve certain commercial purposes.

When compared to travel company blogs, the media credibility of travel expert blogs offers a more complex picture. Only trust and accuracy contribute to media credibility and similar to travel company blogs, they are mutually reinforcing. An accurate medium makes information consumers feel that the media is more trustworthy. Surprisingly, media credibility contributes to non-bias & fairness and completeness of travel expert blogs. A possible reason is the media associated with such travel blogs is still new and needs the collective effort of many travel expert blogs to establish the reputation of completeness, non-bias and fair. Non-bias & fairness plays a role here as the opinion of travel experts is often viewed as electronic word-of-mouth.

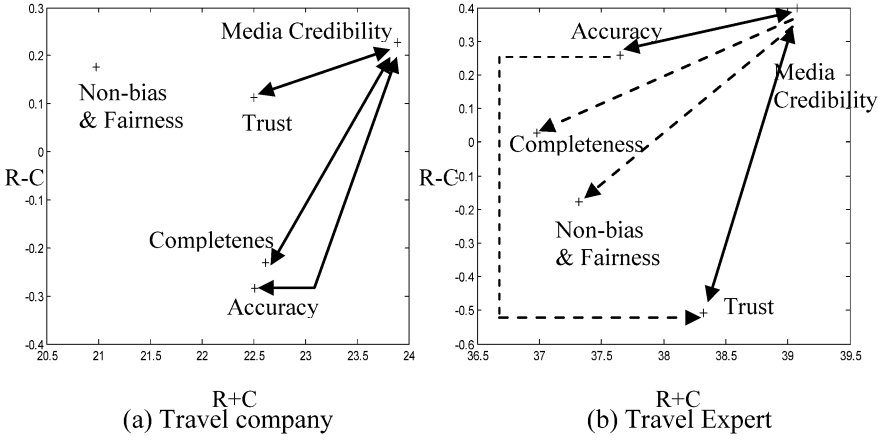


Fig. 4. Influence Maps: Media Credibility and its Underlying Measurements

4.5 Overall Discussions

This study confirms a number of results obtained by earlier recursive model studies on credibility. Through the non-recursive models, it also further provides new insights on how information consumers assess credibility of travel information sources. This study goes beyond showing that overall credibility is influenced by source, message and media credibility, it shows that under certain situations, these dimensions and their underlying measurements may exhibit complex and inter-related relationship.

There is no "one size fits all" answer as to how the credibility of travel information sources is assessed and how the various credibility dimensions and measurements are inter-related. Even though the two sources considered here are travel blogs, their credibility is evaluated differently. It thus confirms the study by Flanagin and Metzger (2000) that credibility of online sources may be linked to the type of sources visited.

Credibility transfer does occur and some of the findings can be explained through this mechanism. As an example, credibility transfer takes place from overall credibility to message credibility and helps the re-confirmation of the latter. How well established a media is and how well known the source is (the celebrity factor) can have an impact on the interaction between credibility dimensions as well as between their related measurements. If the source credibility is still being actively evaluated (such as the travel experts), overall credibility may flow and contributes to source credibility. A less established media (such as the media of the travel expert blogs) can "help" to build up perception of media completeness and non-biasness gradually.

On limitations and future research directions, only two types of travel blogs are considered. Hence, generalisation of findings to other blogs or Web 2.0 tools is limited. Future study may include other Web 2.0 tools. The respondents belong to a

higher age group and they may be less familiar with blogs. Hence, a comparative analysis with younger people may be done. Respondents may still view travel expert blogs as "new." Analysis has shown that celebrity factor and degree of establishment of source influence credibility assessment. As perceived credibility may change with experience and as respondents get more familiar with the blogs, a longitudinal study can be pursued. Sample size is a limitation. The reason is DEMATEL survey is not easy to fill up and as respondents join on a voluntary basis, they cannot be ''forced'' to participate. Instead, this study had to put a lot of effort in encouraging participation. Despite the limitation, this study still provides useful ideas on the complex process of credibility assessment. It is suggested that larger sample size be used in future study.

5 Conclusion

Using non-recursive model to study credibility is necessary and insightful. This study shows that there is no "one size fits all" answer to credibility assessment of information sources. Travel blogs cannot be treated as a monolithic type because information consumers assess credibility of travel blogs of different origin differently. Credibility transfer, celebrity factor and whether a media is well established can affect the process and outcome of credibility assessment of travel information sources.

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The effects of online social media on tourism websites

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Abstract

Web 2.0 and online social networking websites heavily affect today most of the online activities and their effect on tourism is obviously rather important. This paper aims at verifying the impact that online social networks (OSN) have on the popularity of tourism websites. Two OSNs have been considered: Facebook and Twitter. The pattern of visits to a sample of Italian tourism websites was analysed and the relationship between the total visits and those having the OSNs as referrals were measured. The analysis shows a clear correlation and confirms the starting hypothesis. Consequences and implications of these outcomes are discussed.

Keywords: Web 2.0; Travel 2.0; online social networks; tourism websites; Facebook; Twitter.

1 Introduction

At the close of the 20th century – roughly between 1997 and 2000 – a set of hardware and software technologies collectively known as the Internet had an enormous diffusion and radically changed most of our economic and social life. In the last few years a further "revolution" has impacted the way we communicate, work and conduct business. The buzzword for this is Web 2.0.

Not really a technological advancement, since it relies on well developed and known tools, Web 2.0 rather identifies the changes occurred in the ways software developers and people make and use the Web. The applications that facilitate interactive information sharing, collaboration and formation of virtual communities form today a large part of cybernauts' daily activities and may be seen as a natural development of the original Berners-Lee's idea of "*a collaborative medium, a place where we all [could] meet and read and write*" (quoted in Richardson, 2006: 1).

Obviously, as it happened for the first Internet revolution, Web 2.0 could not remain unnoticed in activities genetically bound to the human species such as travel. The impact of Web 2.0 on tourism has been (and is) quite important as numerous publications, scholarly and not, continue to state.

Most of the analyses conducted so far assess the behaviour, the usage and the effects Travel 2.0 (the touristic version of Web 2.0) has as an important set of tools in the hands of a tourist and how it affects the image and the business of destinations, companies and organisations. Moreover, the adoption of such tools is considered to be quite important for improving the status of tourism websites. This generates the hypothesis that the role of OSNs in rising the number of visitors to referenced websites is significant.

Aim of this paper is to verify this impact. Two OSNs have been considered: Facebook and Twitter. The pattern of visits to a sample of Italian tourism websites has been analysed and the relationship between the total visits and those having the two OSNs as referrals have been measured.

The rest of this paper is organised as follows. Section 2 briefly surveys the role of Travel 2.0 and OSNs. Section 3 describes the methods used. Results and discussion are reported in sections 4 and 5. Some concluding remarks close the paper.

2 Background

The environment called Web 2.0 (or Travel 2.0) is today too well known to be further described here (would it be needed, the paper by Constantinides & Fountain, 2008, is a good summary of the main issues on Web 2.0). A few considerations, however, are in order for better understanding the general framework in which this work has been conducted.

Tourism has long been one of most important components of the online commerce world, whose impact has profoundly changed the structure of the industry. Online travel has anticipated ever since (and partly continues to do so) the development of new market dynamics and consumer behaviours. (Werthner & Klein, 1999; Werthner & Ricci, 2004).

With the introduction and the diffusion of the interactive Web 2.0 features and applications, tourism markets have become real conversations on one of the most thrilling subject for a human being. This happens in particular with OSNs which seem to have rapidly attracted a considerable attention by Internet users of all ages. They are, almost unanimously, recognised as the busiest environments, and this is valid especially for Facebook which has become in a few years by way the largest (in number of users) and the most widespread (in geographical terms) online social network in the World (Fig. 1 after Cosenza, 2010).

As stated ten years ago by the Cluetrain Manifesto (Locke *et al*., 2000: xxiii): "*people in networked markets have figured out that they get far better information and support from one another than from vendors.*" In the Web 2.0 era, the boundaries between information producers and users is blurred, and the usual concepts of authority and control are radically changed. Among the other consequences, marketing approaches aiming at improving online reputation are being greatly affected. Brand awareness, one of the objectives of classical marketing practices transforms into brand engagement, purpose of Marketing 2.0. This engagement is created by the perceptions, attitudes, and behaviours of those with whom the different companies and organisations are communicating. More importantly, especially for tourism, it passes necessarily through the experience (direct or indirect) a customer gains (Weinberger, 2007).

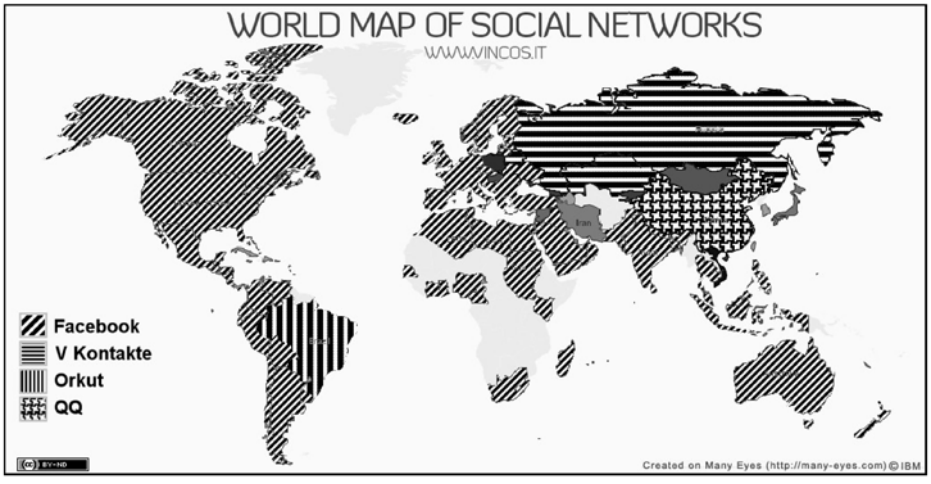

Fig. 1. The World Map of OSNs (adapted from Cosenza, 2010 for better black and white readability). Apart from a few areas (part of Latin America, Russia, China and some others), Facebook shows to be the most widespread OSN.

Contents generated by users (UGCs) have an acknowledged importance in all fields, and in tourism in particular (Akehurst, 2009). Their positive effects have recognised repercussions on quantifiable phenomena such as e-commerce, but also on intangible matters such as those related to the image or the informational side of specific products or services (termed sometimes info-commerce). Already in 2007, the annual Country Brand Index (CBI) measuring attractiveness of countries in several areas, stated that the Web had the highest importance (67%) as channel to collect information about a tourism destination (CBI, 2007). On the other hand, the continuing growth of UGCs' influence, due to their wideness and deepness, makes them perceived as even more reliable than official sources for a tourist. According to PhoCusWright (2009) nine out of ten cybertravellers read (and trust) online reviews on tourism products and services (hotels, restaurants and destinations). Three phases are influential in this travel experience formation process (Milano, 2010):

- pre-experience, built on other people's travel stories, before travelling;
- experience during travel or stay, today increasingly shared real-time through mobile applications;
- post-experience, which disseminates comments, evaluations, emotions.

These issues form the foundations on which specialised Travel 2.0 tourism websites (TripAdvisor, WAYN, Tripwolf, Travelblog, Trivago etc.) have built their success. Today, however, we see a new phenomenon that can be interpreted as starting a new trend, especially in some countries: generic OSNs (Facebook first and Twitter) are being progressively more used in travel and tourism.

Italy is surely one of these countries, being at the first places in the World with regard to diffusion and usage of OSNs, Facebook in particular. According to Facebakers (http://www.facebakers.com/) there are (as per the month of August, 2010) almost 17 million Italian Facebook users, 56% of the online population, which put Italy at the sixth place in country rankings. Italians seem to like much conversing and debating their travel experiences, tastes, perceptions and attitudes. Recent research reports travels as the second most discussed topic on Italian OSNs (Fabris, 2010), and a Google Insights for Search query shows an incredible growth of Facebook searches in Italy with respect to other technologically developed countries such as USA, UK, France or Germany (see Fig. 2).

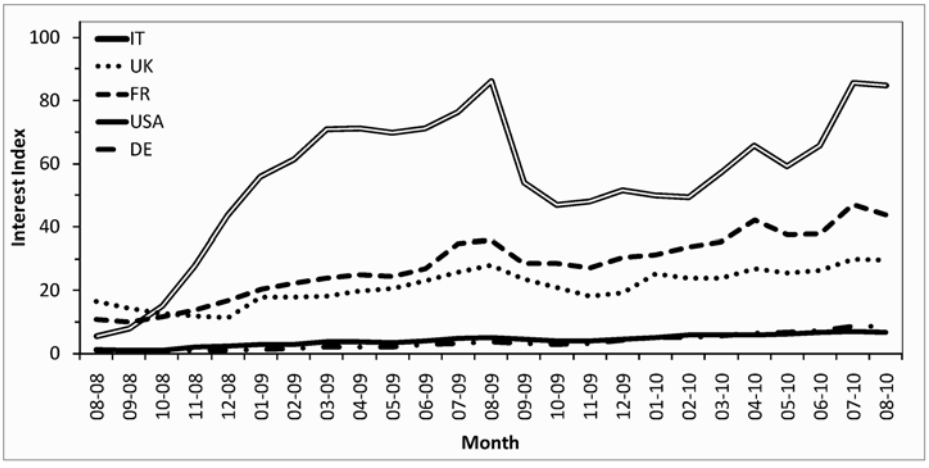

Fig. 2. Growth of interest in Facebook for travel in different countries (source: http://www.google.com/insights/search/#cat=67&geo=&q=facebook&cmpt=geo)

The phenomenon is a social convergence trend: specialised travel websites increase their sociality by adopting applications which enable real-time sharing of contents among the visitors, while giants such as Facebook try to occupy vertical markets through dedicated services or acquisitions of specialised companies as the social

travel recommendation site Nextstop (see: http://www.insidefacebook.com/2010/07/08/facebook-acquires-social-travel-startup-nextstop/).

There are little doubts that the importance of Travel 2.0 features and tools, and specifically of social media environments, is growing fast. Many tourism businesses are, in one way or another, changing their approach to the manners of presenting themselves online (Au, 2010; Jones & Yu, 2010; Schegg *et al*., 2008). However, most of the studies have assesses so far mainly the social and psychological effects, and have well confirmed the role played as sources of information and areas in which discussing various issues related to travels or stays (Chung & Buhalis, 2008; Inversini & Buhalis, 2009; Kasavana *et al*., 2010; Parra-Lopez *et al*., 2010; Schmallegger & Carson, 2008; Xiang & Gretzel, 2010). Some works have also discussed the effects of these tools on the image and the popularity of destinations or other tourism operators, mainly in the hospitality sector, in which the direct contact, real or virtual, with the customer and their crucial role for the good health of the companies (Burgess *et al*., 2009; Inversini *et al*., 2009; Matloka & Buhalis, 2010; Sigala, 2010).

The general conclusion to-date in this field is that, beside the repeated statements on importance and role, tourism operators have not yet fully understood the new technological world by and still many concerns are brought forward. Credibility of the information online, possibility to forge for particular interests by unscrupulous competitors, privacy, overload of useless information, in addition to the usual (in the technology arena) lack of resources or skill shortage are the most reported issues (see all the literature cited so far).

These positions, however create a tension between demand (tourists, travellers, visitors) and supply (tourism businesses and organisations). As well reported by Xiang and Gretzel (2010: 186):

> "social media Websites are ''ubiquitous'' in online travel information search in that they occur everywhere […] no matter what search keywords a traveler uses. Certain social media Websites […], which can be considered more comprehensive and travel-specific sites, are becoming increasingly popular and are likely to evolve into primary online travel information sources. […]. The results confirm that tourism marketers can no longer ignore the role of social media in distributing travel-related information without risking to become irrelevant."

The rest of this paper gives further quantitative support to this stated importance of the role played by OSNs by directly assessing their effects and influence on tourism website visits. This is a topic which has not been discussed in the literature so far, but has an important value in trying to establish the real role of OSNs in supporting the efforts of tourism operators to attract visitors to their websites and influence their attitudes and memories.

3 Materials and Methods

The data analysed in this work were provided by Shiny through their Shinystat service (http://www.shinystat.com/), an online platform specialised in Internet audience analysis and website statistics. The company is well known mainly in Italy, its country of origin and well diffused. More than 275,000 Italian websites use it. Cumulative data were collected concerning the visits to 19,902 websites in the categories: Travel and tourism and hospitality and restaurants. The timeframe spans a little more than two years (26 observations from August 2008 to August 2010 included). To all extent the sample can be considered quite significant, even if a single source of data was used. The data collected consisted of the series of total visits to Italian websites (TOT) and the contributions to these visits having Facebook (FB) and Twitter (TW) as referrals.

Shinystat uses a 30 minutes time window to define a visit; that is: all connections to a website coming from the same IP address in a 30 min period are considered as a single visit. This follows the proposals of the Web Analytics Association (WAA, 2008). Although not particularly meaningful per se, for the arbitrarity in the definition, when measured consistently over a period of time, visits are a good indicator of the behaviour of website with respect to its popularity (Dhyani *et al.*, 2002; Polanco, 2003).

The global series (TOT) is an example of pooled (or cross-sectional) series (Sayrs, 1989): a series consisting of the linear composition of a number of different contributions. In order to assess the significance of these contributions to the global series a multiple linear regression can be used. This technique is well known and has been widely used in many other studies (Beck, 2008). In addition to the usual requirements of a regression analysis, the critical point in our case is to make sure that the independent variables do not suffer from multicollinearity (i.e. predictor variables are not highly correlated with each other) which may hinder the estimation of the effects of individual predictors.

The significance of the contributions due to FB and TW as referrals were assessed with a multiple regression where the time period is the dependent variable and the FB and TW contributions are the predictors. Tests for multicollinearity and normality of residuals were performed. The time series was also examined by using a standard simple decomposition method (Chatfield, 1996) to derive its main characteristics, seasonality in particular. All analyses have been carried out with SPSS version 17 (SPSS, 2008).

4 Results

The time series for total visits to Italian tourism websites (TOT) and the FB component are shown in Fig. 3. It must be noticed that, for space limitations, the figure uses two scale axes (the right one is for the visits from FB) in order to better

show the series' behaviour (measurement scales differ of almost two orders of magnitude, for the same reason TW is omitted due to its very low values).

The maximum values for the contributions of FB and TW visits are recorded in the month of August 2010: FB = 0.329%; TW = 0.002%. When examining the series transformed into an index with the starting observation taken as base, TOT gets to 120 at the end of the period examined, while FB reaches 9438 and TW achieve 2280.The multiple regression uses the following model (Time is the time period number):

$$TOT = \beta_1 Time + \beta_2 FB + \beta_3 TW + Constant + \varepsilon.$$

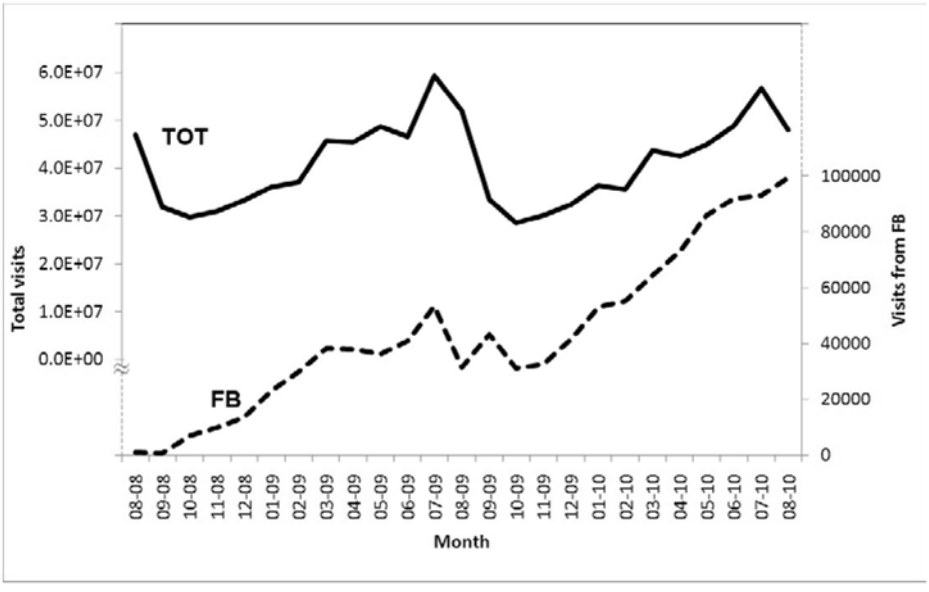

Fig. 3. Total visits to Italian tourism websites (TOT) and contribution to the visits from Facebook (FB). TW contributions are not reported for their very low values

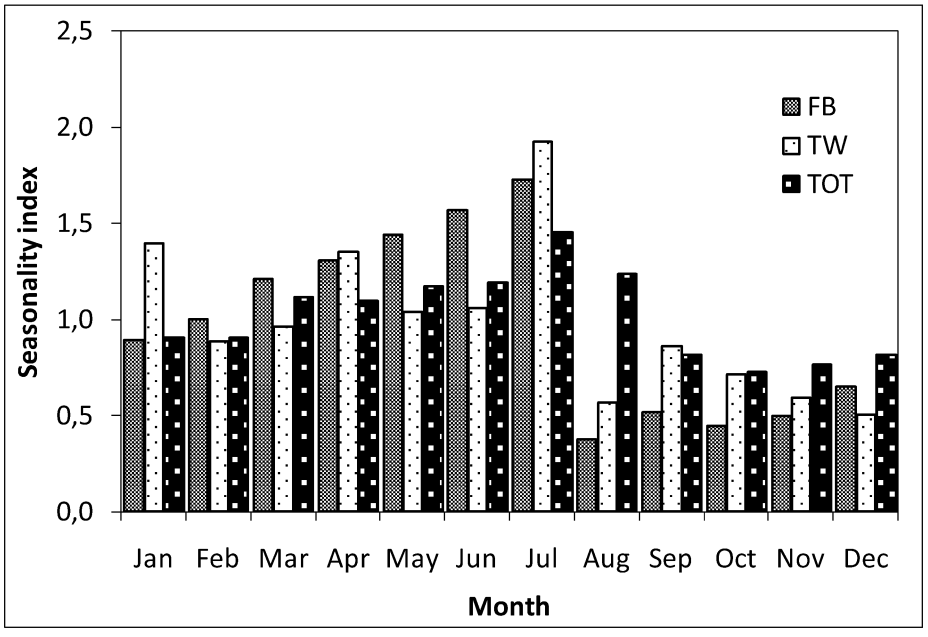

Fig. 4. Seasonality indices of the visits to websites for total visits (TOT) and Facebook (FB) and Twitter (TW) contributions

All the series show a marked seasonality (Fig. 4) with a peak in the summer months. This is typical of the Italian vacation patterns.

Table 1. Results of the multiple regression analysis

Predictor	Coefficients		t	p-value	Condition Index
	β	Std. Error			
(Constant)	3.827E7	2.767E6	13.83	.000	1.000
Time	-1.868E6	5.947E5	-3.14	.005	4.143
FB	538.2	129.7	4.15	.000	8.155
TW	11143.6	12044.1	.93	.365	15.809

The results of the regression analysis are shown in Table 1. The predictor coefficients are reported along with their standard errors and statistical significance (indicated by a *t* statistic and its associated p-value). The last column contains the condition index for which gauges the presence and the extent of multicollinearity (as known when it value is higher than 15 multicollinearity is a concern, when higher than 30 multicollinearity is a serious problem).

The coefficient of determination is $R^2 = 0.523$ (adjusted $R^2 = 0.455$) which can be considered providing a good fit. Residuals are normally distributed, a Kolmogorov-Smirnov (K-S) test produces Z = 0.833 which has a (asymptotic) p-value = 0.492 (the K-S test has a null hypothesis of normality). The multicollinearity diagnostic does not show significant problems. The only slight effect found is for the TW component which has a condition index = 15.809, indicating a limited problem which can be ignored (see Friendly & Kwan, 2009).

5 Discussion

The results of the analysis lead to a number of interesting considerations. First of all the contribution of the two social media websites examined are of a low level. A higher proportion would have been expected, but this result is in agreement with other investigations, conducted on different bases, that show a limited usage of all Web 2.0 functionalities by tourism websites practically in every country (see for example Hamill *et al*., 2009; Schegg *et al*., 2008).

Little research has been conducted on this issue for what concerns Italy and, besides some popular press articles, no reliable data exist on how much OSNs are employed by the Italian tourism industry. In general, however, operators have seldom shown in the past highly favourable attitudes towards ICTs and, still today, make poor usage of them (Antonioli Corigliano & Baggio, 2004; Minghetti & Buhalis, 2010). Hence the advanced Web 2.0 features, OSNs in particular in this case, have a limited diffusion, at least at the present time.

Despite that, the growth of the FB and TW components is quite remarkable (some thousand times), mainly if we compare with the limited increase in total visits (a little more than one). This is an expected outcome and is in agreement with the many publications, scholarly and not, stating the quick growth in the usage of these virtual social environments. Also the seasonality effect is an expected result. The growth in usage in the first part of the year, peaking in July, is a clear indication of the role FB and TW play as important and reputed sources for travellers and tourists planning their summer travels, the most intense vacation period in Italy. This is in good agreement with other studies on the role of online social networks as information sources (Chung & Buhalis, 2008; Inversini & Buhalis, 2009; Xiang & Gretzel, 2010).

The regression analysis shows the positive importance and the significance of the FB contributions to the total number of visits to a tourism website. It must be noted here that no information has been analysed in this work regarding the ownership of these Facebook resources (a study on this topic is ongoing). Very probably these contributions come from pages not directly connected with the websites, a further confirmation of the weight and the value of online social environments for the popularity and the success of tourist operators.

The usual disclaimers apply when it come to the limitations of this work. A single country has been considered, Italy, and a peculiar one for its very large proportion of

Facebook-dependent online population. More studies will have the task of falsifying the outcomes presented here or adding further confirmations to the effects described.

The results presented here have an obvious importance for practitioners. From an academic point of view this work clarifies, for the first time, the role and the influence of OSNs on the popularity and traffic of tourism operators websites. In addition, it provides simple and effective methodological indications for gauging the significance of different contributions to a temporal phenomenon such as the one discussed here.

One final consideration is in order. The mere fact that there are many visits to a website does not necessarily imply a good image of the website owner. Many bad realisations exist and, for example, they are used sometimes to show how not to present an organisation online. In cases like these the websites may be visited by many. As already widely known, only good projects, well designed and carefully implemented, have a positive effect on the health of the actors presenting them online (Baggio, 2005; Bai *et al.*, 2008; Jeong *et al.*, 2003; Lee & Kozar, 2006). This good consideration of the brand, then, produces a more favourable acceptance of the website which, in turn, reinforces the brand image, creating a virtuous cycle of appreciation (Perdue, 2002). Also, many studies argue that a solid, rich and appreciated website is a necessary foundation for the design of an effective and worthy online social media strategy (Constantinides & Fountain, 2008; Miller *et al.*, 2009; Murray, 2009). In this preliminary analysis these aspects have been neglected, the only aim has been to show the effects an OSN may have. Further investigations, already ongoing, will take care of these issues.

6 Concluding Remarks

The main objective of this work was to show the effects of Web 2.0 features, and in particular of online social networks, on the popularity of tourism websites. The survey, conducted on data collected on a significant sample of Italian websites confirms this hypothesis. At the same time the outcomes also confirm the low presence of these features on the sites examined.

Lack of resources, poor technical competence and sluggish management are usually claimed to explain the modest adoption of any type of information technology by tourism enterprises, for the most part very small. To these, in the case of social media, it would be possible to add also a certain level of suspicion, distrust and reluctance to share information, comments or suggestions with others.

However, the demonstrated (not only by this work) impact of modern ICTs and Web 2.0 poses a big challenge to any business or organisation (private or public) working in today's tourism arena. The tourist (traveller, visitor etc.) makes extensive use of these technologies and shows to appreciate quite much the possibilities offered by the Internet today. Difficult (if not impossible) to demonstrate scientifically, most of the declining performance of the Italian tourism in the last years might find a strong component in this poor employment of modern technologies.

Small and medium tourism enterprises are thus urged to rapidly move to a more favourable technological stance. Most, if not all, the adoption issues commonly quoted may find a solution in a firm increase in collaborative and cooperative attitudes which, as long shown, may overcome the weaknesses and deficiencies of single organisations.

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Effectiveness of Advertising on Social Network Sites: A Case Study on Facebook

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Abstract

Social network sites like Facebook, MySpace and StudiVZ have recently gained enormous popularity for marketing communications. Facebook especially describes itself as the perfect marketing tool because its developers have created an advertising system which allows businesses to use the information of each Facebook user for targeted advertising. Despite the current boom of Facebook for marketing, this study reveals that users' purchase decisions are not influenced by advertisements and users do not actively use Facebook as an information source. However, Facebook provides the ideal platform for direct communication between organisations and customers. Marketing on social network sites has to follow new rules and principles and each organisation has to clearly determine if social media marketing is appropriate for them or not.

Keywords: Facebook; fan pages; social advertising; social media marketing; social networks.

1 Introduction

Facebook has experienced a boom since 2004 and is nowadays the most popular social network. At the outset, Facebook was a student network but since 2006, the platform has been open to the public and allows people to stay in contact with friends. Today, Facebook has more than 500 million active users (Alexa, 2010; Facebook, 2010a; Facebook, 2010b).

It was only a matter of time until businesses and advertisers discovered social network sites as the perfect marketing tool to drive their businesses forward. Social media as marketing tools give marketers the unique advantage to be at the same place as their customers, to interact with them and to gain access to their attitudes, needs, interests, preferences, wants and buying patterns. Considering all these insights, organisations have the unique possibility to target exactly the right audience and to create content tailored to each customer's need that allows them to build a loyal and reliable relationship with their audience (Chaffey & Smith, 2005; Facebook, 2010c; Laudon & Traver, 2008; Miller, 2008; Tsai, 2009; Scott, 2007; Weber, 2007).

On the other hand, Facebook is criticized by experts who argue that social network sites for marketing purposes are useless because people use Facebook to stay in touch with friends and not as an information source. On top of that, many companies are still reluctant to use social network sites for marketing because of lack of control of content and there is still no data available if ads in social networks really help to sell a product or service (Carrera et al., 2008; Charlesworth, 2009; Dax, 2009; Gillin, 2009).

It is these differing opinions about Facebook as a marketing tool which serve as a basis for this study. The overall purpose is to provide a comprehensive analysis of social network sites as a marketing tool with a focus on Facebook. The goal is to determine if Facebook is an effective marketing tool, how organisations can use Facebook for marketing purposes and if users are responding to these initiatives or not.

2 Theoretical Background

2.1 Social Network Sites

Social networks have existed for centuries in the offline world. However, in recent years, more and more social networks have shifted from the offline to the online environment. Since the launch of the first social network sites in 1997, these online communities have attracted millions of users because users have the possibility to share their lives, opinions and experiences with other users. Generally spoken, five different types of social networks can be distinguished (Acquisti & Gross, 2006; Boyd & Ellison, 2007; Gillin, 2009; Laudon & Traver, 2008; Tuten, 2008; Weber, 2007).

- General networks e.g. Facebook
- Practise or professional networks e.g. LinkedIn
- Interest-based or vertical social networks e.g. Flickr
- Horizontal networks e.g. TripAdvisor
- Affinity networks e.g. iVillage
- Sponsored communities e.g. eBay

Most social network sites offer their users three major activities. First, users can create “a public or semi-public profile within a bounded system” (Boyd & Ellison, 2007, p. 211). Secondly, users can create a list of other users in the network with whom they are acquainted. Users also can access their friends’ information and their list of connections, however the accessibility and search ability of other private profiles significantly varies among networks. Furthermore, most social network sites provide communication features and applications (Boyd & Ellison, 2007; Dwyer, Hiltz & Passerini, 2007; Gillin, 2009).

It is predicted that social networks will develop into the “identity system of the web” (Tsai, 2009, par. 5). This development will allow websites to recognise a user’s identity and to deliver a personalised and customised web experience considering the user’s personal characteristics and online behaviour.

Users feel attracted to social network sites because they can satisfy their need for direct or indirect contact with friends and other users combined with entertaining themselves and sharing information. Further, social network sites create a feeling of a common meeting place and a sense of belonging based on shared behavioural rules and norms. Online social networks provide a platform for communication and members join to maintain, build and anticipate relationships according to shared interests. Users engage in social networks in order to support their offline hobbies. Taking it further, users can benefit from social networks and use them to find help for specific problems. Another reason to join a social network is to find career opportunities (Blech et al., 2009; Charlesworth, 2009; Dwyer, Hiltz & Passerini, 2007; Gillin, 2009; McWilliam, 2000; Tuten, 2008).

2.2 Social Media Marketing

Social media marketing is still in its infancy and social networks are still small players compared to big portals and search engines in terms of audience and revenue. However, social network sites are the fastest growing online sector and it is likely that they will become the most important online marketing tool and will outperform "traditional" online marketing sites and portals (Laudon & Traver, 2008, p. 440).

Social media marketing can mainly be used for "building brand awareness, […], identifying opinion leaders (known in social media as influentials), driving traffic to brand Web sites, spreading specific messages virally, developing customer databases, instilling credibility and trust in a brand, and enhancing a brand's image, among others" (Tuten, 2008, p. 26).

Marketers need to realise that marketing is changing and following new rules. According to Tuten (2008, p. 175), social marketing is nowadays "characterized by user control, freedom and dialogues." These new characteristics have significantly changed the competitive environment which has become more transparent and makes companies to react to these changes. Nowadays, organisations are defined through their published content and customers want authentic content (Laudon & Traver, 2008; Scott, 2007; World Tourism Organisation, 2008).

Social media have turned the previous passive consumers into active producers and distributors of content, the so called prosumers. The new consumer is an "empowered, impatient customer who has a short attention span, a lot of choices, and a low barrier to switching" (Chaffey & Smith, 2005, p. 119).

Social media have changed the brand building process. Previously, marketers have been in the position to determine the appearance of a brand and then simply copy their offline strategy in the online environment without any adaptation to the customers' needs and wants. However, organisations are not in control anymore and need to consider the new power of consumers. Users have the possibility to interact both with organisations as well as with other users and to participate in the branding of a product or service. Additionally, it is crucial to empower consumers to encourage

interaction and collaborative product development (Christodoulides, 2009; Govers & Go, 2006; Harrison & Barthel, 2009; Zwick, Bonsu & Darmody, 2008).

Social media have created a new form of dialogue between companies and consumers. Traditional forms have been business-to-business (B2B) and business-to-customer (B2C), whereas new forms are customer-to-business (C2B) and customer-to-customer (C2C) (Chaffey & Smith, 2005).

Nowadays, consumers have the possibility to inform each other about products and services through social media and are not solely dependent on the information provided by organisations. Consumers are using social media as an important source prior to a purchase decision because they trust other members and their experiences. Especially in tourism, social media are important information tools because the tourism product is intangible and as such cannot be tried out before a purchase (Charlesworth, 2009; Chung & Buhalis, 2008).

Social media marketing should be understood as a direct two-way communication between brands and customers and not as the passive consumption of advertisements. The goal of social media marketing is not to create traffic nor to interrupt the community but to create brand value and a relationship between the brand and the consumer. In social media, it is crucial to pay attention to the consumer and their opinions. Organisations need to interact and communicate with their customers, encourage participation, share stories and become a part of the community based on trust and a mutual relationship. Trust is established by providing honest information and quality content, however, organisations need to understand that social media marketing is a slow transaction as it takes time to build up trust (Chaffey & Smith, 2005; Laudon & Traver, 2008; Tsai, 2009; Tuten, 2008; Weber, 2007).

2.3 Facebook as a marketing tool

Facebook is one of the largest and fastest growing social network sites, which has developed into a global network. Their goal is to become the operating system of the Internet and to make the world more open and transparent by giving everyone the right to share and connect (Facebook, 2010d; Laudon & Traver, 2008).

The products offered by Facebook can be divided into core products, applications and features. The two elements of Facebook with which each user interacts the most is the Facebook homepage with the news feed and the own profile, which is accessible by other users in the network (Vander Veer, 2008).

Facebook's marketing system is based on three elements and on the concept of a transparent client as organisations can access users' published personal information to target exactly the right audience (Blech et al., 2009; Tapscott & Williams, 2008).

The first elements are ads, which take into account users' personal information and online behaviour. Every ad includes a text line, title and a picture, which is limited in length and size respectively. Depending on the set budget, ads are either displayed in

the news feed, which are more effective, or in the advertising space of each site. As soon as a user clicks on the ad, the user is directed to a website or to site within Facebook. Facebook's ad system is based on the possibility to target the exact audience marketers want to approach. The filters that can be used for targeting are "country, state, city, gender, age, any interest keywords, educational status, workplace, relationship status and interested in" (Facebook, 2008, p. 4). Except the filter location, which is based on the Internet protocol address used for the most recent log in, all other filters are provided by the users. Facebook defines interests and preferences on the profile as keywords, which are used for matching social ads with the social actions of the users. However, in order to use these keywords for audience setting at least 1000 users need to have this particular keyword on their profile. Interestingly, advertisers are not able to specify individual keywords but they have to choose out of the options provided by Facebook. In addition, most of the offered keywords target a younger target group (Facebook, 2008; Holzner, 2009).

The second element is pages, which are free company profiles. Pages offer organisations more features than regular profiles. Users can interact with organisational pages and can become fans of a page instead of becoming friends with other users. Users interact with brands through pages because they are looking for incentives and in order to build a relationship with a company (Facebook, 2007; Holzner, 2009; Tuten, 2008; Vander Veer, 2008).

The last part of Facebook's marketing system is the social graph system. The social graph is a free word-of-mouth system, which allows users to inform other users about their favourite products and services. This so-called friendvertising is the strongest advantage of Facebook marketing because organisations can use this system of connections through the social graph to reach as many users as possible. Friendvertising is successful because consumer behaviour always reflects their network and users are most likely to copy the behaviour of their friends and opinion leaders because they trust them. The overall goal is that users include a brand message in their conversations with their friends. The news feed is the most important feature for viral marketing. An example is Facebook.connect which allows users to share content from other sites with their friends and to inform them about their activities outside of Facebook (Facebook, 2009; Facebook, 2007; Geminder, 2007; Holzner, 2009; Laudon & Traver, 2008; Tuten, 2008; Vander Veer, 2008).

3 Methodology

The purpose is to determine how effective social network sites are as a marketing tool and to which extent users' purchase decisions are influenced by Facebook applications, pages and advertisements. Therefore, the research questions are:

Q1: Are Facebook users aware of the advertisements?

Q2: Are Facebook members using Facebook as an information source?

Q3: Who can be reached via advertising on Facebook?

Q4: Can demographic differences be observed according to characteristics like age, nationality, profession, education, income and marital status?

The methodology of this study is a combination of an in-depth desk research and the outcomes of a conducted quantitative survey. In order to partly answer the research questions, the conducted literature review provides a general understanding of social network sites, their members, Facebook's marketing system and applications. The current state of research about social media marketing is further included in this paper to broaden the findings of the conducted survey. A quantitative survey was chosen to measure the self-assessment of the respondents. This survey is based on a descriptive approach, as the primary objective is to test the above-mentioned research questions.

3.1 Sampling

The population for this survey consisted of all 2.09 million Facebook members in Austria, which represent 0.42% of the global audience (Gonzalez, 2010). The chosen sample method was snowball sampling and the target sample size was n=250. In the case of this survey, the initial group consisted of one of the authors' Facebook friends in Austria (n=110) who were contacted through the mail application in Facebook. After their participation, they were asked to forward the questionnaire to their contacts in Austria in order to reach as many Facebook users as possible. It has to be mentioned that the selection of the sample was non-random because not every member of Facebook in Austria had an equal chance of being contacted to participate in this survey. Further, the participating Facebook users are primarily students and therefore the survey might be biased in favour of that group.

3.2 Data Collection and Analysis

An online questionnaire published with the survey tool voycer.de was designed. The questionnaire consisted of an introduction and 17 questions. The first part of the questionnaire dealt with a pre-set list of reasons to determine why members are using Facebook. The second part asked how often Facebook is used ranking from several times a day to less than once per week. The third part of the questionnaire asked if respondents inform themselves on Facebook before making purchase decisions and where they inform themselves in Facebook. The next part focused on fan pages with the purpose to determine how many users are fan, why users had become fans of a page and their level of interaction with fan pages. The fifth part of the questionnaire dealt with advertisements on Facebook and the goal was to determine if respondents are aware of ads and if these ads influence the respondent's behaviour. The questionnaire ended with a number of demographic questions.

The questionnaire was published from November 28th, 2009 to January 7th, 2010. The survey link was distributed using the mail application in Facebook and was published on the Facebook and Twitter page of Bene AG. The statistical programme SPSS was used for the data analysis.

4 Results

4.1 Profile of Respondents

Out of 250 respondents, 56% of all respondents were female and 44% male, which reasonably reflects the composition of the Facebook population in Austria. With regard to age, seven age categories were established. 44.8% of all respondents were between 18 and 24 years old, followed by "25-34" with 33.6%. The least interviews were conducted with respondents older than 64 (0.8%). The age distribution of the sample reflects the general Facebook population in Austria as the majority of users are between 18 and 34 years old. A small percentage of Facebook users in Austria is older than 45.

Concerning the education profile, the largest group of respondents had a university degree (48.4%), followed by 38.8% with A-levels and 12.8% who had finished high school. The majority of respondents were in employment (54%), followed by students with 32.4% and 6.4% were self-employed. 4.4% were blue-collar workers and 1.2% of all respondents were housewives. Only a small percentage of all respondents were not in occupation (1.6%). Reflecting the occupational structure of the sample, the majority of all respondents earned monthly between "1201-2000 €" (31.2%), followed by "less than 500 €" (18.8%), as a high percentage of all respondents were students. 11.2% of all respondents were not willing to answer this question or found it irrelevant.

The majority of all interviewees were unmarried with 81.2%, followed by 16.4% that were married respondents and 1.6% who were divorced. Only 0.8% of respondents were widowed. With regard to the nationality, 78.8% of all respondents were Austrians and 21.2% were of different nationalities.

4.2 Reasons for Using Facebook

The majority of respondents indicated that the most important reason for using Facebook is to stay in contact with friends and acquaintances (92. 4%). Another important reason is to receive information about friends (65.2%). A further 45.6% indicated that they use Facebook in order to provide their friends with information about their lives.

The group that uses Facebook the most to gather information about friends and visits their friends' profiles regularly are young respondents, students, unmarried respondents and respondents with low income. It can be deduced then that companies should focus on these target groups and create appealing content tailored to this audience, because if users publish or share content about a company or product on their profiles it is a reasonable assumption that their friends will read it and will be influenced by it.

Presumably users will likely keep Facebook throughout their lives and by focusing on these target groups now companies will get a chance to stay in constant contact and

grow with them and build a relationship. Even if a user is not a frequent customer now, he or she might become one in the future (Charlesworth, 2009; Holzner, 2009).

15.2% of all respondents named information about events as an important reason why they use Facebook. 10.8% use Facebook in order to get to know and meet new friends. Out of all respondents, 6.4% mentioned the exchange of interests with other users as their motivation to use Facebook. Only 3.2% of all respondents use Facebook to inform themselves about products and services. The least quoted reason was the search for career opportunities (0.8%). 4.8% named other reasons such as playing games and making businesses contacts.

4.3 Frequency

The majority use Facebook several times a day (45.3%) followed by 21.6% who use Facebook once per day. 17% use Facebook several times per week and 5% once per week (5%). 11% check their Facebook profile less than once per week. It can be said that the younger the respondents are, the more often they use Facebook. Students are significantly using Facebook more often than employees. Further to that, those respondents who use Facebook to stay in contact with friends, to get information about friends and to provide personal information are significantly using Facebook more often than those not indicating these reasons.

4.4 Information Search

The majority of respondents never use Facebook as an information tool before a purchase decision (88.8%). 6.4% of all respondents indicated that they rarely inform themselves before a purchase decision in Facebook, followed by 4.8% who use Facebook sometimes as an information tool. Interestingly however, Facebook users with compulsory education are significantly more likely to inform themselves than those users with university degree or A-levels and further, older respondents are significantly more likely to inform themselves than younger users. However, the number of elder respondents using Facebook is small and they are using Facebook less often and therefore, might be more difficult to reach through this medium.

The most important Facebook feature for users to inform themselves is by using the profiles of friends and acquaintances (71.4%). Certainly, the younger Facebook users use these friends' profiles to inform themselves. The second most important feature is groups, which are significantly more important for users with compulsory education and A-levels than for those with university degrees. The third most important feature is networks primarily for the more elderly respondents. A ranking of the selected alternatives is outlined in Fig. 1.

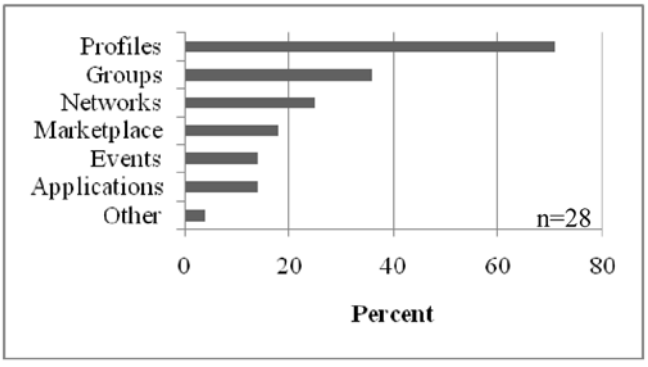

Fig 1. Applications and features as information tool

4.5 Advertising

The respondents' opinion about advertisements in Facebook and in how far their purchase behaviour is influenced by them was measured by five statements. The ranking system was based on a scale from "1" to "5". "1" means that the respondent agrees strongly, whereas "5" means that the respondent disagrees totally. Users do not perceive that ads in Facebook influence their purchase decisions (mean 4.71). Facebook markets its advertising system as the most successful online marketing tool as marketers have the opportunity to match their ads with the personal information of users and their online behaviour. However, after considering the results of this survey, one can say users do not feel that ads in Facebook are responding very well to their needs (mean 4.63). An explanation might be that organisations do not invest the appropriate time to develop a variety of ads and appropriate target filters in order to respond to different needs. Further, no interaction between users and ads can be observed because users do not click regularly on ads (mean 4.62) and do not evaluate them (mean 4.79). The majority of respondents agreed that ads in Facebook are annoying. However, the responses were widely spread and the respondents perceived ads differently.

4.6 Fanpages

Despite the fact that Facebook is not actively used as an information tool and users are not aware of advertising, 36.8% of all respondents are fans of pages and therefore, a direct link between users and an organisation can be established. Members who are using Facebook, more often than not, are likely to become fans. Add to that the fact that male users are significantly more likely to be fans than female users. Users who inform themselves before a purchase decision are also more likely to become fans. It can therefore be said that companies might well be able to generate sales with their fans by providing special sales incentives.

The most important reason to become a fan is information about news (58.7%), followed by recommendations from friends (43.5%) and information about events (40.2%). Fig. 2 outlines the reasons for becoming a fan.

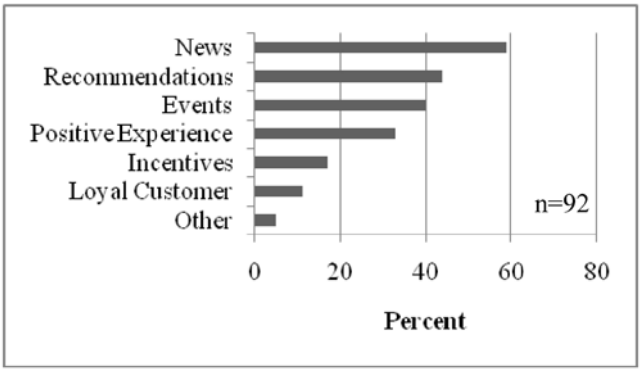

Fig. 2. Reasons for becoming fan

Respondents were further asked about their level of interaction with their fan pages and how far fan pages influence their purchase decisions. The interviewees rated five statements on a scale from "1" to "5". A "1" means that the respondent totally agrees to the statement, down to where "5" means that the respondent totally disagrees. Despite that users have an interest in companies' news, the survey indicates that the majority is rather not visiting their fan pages regularly (mean of 3.39). Therefore, a major focus should be put on up-to-date news accompanied by pictures and videos to satisfy this interest and to encourage users to visit fan pages more often. This would in turn encourage fans to share content with their Facebook friends and to invite them to become fans. Despite that events are an important reason to become fans, respondents rather disagreed to the statement that they have visited events because of pages. Therefore, companies should provide and promote events with an incentive for Facebook users. Organisations can use these events to turn their fans into buying customers. It is crucial to consider that the major goals of social network marketing are communication and participation. Based on the findings of this study, the interaction with fan pages is very low (mean 4.16) and companies should specifically encourage participation by providing incentives for Facebook users and by asking for feedback and reviews. It is important to get to know the fans even if the company cannot easily control the content published on their wall.

It is clear that fans are not using fan pages to inform themselves before a purchase decision (mean 4.12) and do not buy products because of fan pages (mean 4.49), therefore it is recommended to focus on pages as a tool for branding and relationship marketing rather than for increasing sales.

5 Conclusion

Considering the results of the survey and the findings of the literature review, it has to be stated that the majority of users do not use Facebook as an information source and do not purchase products because of Facebook. Only a small percentage of users inform themselves on their friends' profiles and in groups and networks. Despite Facebook's major focus on their ad system, users are not aware of ads in Facebook. Users do not want to be exposed to ads in social networks because one of the benefits of these networks is to escape from the overflow of ads on other sites.

However, if organisations follow the new rules for social network marketing, Facebook can be an effective marketing tool for branding and for building a relationship with customers. Social network sites provide an ideal platform to communicate with users and interact with them to gain more information about their interests, preferences, needs, wants and demands. Interestingly, the user is in control and it is crucial for an organisation to become a member of the network with whom other users can interact and develop a relationship based on trust. Social network marketing is not about advertisements interrupting users nor hard selling techniques and it is crucial not to control the content published by users.

Users use Facebook to stay in contact with friends and organisations need to be careful of how much commercial content they provide. The most important element of social networks is the relationship with friends in an indirect or direct manner. Further, friends have the most influence over each other because according to the findings of the survey the most important source of information is the profiles of friends and acquaintances and one important reason to become a fan of pages is friends' recommendations.

Despite the findings that pages, networks and groups have the highest potential to be used as an information source before a purchase decision, pages should in the future become the preferred choice, because groups and networks have a restricted number of participants and advertising is prohibited. Additionally, applications cannot be used through these features. A major focus is going to be placed on pages because users have an interest in organisations and there are indications that users are more likely to purchase products from brands they are fans of. From a company perspective, the focus on pages should be encouraged as they are free and so the risk is minimal. However, qualified human resources are going to be required to conduct successful social network campaigns and it will take time to carry out such campaigns.

Generally, it is necessary to provide interesting and entertaining content and to be authentic and transparent in order to persuade users to share content with their friends and to invite them to become fans. Despite the finding that the majority of users do not actively contribute to pages, interaction between the user and the brand should be encouraged through incentives to gain access to their opinions, interests and experiences. It is crucial now to provide interesting news and to promote events because users are currently looking for this information on pages. Add to that, using events and interesting news can turn a fan into a buying customer. It is argued that

companies are able to generate sales by directing traffic from their pages to their homepages through news and ads. Considering the results of the survey, traffic is hardly generated through ads at all, as users are not interested in them, but users are interested in the news of organisations and therefore, might look for more information on the organisational homepage.

Despite the criticism that Facebook attracts a young audience with a low disposable income, this audience provides the biggest opportunity for friendvertising, which is shared information between friends. Organisations should focus on young students and unmarried respondents with a low income with the goal to become part of their conversations because they gather the most information about their friends. Especially, this group accesses their friends' profiles more often and use these profiles as an information tool before purchase decisions and therefore, are more likely to be reached through these friends' behaviour and decisions. More importantly, this group is most likely to be reached as they use Facebook several times a day and significantly more often than all other users, which means that organisations can grow with this audience and build a life-long relationship.

Despite the current boom of Facebook as a marketing tool, social network marketing is not appropriate for every organisation and each organisation has to follow the new rules and should clearly consider whether they can reach their desired target groups through Facebook or other social network sites.

It has to be mentioned that all results of this survey are based on the self-assessment of the respondents and the subliminal effect of advertising and commercial content on users in Facebook is not considered in this survey. Future studies and experiments will be necessary to measure the subliminal effect of marketing in Facebook. This paper is primarily analysing Facebook from a traditional marketing perspective focusing on advertisements. In future studies, the major focus should be placed on friendvertising, as advertisements in Facebook do not deliver the promised success.

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Online Customer Reviews Used as Complaint Management Tool

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Abstract

On travel review platforms, tourists can share their holiday experiences with the global community. In case of critical experiences, consumers can use online reviews as a further channel to articulate their complaints. Through Web 2.0, negative word-of-mouth is spread to a progressively larger audience with the instant of a mouse click. Therefore, complaint management is an integral part of today's business strategies. Successful complaint resolution can keep customer relations harmonious and makes them even stronger. Through complaints, hotels can learn about their own weaknesses as well as customer needs. Online reviews integrate such valuable information and can help hotels to improve their performance.

Keywords: online reviews; complaint management; word-of-mouth; Web 2.0.

1 Introduction

With the emergence of Web 2.0, the web has become increasingly social. Users can generate and globally share consumer generated media (CGM) with a minimum of effort (Charlesworth, 2009). Moreover, it enhances the power of word-of-mouth due to the increased speed at which experiences and opinions are spread around the globe to a progressively larger audience (Thackeray *et al*, 2008). On travel review websites, such as HolidayCheck, users can publicly post what they feel and think about a tourism product. Users consider these reviews because they trust in the independent information from other users, peers and friends (Charlesworth, 2009). Moreover, online reviews are seen as a further channel to articulate complaints as dissatisfied customers can voice their opinion about the perceived inequity of expectations and quality delivery (Tyrrell & Woods, 2004).

Recently, the trend to write and read online reviews flourished. According to Gretzel, and Yoo (2008), over 95% of online travel planners read comments from other tourists. It was further found that travellers consider customer reviews to be more important for hotels than for any other tourism product (Gretzel, Hyan-Yoo & Purifoy, 2007, cited following O'Conner, 2008). Studies on online word-of-mouth or online consumer behaviour are largely available. However, there has been little research undertaken in the field of online complaint behaviour. It is, therefore the aim

of this study to find out if online reviews can be used as a complaint management tool for hotels and how hotel services evaluated within the online environment.

A content analysis of reviews from the travel review platform HolidayCheck.com was undertaken. In total, 352 reviews from 150 Munich hotels were analysed. The review analysis focuses on 3 main parts. Firstly, it was investigated how hotel services were evaluated on HolidayCheck. Secondly, it was intended to establish a complaint behaviour profile of online complainants. Thirdly, it was of importance to reveal if and why hoteliers use online reviews. For that reason, an additional questionnaire was sent out to the respective 150 hoteliers in order to integrate their perspective on this topic.

The following research questions have been established:

RQ1: What hotel services become most often subject to a complaint on HolidayCheck?
RQ2: Do certain personal aspects such as age, gender, or travel habits have an influence on online complaint behaviour?
RQ3: Do hoteliers already integrate online reviews in their complaint management process, meaning do they give answer to reviews on HolidayCheck?

2 Theoretical Background

2.1 Customer Relationship Management (CRM)

CRM is seen as a managerial philosophy where an intimately familiar contact with customers is desired. Particularly the lodging industry, with its multitude of customer touch points seems to be ideally positioned to benefit from CRM initiatives (Piccoli *et al*, 2007). Through the deep bonding, companies can benefit from the close contact by the high information volume resulting from these relationships (Kotler, Bowen & Makens, 1999). Information about customer needs is seen as the very basis for CRM. With the gathered information, a database is created which serves as the fundament of subsequent CRM initiatives (Brink & Berndt, 2008; Boone *et al*, 2010).

Due to new emerging technologies and an advanced economy, competitors can nowadays easily duplicate each other's products and prices. However, what cannot be duplicated are the relationships to customers. Hence, the ability to satisfy customers becomes an integral part of today's business strategies (Williams & Uysal, 2003). Organizations have recognized that loyal customers positively contribute to the achievement of organizational goals since they produce several benefits. Most preciously, loyal customers are an excellent source of word-of-mouth advertisement and are also more likely to complain if a potential problem occurs (Shoemaker & Lewis, 1999; Kotler, Bowen & Makens, 1999; Schlagel Wuest, 2001).

2.2 Complaint Management

A complaint is seen as any statement that suggests that the performance or behaviour of a company falls short of customer expectations (Barlow & Møller, 2008; Stauss & Seidel, 2004). Dissatisfaction is among the principal reasons why customers terminate their loyalty. Complaints represent a pivotal starting point to return disgruntled customers to a state of satisfaction (ibid). Customers who complain give the company the opportunity to solve a problem. Furthermore, they refer to possible improvements of products and services since customer feedback can enhance quality (Naz, 2005). The recovery paradox even proposes that a successful resolution of a complaint might even lead to a higher overall satisfaction than before the critical incident (Jones & Farquhar, 2003; Smith & Bolton, 1998). In this sense, effective complaint management might keep relationships harmonious and makes them even stronger (Barlow & Møller, 2008). However, only very few customers actually chose to complain (Stauss & Seidel, 2004).

Several factors have been identified that influence complaint behaviour. Basically, customers are more likely to complain if they think that the product is of importance and quality to them and that the problem will be handled fairly and fast (Barlow & Møller, 2008). Complaint benefits are weighted against complaint costs. The majority does only complain if they think that there is a realistic chance of resolution (Michel, 2001). Customers are often reluctant to complain because they fear exasperation and the high efforts that are involved in the complaint process. Complaint costs such as time, frustration or stress decrease the individual's willingness to complain (Barlow & Møller, 2008). Moreover, concrete problems that can be manifestly proven (such as a dirty hotel room) are more likely to become subject to a complaint than unclear circumstances like personnel behaviour (Stauss & Seidel, 2004). Person specific attributes are as well evidently jointly responsible for complaint behaviour. Socio-demographic attributes, psychographic attributes (e.g. self-confidence, complaint experience) and behavioural attributes influence the customer in the decision whether to raise a complaint or not (Morganosky & Buckley, 1987). Lastly, situation-specific attributes also influence the probability of complaints (Stauss & Seidel, 2004).

If customers chose not to complain or if they are not satisfied with the resolution, they certainly engage in other activities (Schoefer & Ennew, 2003). A customer might switch to another brand or exit the market entirely (Stauss & Seidel, 2004).A dissatisfied customer might also engage in negative word-of-mouth communication and talk unfavourably about the organisation (Schoefer & Ennew, 2003). If customers feel that their complaints have not been satisfactorily solved, they share this experience with 9 to 10 other people on average. Even worse, some tell 20 people or more about a complaint (Tschohl, 2007). Relating negative word-of-mouth behaviour to online customer reviews, messages can reach people on a global scale (Barlow & Møller, 2008).

2.3 Customer Reviews as Complaint Management Tool

Online reviews are written opinions of users which are transmitted to the online sphere (Gretzel & Yoo, 2008). They are seen as an independent information source and as the most accessible and prevalent kind of online Word-of-Mouth (WOM) (Yoo & Gretzel, 2009). Online consumer-generated opinions are of special importance to the hospitality and tourism industry because intangible products are difficult to evaluate prior to the consumption experience and customers, hence, heavily rely on WOM (Litvin, Goldsmith & Pan, 2008). In Germany, already 24% of internet users book their holidays online from which 50% refer to customer review websites (Reiseanalyse, 2009). Gretzel and Yoo (2008) found that 97.7% of respondents, who use the web for travel planning, read other travellers' reviews in their planning phase. Another study from Gretzel, Hyan-Yoo and Purifoy (2007, cited following O'Conner, 2008) revealed that travellers consider customer reviews to be more important for hotels than for any other travel product.

Online complaining possibilities are thought to stimulate and encourage customers to express their dissatisfaction. Moreover, they are more convenient and less time consuming as time and place no longer play any role. Consequently, the overall rate of complaints should be increased (Hong & Lee, 2005). Therefore, a further form of complaint behaviour evolved through Web 2.0: uttering WOM to the online sphere (Buttle, 1998).

Whereas increasing numbers of consumers take advantage of online opinions, this new form of communication venue does also create new opportunities for deception (Yoo & Gretzel, 2009). O'Conner (2008) indicates that deceptive reviews are often posted by hoteliers to reduce the scores of competition or to improve own scores. On the other side, disgruntled customers are willing to harm a company's reputation through writing fraudulent posts. They make heavy use of exaggeration or embellishment (Elliot, 2006).

From the customer perspective, online reviews are a potential channel to articulate problems since the barriers to complain are very low. The internet decreases psychological costs as direct confrontations can be avoided (Hong & Lee, 2005). Also time is irrelevant for customer reviews since they can be written at any time (Gretzel & Yoo, 2008). Customers expect that companies show an interest in their problems and they are longing for the feeling of understanding (Töpfer, 1999). Through the internet, users will not only get heard from many people but also might receive approval from customers who have faced similar problems. 58% of users indicated that if they had articulated a complaint on a social media site, they would like the company to respond to their comment (RightNow Technologies, 2009).

With regards to hotels, complaints include relevant information of organizational weaknesses and strengths. Customer reviews provide a hotelier with information that is not only easily accessible but also documented and structured. However, it needs to be taken into account that reviews also have to be managed and monitored. Unsupported communication channels may result in even more dissatisfied customers

and negative WOM might propagate. Since online reviews are countless in numbers, it is necessary to effectively allocate resources among complaining channels (Hong & Lee, 2005).

3 Methodology

The method of investigation includes an analysis of reviews entered on the online review platform HolidayCheck.com and a supplementary questionnaire which was sent to the respective hoteliers. In total, 352 reviews from 150 Munich hotels were analysed.

The review analysis comprises solely reviews from HolidayCheck. Hotels with 2 stars or more from the city of Munich were analyzed. Munich was selected because the author completed her practical training semester there, and it is, with 9.9 million overnight stays, the second most important tourism destination in Germany (Deutscher Tourismusverband, 2009, p. 14). HolidayCheck was chosen since it represents Germany's largest travel review platform with 1.4 million Unique Users and more than 10.11 million Visits per month. HolidayCheck indexes hotels from locations around the globe along with written reviews by travellers. On the platform, users can evaluate hotels with a likert-scale from 1 to 6 (1=very poor, 6=excellent). For the analysis, only reviews with a smaller than or equal to evaluation of 3.5 were analysed. 3.5 were set as an upper-boundary because all reviews equal to or below this score are referred to as a complaint. Firstly, all Munich hotels (total 292) were ranked according to their overall score. The 150 hotels with the poorest overall scores were taken into account. Secondly, for each hotel reviews were again sorted from the lowest to the highest member rating. Only reviews with a smaller than or equal to evaluation of 3.5 were analysed. A maximum of 150 hotels and 10 reviews per hotel was extracted as an analysis of all reviews would have been too complex. The data was collected from October 2009 until January 2010 during the course of the author's work on the master thesis.

On HolidayCheck, users have the possibility to evaluate hotels according to 6 categories (hotel in general, location, service, gastronomy, wellness & sport and rooms) with the likert-scale from 1 to 6. The mean of the scores from each category results in the overall score per evaluation. As these 6 evaluation criteria were not sufficient enough for the review analysis, further sub-categories were amended (see ´miscellaneous` in Table 1). Moreover, users have also the possibility to personally write comments to each category in their own words. As soon as a user mentioned a specific complaint, it was entered into the database. Hence, each review was analyzed according to the mean value of the 6 evaluation categories and the data collected from the written comments. The reviews were further analyzed according to demographic data such as age, gender or travel habits which users have to enter when they evaluate a hotel. Moreover, it was also investigated if hoteliers answer to reviews on HolidayCheck and therefore, all hotel answers were counted.

A supplementary questionnaire was sent online (via voycer.de) to the 150 analysed hotels. The response rate amounted to 29 answered questionnaires. As this is not a valid result, the answers should serve as an additional input to illustrate the hotelier's perspective on the topic. The questions mainly investigated if and since when hoteliers read reviews and how often. It was further asked for what reasons reviews were used or not and how hoteliers react to complaints. Moreover, hoteliers were questioned about their opinion and if reviews are important to them.

The statistical program SPSS was used for the data analysis of both, the complaint analysis and the questionnaire. All variables were coded and entered into the data set. The analysis of variances (ANOVA), linear regressions, frequency tables as well as cross tabulations were used for the data analysis. Data was analysed with an ANOVA if a scale variable was dependent from a nominal variable. Regressions were used for two scale variables. Relationships and differences are defined as significant when the p-value is ≤ 0.05. Results are highly significant if p is ≤ 0.01.

4 Results

4.1 Hotel performance and complaint cases

In order to reveal which service failures become most often subject to a complaint, it was firstly investigated which types of failures were mentioned in the written comments of reviews. In total, 1,456 failures (total sum of complaint cases) for the 352 complaints could be identified. Multiple failures per review were possible. If a guest complained about more than one issue, each case was counted.

The complaint category **rooms** represents the highest number of failures among all categories with a total of 598 cases. More than 50% of the initial sample of 352 reviews complained about cleanliness in the room. Examples of these complaints included dirty carpets, hair found in the bathroom, or malfunctioning toilet flush. The overall **service** delivery failure represents 264 cases. From the 352 complaints, 43% complained about the employees' competence; 32% evaluated the service as unfriendly. Examples for service delivery failures referred to unprofessional handling of complaints, slow delivery of services or rude and impolite employee behaviour. The complaint category **hotel in general** achieved 222 cases. 39% were dissatisfied with the hotel in general and 24% found that the actual service did not conform to the hotel stars. For **gastronomy**, 135 cases (38%) assessed the gastronomic offer as not satisfying. Examples were bad quality of the food, no variety or dirty dishes. The other two complaint categories are **location** and **wellness & sports**, representing 11% and 6% respectively. Also the amended miscellaneous sub-categories show 173 complaint cases in total.

Table 1. Frequency of complaint cases

Frequency of complaint cases							
category	sub-category	cases	% of 352	category	sub-category	cases	% of n=352
Rooms	Cleanliness room	187	53%	**Service**	Competence	151	43%
	Cleanliness bathroom	131	37%		Friendliness	113	32%
	Equipment	119	34%	Total		264	
	Room size	100	28%	**Hotel**	Hotel in general	139	39%
	Bathroom size	61	17%		Description not met	83	24%
Total		598		Total		222	
Gastronomy		135	38%	**Miscellaneous**	Noise	85	24%
Location		39	11%		Price	54	15%
Wellness & Sport		25	7%		Odor	34	10%
				Total		173	

In order to evaluate the performance in each category and to determine their complaint potential, the mean value was calculated (1 = very poor; 6 = excellent). **Sport & wellness** facilities were evaluated most negatively with a mean value of 1.94. However, only very few users (30%) evaluated this group in contrast to 85% for all other categories. **Rooms** have a mean value of 2.43, the **hotel** itself of 2.64. **Service failures** summed up at a mean evaluation of 2.71 followed by **gastronomy** with 2.87. Lastly, the least complaints were raised for **location** which represents the highest mean (3.95).

4.2 Complaining Behaviour Profile

According Morganosky and Buckley (1987), complainants are seen to be more verbal and communicative. Hence, the number of words per written review was counted. It is supposed that the more often a complaint occurs in written form, the more negative the mean ranking of the respective category will be. The ANOVA (see Table 2) confirms the assumption in all but one category (wellness & sport) with a p-value $\leq$ 0.01. For example, the more often people complained about rooms, the more negative the mean value of this category has been. It is further suggested that the more words are written in each complaint category, the more negative the mean evaluation of this category will be. The linear regression (see Table 2) shows a significant difference in all complaint categories but wellness & sports and gastronomy. Generally, the longer and the more detailed a review is written, the more dissatisfied customers are and the more negative they will evaluate the respective category.

An ANOVA (see Table 2) examined the relationship between age and complaint behaviour. Generally, most complaints (215 from 352) were raised by people between 26 and 45 years old. However, no significant difference could be found between age and the negativity of the evaluation, meaning that people from one age category do not evaluate a complaint category better or worse than users from another age category.

With regard to gender it was found that men complain more than women. From the 352 complaints, 208 were entered by men in comparison to 136 by women and 8 by couples. However, when it was examined if men also evaluate hotels more negatively than women, the ANOVA (see Table 2) only showed a significant difference in the **service** category, where the mean value is higher for women (2.85) than for men (2.6).

It was also of interest to find out, if the annual travel frequency has an impact on complaint behaviour. With an ANOVA (see Table 2), it was tested if people who travel more frequently are more likely to complain. Firstly, the frequency table showed that most users indicated to travel 3-4 times a year (48%) followed by 1-2 times a year with 26%. When travel frequency was compared with the total mean evaluation of the reviews, no significant relationship could be identified. Hence, people who travel more often do not complain more than guests who travel less.

Table 2. ANOVA and Regression Results

ANOVA and Regression Results						
***A**=ANOVA* ***R**=Regression*	hotel in general	rooms	service	gastronomy	wellness& sports	location
n° cases + performance (**A**)	,000	,000	,000	,000	,604	,000
age + performance (**A**)	,072	,274	,307	,323	,044	,113
gender + performance (**A**)	,285	,885	,035	,986	,213	,994
travel frequency + perform. (**A**)	,926 (compared with total mean of all 6 categories)					
n° words + performance (**R**)	,003	,022	,001	,102	,868	,008

4.3 Answers from Hoteliers on HolidayCheck

From all 352 complaints, only 13 reviews were answered on HolidayCheck. This is clearly a rather poor result as 96% of 352 complaints remained unanswered. From the 13 responses, 9 included an apology. Also this raises the question if hotel companies do actually integrate customer reviews in their complaint management process. An apology is the least thing a hotelier can do when answering to a negative review. Moreover, some hoteliers gave rather standardized answers to more than one user.

4.4 Outcomes of the Questionnaire

The results from the questionnaire should give further insights into the hotelier's opinion towards customer review websites. The grand majority of hotels started using hotel review platforms about one or two years ago (85%). About 50% read them at least once a week. Over 80% confirmed to have a registered hotelier-account on review platforms. As Figure 1 shows, the most popular reasons why hoteliers are actually interested in online feedback are to identify weaknesses, to improve quality

and to learn about customer needs. The mere informational use of reviews is confirmed with a mean of 2.88 (1=I totally agree; 6=I totally disagree). In total, 60% of the respondents declared that they do not answer publicly to reviews. However, the overall importance of customer online reviews was recognized by all hotels with 70% assessing it as very important or important. However, about 72% nonetheless deem online reviews as risky or rather risky.

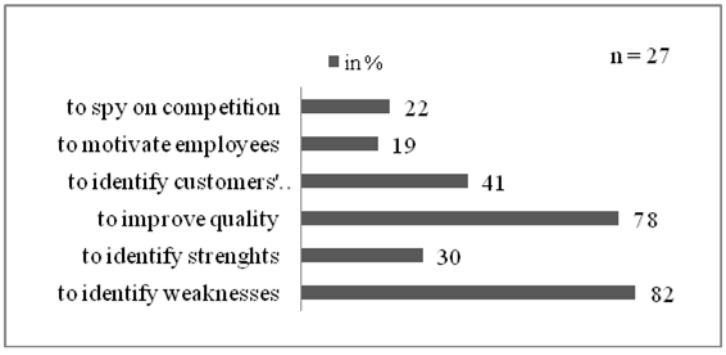

Fig. 1. Reasons for using online reviews

Hoteliers were also questioned if they answer to reviews. 60% declared that they do not answer to online comments at all, 7% only answer to complaints. With a mean of 3.46 and 3.75 respectively (1=I totally agree; 6=I totally disagree), an apology or remaining inactive are the most popular reactions towards negative reviews. 8 out of 28 hoteliers believe that guests are satisfied as long as they do not complain.

5 Discussion and Recommendations

From the frequency of complaint cases and the mean value of each complaint category, a ranking of the most mentioned complaints was established which shall give answer to research question 1: what hotel services become most often subject to a complaint on HolidayCheck?

The analysis has shown that hotel **rooms** are the greatest source of failure. Over 50% of the 352 complainants referred to the lack of proper cleanliness. Moreover, the mean value of 2.43 confirms that most guests were not satisfied with their rooms and evaluate them as poor or rather poor. Also the overall **hotel** appearance felt short of expectations and was on average perceived as not satisfying with a mean of 2.64. 24% stated that the number of stars was not justified. Guest **service** is ranked three. The low mean value of 2.71 and the 264 complaint cases from this category may indicate that hotels have not solved the problems of their guests properly. According to Barlow and Møller (2005), people are more likely to articulate a complaint when the product or service is of importance. Rooms, the hotel in general and service delivery can be seen as core processes and therefore people might be more sensitive towards these failures. Moreover, they can be classified as hygiene factors when the model

from Herzberg is taken into account. According to Herzberg, hygiene factors refer to those aspects that have to be in place in order to ensure that the customer is not dissatisfied (Herzberg, Mausner & Snyderman, 2004).

Gastronomy is placed on the fourth rank with a mean of 2.87. Quality and freshness were mentioned in nearly all cases where a complaint about gastronomy occurred, indicating that they must be controlled more strictly. **Wellness & sport** has the lowest number of complaint cases, it is ranked as fifth failure source although the mean value is the most negative. However, wellness & sport was seldom mentioned in written reviews with only 7% of complaints. The low evaluation ratio of this category might indicate that those facilities were either not important to customers or generally not used. **Location** was evaluated best by all customers with a total mean of 3.95. The gastronomic offer, wellness & sport facilities as well as the location are not classified as core processes or core aspects of a hotel business. According to Michel (2001), customers are more likely to accept a failure when it is not related to a core process. The better evaluation of these three complaint categories might be explained through this assumption.

Whereas hoteliers can do only very little against their building or furniture, dirty rooms, customer service failures or lack of quality with regard to food can be avoided through better trained employees and the implementation of service standards. Knowing the source of failure is imperative if hotels aim to improve their overall performance.

In research question 2, it was investigated if personal attributes such as communication abilities, age, gender or travel habits influence online complaint behaviour. Firstly, it was found that originators of detailed written reviews tended to evaluate the hotel more negatively than users who only wrote a few sentences. Customer reviews give complainants the possibility to complain whenever they want with no limit on time or depth. In terms of age, the outcomes of this study can confirm previous works on this topic. Bonn, Furr and Susskind (1999); Wolfe, Hsu and Kang (2004) or Stauss and Seidel (2004) already suggested that complainants are rather young, and online bookers beneath the age of 45. Moreover, Day (2008) proposed that people aged 18-24 are less likely to make use of travel reviews than the 25 plus generation what can be confirmed as well. The majority of complainants (215) were between the age of 26 and 45 years old, only 46 complainants were younger. However, no significant difference with regard to complaint behaviour as such could be found. Elder people do not evaluate more negative than the younger generation.

With regard to gender, it was found that generally no difference in complaining behaviour between women and men exists. The total evaluation mean of all complaints even summed up identically for male and female users alike. Nonetheless, the ANOVA shows that there is a significant difference between gender and the service complaint category. Due to the general role model, males might be more willing to articulate a complaint. This can also be confirmed by the number of complaint cases as men with 208 cases complained more often than women. Also

Stauss and Seidel (2004) suggested that men raise their voice more often than women in critical moments.

It was also investigated if travel frequency influence complaint behaviour which has to be neglected. People who travel more often do not complain more than guests who travel less.

Research question 3 aimed to find out if hoteliers already answer publicly to reviews. Hence, answers from hoteliers to the 352 complaints on HolidayCheck were counted. Only 13 reviews have been answered. Similar studies found same results in their work. Lee and Hu (2004) analyzed online complaints in the hotel sector and received only 31 answers from lodging companies (out of 222). A study on TripAdvisor (O'Conner, 2008) found only 2 answers out of 500 complaints. From this perspective, research question 3 has to be clearly neglected: hotels do not actively use customer reviews and are only rarely answering to online complaints. As the results from the questionnaire show, hoteliers use them rather for informational purposes. The three main reasons are identifying own weaknesses, to improve quality and to learn about customer needs. To sum up, hoteliers might not yet use online reviews actively as complaint strategy but they have already recognized their informational value and importance to improve the hotel's own performance and to learn more about guests.

6 Conclusions

Complaint management is a pivotal point to keep relationships harmonious and successful complaint resolution helps hotels to maintain their guests. Studies have shown that successful complaint management can positively contribute to customer loyalty what, in the end, leads to long-term financial benefits and positive word-of-mouth. Online reviews represent a new form of complaint channels. They include valuable information for companies such as customer preferences, weaknesses and brand performance. On the other hand, they provide users with more possibilities to complain but as well with more power since negative comments can propagate progressively fast. Through the outcomes of this study and previous works, it can be concluded that hoteliers have recognized the potential of customer reviews and use them as a valuable information source. However, online reviews represent a fairly recent phenomenon, and therefore, an active use within the complaint management strategy could not be confirmed. As each study, also this analysis is limited in its scope. Firstly, it includes only city hotels from Munich. Future research in other fields of tourism as well as other cultures would give insights into different kinds of complaint behaviour. Moreover, through the Social Media trend, other Web 2.0 applications such as Facebook might represent further opportunities for complaint management as a direct dialogue between enterprises and customers is possible. Furthermore, on community pages or own company blogs, businesses could regain some of the lost control over their information. A further limitation is set due to the specialisation on the travel review platform HolidayCheck. HolidayCheck allows the creation of reviews without registration; the writer can remain totally anonymous and does not need to bring any proof for a booking. Moreover, the author evaluated the

written content of complaints personally. Although all work was done conscientiously, the outcomes might be biased to a certain extent.

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Impact of Perceived Benefits of Social Media Networks on Web Quality and E-satisfaction

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Abstract

As many DMOs have increased their investment in Social Media Networks to support B2C systems, it is important to measure the success of such investment. This paper aims to examine the impact of perceived benefits of Social Media Networks (SMN) on Web Quality and eSatisfaction within the context of tourism destination marketing. In this research, integrated model is proposed based on study by DeLone and McLean's (2004) and McKinney et al (2001) in order to assess the influence of perceived benefits of Social Media Networks on website quality and costumers' satisfaction. A total of 200 useable responses were collected in order to examine the validation of the model from the customer perspective. Multiple Regression Analysis techniques are applied to test the validation of the proposed model. The findings provide several important implications for Social Media Networks research and practice in destination marketing context. This paper concludes by discussing limitations of the study which should be addressed in future research.

Keywords: Social Media Network, Web Quality, eSatisfaction, Sicily tourism website

1 Introduction

The purpose of this study is to assess the impact of perceived benefits of Social Media Networks (SMN) on web quality and satisfaction of official tourism website of Sicily from the perspective of potential visitors. As the regional tourism authority which is often responsible for marketing and promotion through an official website and more DMOs are considering using Social Media Network as support tool, it is crucial to identify the perceived influence of Social Media Networks on Website quality and users' satisfaction. Nowadays, in spite of all efforts, many tourism websites projects fail and lead to the introduction of a site that does not meet users' expectations. Therefore, it is important to obtain a high level of customer's satisfaction by identifying the level of quality that a website needs in order to fulfill adequately all users' requirements, especially during the information search stage. It is believed that high customer's satisfaction will lead to customers' retention as users will continue to use the website and visit it regularly (Matzler et al., 2006). In order to reassure repeat visit, the literature review has identified which elements are perceived to be critical to obtain customer satisfaction and recently, particular focus has given to the role of Social Media Networks in enhancing these elements. In order to find out the key role that Social Media Networks can play in a tourism website, this study has focused on

the Sicilian website and on the opportunity to implement it with a Social Media Networks. In order to achieve this, firstly, this study aims to assess the perceived influence of Social Media Networks on Web Quality and customer satisfaction. Secondly, this study examines the impact of Web Quality on customer satisfaction and finally, it also looks at the effect of customer satisfaction on the intention to revisit of tourism destination website.

2 Social Media Networks and E-satisfaction

Within eBusiness context, the tourism industry is one of the most highly represented economic sectors. Therefore, the need to develop and manage website has become an integral part of the overall marketing strategy of a tourism destination (WTO, 2001). According to Mintel (2008), 22 million people booked their holidays online, with an increase of 30% compared to the previous year which registered only a 2-3% growth. According to Poon (1993), technology is in the cornerstone to target the new tourist. They are usually frequent travelers, they spent more time to collect and compare information about different destinations, they often organize they own trip by including different leisure products and are willing to try new experiences (Buhalis, 2003). However, the easiness to be online has brought several destinations to compete in the online market place. Hence, it is crucial to guide the tourists to find the optimal destination which offers them the product that they are looking for. Several studies have been conducted to assess the impact of internet on customer satisfaction and browsers experience with the digital world (Bai et al., 2008; Kim & Fesenmaier, 2008; Law & Bai, 2007; Yoon & Uysal, 2005; McKinney et al., 2002; Szymanski & Hise, 2000). Moreover evaluating websites' effectiveness requires a multidimensional approach (Park & Gretzel, 2007).

Anderson and Srinivasan (2003, p.15) define e-satisfaction as contentment of the costumer with respect to his or her prior purchase with a given electronic firm. While other researchers defined users information satisfaction as the desire quantity of information available which match their information needs (Bai et al., 2008). Unfortunately, the majority of destination websites are still product oriented by providing information about the destination tourism offer rather than demand oriented. Stamboulis and Skayannis (2003) suggested that a more interactive consumer approach will lead to a unique experience. The primary aim should be therefore the creation of a legend that involves the visitors' feelings. Other studies have also revealed that attracting users' curiosity and involve them in online virtual trip, checking their preferences, providing user-friendly software with direct access to relevant and update information enhance costumers' satisfaction with destination website (Heung, 2003; Youcheng et al., 2006).

On the other hand, Social Media Networks (SMN) are web space where people can meet together and exchange in cyberspace information, experience and opinions. These virtual environments are crucial to create new business model for companies and organizations, as they gather people who share similar interests (Stepchenkova et al., 2007; Gupta & Kim, 2004). Depending upon the objectives followed by the organization, SMN can be applied as a strategic tool in e-marketing; as a channel for relationship marketing; as tool for developing relationship commitment, building

brand image and loyalty among members (Wang et al., 2002). From the consumers perspective, on line tourism market place consists of complex product which includes several different components not always easy to bind together. Due to this fact, consumers rely more and more on other people's online comments and opinions, especially when the travel website is poor quality in terms of provision of information and service (Corigliano & Biaggio, 2003). From a tourism firm's point of view, SMN could be an effective marketing tool to monitor visitors' feedback about their holidays , to understand consumers' opinions about the destinations, to identify the strength and the weakness of the promotional plane in creating the wanted destination image in consumers' minds (Carson, 2008). The popularity of this electronic community has been widely recognized by several researchers which highlighted the fact that more and more people rely on online reviews, comments and opinions left by other tourists when they search, select and plan their own holiday (Schmallegger & Carson, 2008; Gretzel & Yoo, 2008; Arsal et al., 2008). Moreover, acting online communities have been found to enhance users' satisfaction and motivate them to revisit the site (Chung & Buhalis, 2008).

3 Web Quality and eSatisfaction Evaluation Model

Despite the fact that new forms of electronic marketing efforts are arising, the main role of IT has not been modified and therefore the methodologies for measuring the success of information system have been used. The web site quality evaluation model was instead proposed by Orsina et al. (1999) as a systematic and quantitative approach in order to assess the quality of academic website. The model identifies functionality, usability, efficiency and site reliability as the most important aspects. Further the e-commerce evaluation website, other researchers have also identified similar web quality factors like information quality, learning capability, playfulness , system quality, system use and service quality (Liu & Arnett, 2000) while Wan (2000) divided e-commerce web quality attributes into four categories such as information, friendliness, responsiveness and reliability. According to the updated DeLeone and McLean (2003) success model, the performance of information system is still based to six interconnected variables such as system quality, information quality, service quality, use, user satisfaction and net benefits.

Based on previous studies measuring website quality, Bai et al. (2008) identified functionality and usability as principal instruments in evaluating electronic sites. Their rival model started from the assumption that overall satisfaction with functionality and usability will lead to purchase intentions. This study also highlighted the fact that website quality is a multi-level construct and it might be affected by cultural difference as different value weight can be attributed on website features. From a web designer perspective, Tan and Tung (2003) identified a list of important elements that should be taken into consideration when designing and developing a web site. However this study is limited by the fact that only a perspective is taken into consideration and is not integrated as well with the user point of view. A catalog of relevant attributes collected from the literature review have been used instead to develop the E-SAT model and its subsequent three constructs which have been identified as interface, perceived quality and perceived value. The last one was identified to be the most significant among the three constructs. The model was

tested on students, as they are the principal user of Internet for researching and purchasing holidays (Mills & Morrison, 2003).

Both the importance of the web quality aspects and their subsequent satisfaction are complementary with any of the five factors of the SERVQUAL scale. A study conducted by van Iwaarden et al. (2003) used the SERVQUAL model and applied to traditional service environment, to evaluate the degree of quality of e-commerce websites. Among the five instruments, attributes applied to reliable and tangible aspects were ranked in the first top ten while other attributes such as empathy and assurance ranked the lowest score. It is important to highlight also that the added value for any of the five factors of the SERVQUAL scale differs per type of website evaluated and that experienced users have usually higher expectations. In the same year, another publication of Tan et al. (2003), has emphasized the importance to develop a web-based service quality framework by adopting as well the SERVQUAL model as a starting point. Eleven dimensions were identified, and among them information quality was highlighted as the most important component.

As e-satisfaction is relatively new study field and there is no clear definition for it, researches are often involved in collection of qualitative data in order to formulate an appropriate model. In their conceptual model, Szymanski and Hise (2000) identified that online convenience, merchandising, site design and financial security as the most important elements to rank the degree of satisfaction and dissatisfaction with a determinate e-retailing website. Furthermore the merchandising element was better divided in product offering and product information. However in a preliminary examination, the former was not statistically significant and was subsequently dropped while product information was kept as statically relevant but with a value half of the size of convenience, site design and financial security. With regard to the evaluation of website security, some authors have reported the importance of factors such as download speed, web interface, and search functionality as criteria to measure the web site security (Rose et al., 1999).

Another approach to evaluate a web site was analyzing its user interface. Web designer try to identify which web design elements will lead to users' satisfaction. According to Herzberg's model, there are some design elements which more likely will lead to customer dissatisfaction if they are absent or inadequately provided, and these are usually called hygiene categories. They usually concern with technical aspects, navigation and privacy/security. On the other hand, the design attributes which fallen into the motivator category, are more likely to delight the users. They usually refer to enjoyment, cognitive outcome and credibility (Zhang and Von Dran, 2000). A recent study has instead used the Kano model to evaluate the web site interactivity and the opportunity of it to improve customer satisfaction. According to Zhao and Dholokia (2009), the Kano model highlighted the fact that web site attributes are subjected to temporality. In other words, it means that website attributes can score different level of satisfaction depending on the user experience and confidence with them. The Kano model, therefore, identifies three types of attributes. The 'must-be' which are those elements necessary present on the site which absence in fact will lead to user dissatisfaction. The second one, the one dimension attributes,

refers to those elements that lead to customer satisfaction when fulfilled and dissatisfaction if inadequately present. The third and last one, the attractive attributes, are instead those added elements which are able to delight the users.

Finally the expectation-disconfirmation model was analyzed to evaluate its effectiveness in measure customers' satisfaction (McKinney *et al.,* 2002). This model separates the web site quality into two categories: information quality (IQ) and system quality (SQ) and suggest a nine key constructs which might affect web-consumers' satisfaction. A second order factor was furthermore implemented in order to measure users' expectations, disconfirmation and perceived performance regarding IQ and SQ. Due to the intangible nature of the tourism destination which cannot shown its attractiveness at the sale point, potential tourists often tend to form their first impression based on the information supplied and the user-friendly interface. McKinney et al. (2002) noted also that due to the nature of the online channel, it is easy to identify and separate the information part from the information-delivery system and therefore enhance the opportunity to monitor better which of the two factors has a higher influence on web user satisfaction. Similar categories have also been investigated by Huizingh (2000) who focused on content and design to evaluate the web site quality.

4 Research Model and Hypotheses

Based on the literature review and the subsequent researches undertaken to discover which model is more appropriate to estimate web satisfaction has lead to the conclusion that it is impossible preferring one to the other one. The reason behind this is that any of them has been applied to different websites which presented different elements. However, information quality and system quality seem to be the two categories widely adopted by the majority of them. Information quality explores the relevance, timeliness, ease of understanding, accuracy and valuable information (McKinney, 2002). System quality, on the other hand, verify loading time, clear design, simple to use and easy to navigate (McKinney, 2002). Based on the aforementioned literature review on service quality, this category includes elements like the presence on the website of FAQ, the opportunity to register on the site, the encouragement to leave their own feedback and the chance to select the content in the preferred language (Cox & Dale, 2002). Furthermore, as the importance of Social Media Networks (SMN) is growing in the online channel, research on the effects that Social Media Networks (SMN) might be have on web quality and customer satisfaction still need to be addressed. According to Kim et al. (2004), Social Media Networks (SMN) increase customer interaction and might lead to customer loyalty as online community often offer valuable entertainment and information. Hence, it is meaningful to investigate how perceived benefits of Social Media Networks influence on IQ, SQ, ServQ and customer satisfaction. As mentioned earlier, Social Media Networks (SMN) seem to enhance consumers' experience with the website by providing further information about the destination, its attractions and service, thus improving the website content. It also makes the website more interactive and interesting as traveler might want to share personal video. Moreover, experienced travelers might offer solutions, ideas to other potential vacationers improving also the service of the website by answering other users queries (Wang et al., 2002).

Table 1. eSatisfaction Success Dimension and Measures

Success dimensions	Success measures	References
Information quality	Accuracy, Relevance, Understandability, Completeness, currency, Dynamic content, Personalized content	DeLone and McLean (2004) McKinney et al. (2002) Webb and Webb (2004) Wan (2000)
System quality	Access, Usability, Navigation, Interactivity, Entertainment	McKinney et al. (2002) Webb and Webb (2004) Chaffey et al. (2006) Kim and Fesenmaier (2008) Shanshan et al (2007) Mills and Morrison (2003)
Service quality	Tangible, Reliability, Responsiveness, Assurance, Empathy	Van Iwaardeen et al. (2002) Webb and Webb (2004)
Perceived benefits of Social Media Networks	Sharing comments and opinions, Update and valuable information, Interactive, Enjoyable, Word of mouth	Stepchencova et al. (2007) Gupta and Kim (2004) Corigliano and Biaggio (2003) Carson (2008) Schmellegger and Carson (2008) Preece et al. (2004)
Customer satisfaction	Overall customer satisfaction with the service, Overall customer satisfaction with the website overall customer satisfaction with the website and other tourism site	Hayes (1998) Fornell (1992) Spreng and Mackoy (1996) Bigné et al. (2001)
Intention to revisit	Intention to revisit the site, Intention to suggested to friends and relatives.	Oppermann (2000) Chen and Gursoy (2001) Bigné et al. (2001) Niininen et al. (2004)

Based on eSatisfaction success dimensions and measures, the following hypotheses have been formulated:
H1. Perceived benefits of SMN will positively affect information quality.
H2. Perceived benefits of SMN will positively affect system quality.
H3. Perceived benefits of SMN will positively affect service quality.
H4. Perceived benefits of SMN will positively affect customer satisfaction.

In order to evaluate the different level and analyze the different aspects which lead to online customer satisfaction three hypotheses are developed in the research:

H5. Information quality will positively affect customer satisfaction
H6. System quality will positively affect customer satisfaction
H7. Service quality will positively affect customer satisfaction

Customer satisfaction, as other researchers pointed out, can be estimated with items which measure the overall satisfaction (Fornell, 1992; Spreng & Mackoy 1996; Bigné et al., 2001). As the literature review suggest, consumers that scores a high online satisfaction are usually more willing to reuse and revisit the site in the future

(Oppermann, 2000; Chen & Gursoy, 2001; Bignéet al. 2001; Niininen et al., 2004). Therefore, the research has developed this last hypothesis below:

H8. Customer satisfaction will positively affect intent to revisit.

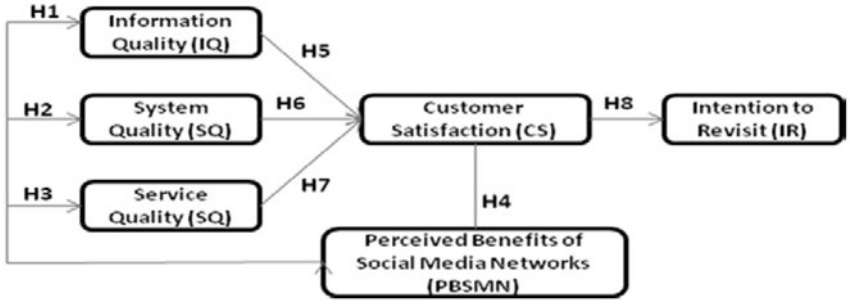

Fig. 1. Research Model

The research model for this study is shown in Figure 1. From left to right the influence of perceived benefits of Social Media Networks (SMN) will be investigated in order to evaluate the possibility that Social Media Networks (SMN) might affect positively the users' perception on IQ, SQ, ServQ. This research should also show a positive relationship between the perceived benefits of Social Media Networks (SMN) and user satisfaction. If this positive relation exists it should in turn affect customer satisfaction which in turn influences the user's intention to revisit the website.

5 Research Methodology

The population of this study is potential visitors to Sicily from Manchester region, UK. In 2010, there are 2.6 million people live in Greater Manchester region. The sample size required for this population represents at least 197 with marginal error of seven percent (Saunders et al., 2009). Considering the subject area of research, target sample should be confident in using Social Media Networks and therefore, central library of city of Manchester was selected to collect data as this is one of public places which used by students and staff in main universities in Manchester including University of Manchester, Manchester Metropolitan University, Salford University. The data was collected through a self administrated questionnaire and sample represents high level of education including 28 percent of sample engaged with Doctoral degree, 37.5 percent with postgraduate degree and 20.5 percent with undergraduate degree respectively. In order to ensure an adequate sample distribution the questionnaire were distributed on different days and at different times. According to Mintel (2004), potential travelers with high education background have the highest access to internet connection and they often use it to compare different travel offers and holidays package. The questionnaire was composed of six dimensions. These are information quality, system quality, service quality, perceived benefits of Social Media Networks (SMN), customer satisfaction and intention to revisit. All items of the questionnaire were previously adopted from other validated instruments and the questionnaire consisted of forty-six statements. A total of 230 potential visitors to

Italy participated in order to assess the influence of perceived benefits of Social Media Networks (SMN) on web qualities and customer satisfaction of DMO website in Sicily within a controlled computer lab environment. Respondents were asked to enlighten how closely they agree or disagree with each statements. The five point Likert scale used in questionnaire and 1 represents strongly disagree and 5 strongly agree. With regard to data analysis, multiple regression analysis technique has been applied (Hayes, 1998).

6 Research Finding

Out of 230 questionnaires collected, 200 were properly completed resulting in a high response rate and analyzed with SPSS 16. Male participants were fifty three per cent and female participants were forty seven per cent. The majority of the sample were British (40.5%) followed by American (11%), German (10%), Australian (9.5%), Spanish (9%), Japanese (7.5%) and French (7%). A reliability test (Cronbach's alpha) was performed to assess the reliability and internal consistency of each of the scale measuring the different aspects of the destination website. Cronbach's alpha is 0.930, 0.887 and 0.841 in information quality, system quality and service quality respectively. Good reliability has been also achieved on overall satisfaction and intention to revisit one which scored respectively 0.920 and 1.

The first linear regression analysis indicates that there is a positive relationship between information quality and perceived benefits of SMN ($\beta = .418$). Based on the outcome, perceived benefits of SMN could therefore improve the information quality of the destination website by adding valuable information about destination or by implementing the information available on the side when these might be poor or insufficient. The second linear regression analysis showed a stronger and positive relationship between perceived benefits of SMN and system quality ($\beta =. 971$). The result revealed that SMN could affect the quality of system. In other words, accessibility of destination website, usability, interactivity and entertainment could be enhanced greatly by SMN. It was shown that potential influence of SMN is greater on system quality than information quality of destination website. However, the third linear regression analysis showed that there is a weak relationship between perceived benefits of SMN and service quality ($\beta = .181$). This is probably due to the fact that Internet- based service in current Sicilian DMO website are really poor. The results of regression analysis showed that H1 and H2 were supported while H3 was rejected. In addition, perceived benefits of SMN had a significant impact on customer satisfaction and intention to revisit. Hence H4 ($\beta =. 434$) and H5 ($\beta = .362$) were supported.

Table 2. Impact of Perceived Benefits of SMN on Web Quality and Satisfaction

	Unstandardized, Coefficient		Standardized Coefficient	T-statistic	Sig.
	B	**Std. Error**	**Beta**		
Information Quality	.213	.033	.418	6.467	.000
System Quality	.736	.013	.971	57.405	.000
Service Quality	.136	.053	.181	2.585	.010
Customer Satisfaction	.228	.034	.434	6.788	.000

As it is shown in figure 2, customer satisfaction on the Sicilian website is better predicted by information quality (β = .910) than by system quality (β = .062) and service quality (β = .037). The results of multiple regression analysis show that among the primary website constructs, information quality is the variable which strongly influence on users satisfaction. The importance of information quality to determine website access is similar to the results of previous research. According to this study, about 32,5 % of users stated that the most important factor for a tourism website access was providing a large amount and update information followed by system features (Lu et al., 2002). Therefore H5 was supported while H6 and H7 were rejected. Finally users satisfaction will positively lead the user to revisit and reuse the website as H8 was supported (β = .903).

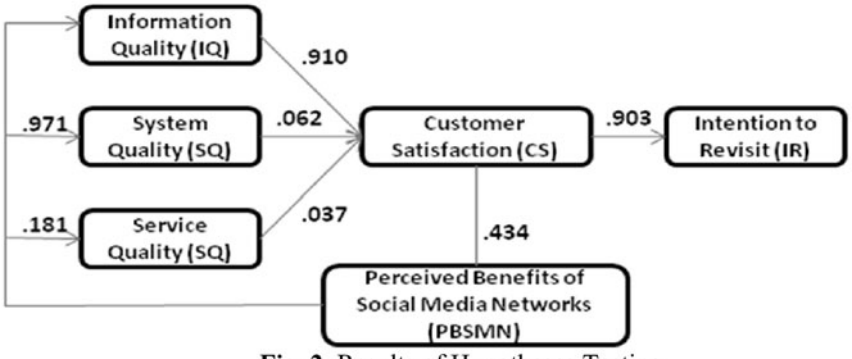

Fig. 2. Results of Hypotheses Testing.

7 Conclusions, Limitations and Recommendations

The purpose of this research was to assess the perceived benefits of SMN on web quality and eSatisfaction of the Sicilian regional DMO website. In order to do this, integrated model was proposed based on study by DeLeone and McLean's (2004) and McKinney et al (2001). The result of the multiple analysis showed that potential existence of Social Media Networks (SMN) can have positive effects on information and system quality while weak relationship is associated between perceived benefits of SMN and service quality. Moreover, the result of this study revealed that

information quality is the main responsible of customer satisfaction. The theoretical evidence shows therefore that SMN can play a major role in the achievement of user satisfaction within a website. In addition, this suggests several practical contributions to enhance the Sicilian DMO website. Firstly, web developers could actively use SMN to enhance the web quality by providing alternative method of distribution of destination information. Secondly, DMO managers could monitor type of information exchange by the members and this can be used categorise web contents according to their needs. These operations might help DMO to provide more personalized information and create newsletters to specific interest group with updated contents. As Wang et al. (2002) highlighted, Social Media Networks (SMN) could be used as tool for attracting potential visitors to DMO website. This study has a number of limitations and recommendations for future research. The first limitation of the study is that it examines the influence of perceived benefits of SMN without current Social Media Networks (SMN). Based on this, respondents have given a personal opinion how a possible implementation of Social Media Networks (SMN) might enhance the Sicilian website. Therefore, further research could be conducted using DMO website with SMN. Secondly, despite the fact that this study is of use to provide an updated overview on recent research on Social Media Networks (SMN) and their impact on website development and enhancement, its scope of coverage is limited by the time available to collect and analyse all the data. Thirdly the sample size was 200 and mainly European users, and therefore the findings cannot be generalized to other region. As mentioned previously, further researches are suggested to extend this research to a more general population and to improve or extent the research framework by taking into account other approach to website measurements.

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Travel Opinion Leaders and Seekers

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Abstract

While opinion leadership has been recognized as important in tourism, there has been very little empirical research investigating the phenomenon. Given new developments in social media technologies, it is especially important to understand whether travel opinion leadership and seeking are drivers of specific social media perceptions and behaviours. Based on an online survey of US online travellers, this paper seeks to identify travel opinion leaders and seekers and their characteristics. Further, the research conducted investigated linkages between travel opinion leadership/ seeking and travel social media use. The findings suggest that travel opinion leadership and seeking are distinct but connected. Both opinion leaders and seekers are technology savvy, young, educated, involved in travel planning and engaged in social media use for travel. What distinguishes opinion leaders is their greater travel experience and greater trust in official sources of travel information.

Keywords: opinion leader; opinion seeker; travel; social media; online contents creation.

1 Introduction

Recent developments in social media technologies enable travelers to more easily advocate and share their opinions online. Travelers today can actively create and distribute travel information through the Internet (O'Connor, 2008; Sigala, 2008). Litvin, Goldsmith and Pan (2008) identified studying both originators as well as listeners as central to researching electronic travel word-of-mouth (eWOM) processes. Clearly, not everyone is a travel opinion leader online. Yoo and Gretzel (2008) found that those who passively consume travel e-WOM outnumber by far those who actively contribute and also differ from them in terms of demographics and travel involvement. Understanding who seeks travel opinions and who is asked for travel advice is crucial in understanding the dynamics of eWOM through social media.

Despite the increasing significance of online opinion leadership and seeking, only limited studies have investigated the role and characteristics of opinion leaders and seekers. Especially in the tourism literature opinion leadership has been mentioned but not extensively researched. An exception is the study by Jamrozy, Backman and Backman (1996) that finds opinion leaders in nature-tourism to be more involved in travel and travel information search. An investigation in the context of travel is necessary as opinion leadership has been identified to be domain-specific (Goldsmith & Flynn, 1993). Given the growing importance of social media activities among travelers, it is vital to understand online opinion leadership from a conceptual point of view. In addition, it is of great practical relevance to know who these travel opinion leaders are and what characteristics their counterparts, the travel opinion seekers, have. Consequently, this study sought to test a scale to measure opinion leadership and seeking in the travel context. Further, it sought to investigate how opinion leaders differ from non-opinion leaders and opinion-seekers from non-seekers and whether opinion leadership and seeking could be connected to social media use.

2 Background

2.1 Social Media in Travel

While various definitions of social media are available (e.g., Safko, 2010), social media are generally understood as a group of Internet-based applications that carry consumer-generated contents such as blogs, social networks, virtual communities, wikis, collaborative tagging, and media files shared on sites like YouTube and Flicker (Xiang & Gretzel, 2009). With the growing importance of social media in travel, many travel industry players are seeking ways to incorporate social media connectivity into their offerings (eMarketer, 2010a). According to a Nielson report (2009), US social network advertising spending for the travel industry jumped 364% from 2008 to 2009 and it is expected to continue to grow since many travel industry practitioners indicate that they plan to expand their Web 2.0 activities (HeBS, 2010).

As increasing numbers of travel providers as well as travellers engage in social media activities, social media have become an important information source for trip planning. According to recent reports by eMarketer (2010b), three out of the top ten online travel information sources used by US adults were social media sites. Further, 23% of US Internet users said their travel and vacation decisions were influenced by social media (eMarketer, 2010a). Clearly, social media are taking on an important role in travellers' information search and decision-making behaviours and provide a fertile venue for travellers to engage in e-WOM. While traditional WOM is pre-dominantly triggered by receivers who ask for opinions (Mangold, Miller & Brockway, 1999), eWOM through social media is asynchronous, very often unsolicited, and exchanged in many cases with unknown others. Thus, it is important to examine whether opinion leadership actually plays a role in social media.

2.2 Opinion Leadership

Flynn, Goldsmith and Eastman (1996) define opinion leaders as those individuals who influence the purchasing behavior of others in a specific product domain. According to the two-step flow communication model (Lazarsfeld, Berelson, & Gaudet, 1944), an opinion leader is an active media user who interprets the meaning of media messages or content for other media users. Since opinion leaders were found to play an important role in consumer's decision making, the topic of opinion leadership has long been of interest in consumer research. A good number of previous studies have investigated the motives of opinion leadership (Dichter, 1966), measurement (Childers, 1986; Flynn et al., 1996; Tsang & Zhou, 2005) and the outcomes (Bloch, 1986). Previous studies have also identified the characteristics of opinion leaders. Although the findings vary depending on the type of product and context, opinion leaders were often found to be more innovative (Gatignon & Robertson, 1985; Hirschman, 1980), heavy consumers of the mass media (Chan & Misra, 1990; Summers, 1970), socially active (Baumgarten, 1975; Venkatraman, 1989), self-centered (Baumgarten, 1975; Summers, 1970), and to display higher levels of product involvement and familiarity (Allen, 2001; Bloch & Richins, 1983; Goldsmith, Flynn & Goldsmith, 2003; Richins & Root-Shaffer, 1988). In terms of their demographic characteristics, previous studies show that opinion leaders tend to be younger, with a higher level of education and income, and often exhibit greater social mobility (Gatignon & Robertson, 1985; Midgley & Dowling, 1978; Myers & Robertson, 1972; Piirto, 1992). Jamrozy et al. (1996) found that nature-tourism opinion leaders travel more, are more involved in nature-tourism, use more information sources and perceive less risk in making travel-related decisions. Litvin (2000) also found a relationship between frequent travel and opinion leadership.

As Internet technologies enable interpersonal communication online, some recent studies have examined opinion leadership in the online context. Lyons and Henderson (2005) found that the characteristics of online opinion leaders are similar to the characteristics of opinion leaders in an offline setting. Their findings show that online opinion leaders possess significantly higher levels of enduring involvement, innovativeness, exploratory behavior and self-perceived knowledge than non-leaders. In addition, online opinion leaders possess greater computer skills and have used the Internet for longer periods of time and more frequently. Sohn (2005) also found consistent patterns of opinion leadership and seeking behaviors across online and offline environments.

2.3 Opinion Seeking

Opinion seekers were defined by existing literature as "individuals who sought information or opinions from interpersonal sources in order to find out about and evaluate products, services, current affairs, or other areas of interest" (Feick, Price & Higie, 1986, p. 302). The topic of opinion seeking has received less research attention and researchers often see opinion seeking as a co-phenomenon of opinion leadership (Flynn et al., 1996; Shoham & Ruvio, 2008). From the perspective of the two-step flow communication theory (Lazarsfeld, Berelson, & Gaudet, 1944), opinion seekers

are viewed as the message receivers who get the information through opinion leaders. Beatty and Smith (1987) suggested that a person who has little knowledge or who is worried about a purchase is highly likely to seek advice from someone they know. Similarly, Alba and Hutchinson (1987) found that younger, less-experienced consumers rely more heavily on the expertise of others. Opinion seekers also tend to regard word-of-mouth recommendations from friends and relatives as more credible than information from commercial sources (Assael, 1992).

As far as the relationship between opinion leading and seeking is concerned, Piirto (1992) suggested that opinion leaders and seekers can be differentiated by the level of their activities in a social network. Flynn et al. (1996) discussed that these two concepts are related and that there may be some overlap between them but noted that they are nevertheless two distinct constructs. In contrast, the findings of Feick et al. (1986) suggested that there is a high overlap between opinion giving and seeking and the profile of opinion seekers is similar to the profile of opinion leaders.

3 Methodology

3.1 Data Collection

An online survey was conducted in January 2010 to investigate whether online travellers could successfully be classified into opinion leaders and seekers, and whether they fundamentally differed in terms of personal characteristics, travel behaviour, and social media engagement. The survey was sent to members of a commercial online research panel residing in the United States. No additional incentives beyond the rewards provided by the panel company were offered. A total of 2,046 panellists responded to the survey invitation but only 1,810 indicated they were active Internet users. Further, of those Internet users, 1,221 had travelled for pleasure within 12 months prior to the study. These online travellers form the actual sample for the study.

3.2 Measures

Opinion leadership and seeking were measured based on two scales adapted from Flynn et al. (1996), who conceptualized them as people's perceptions of their own influence over others vs. others' influence on them. Both constructs were measured with four positively worded items that had been adjusted to fit the travel context. Respondents were asked to indicate their agreement/disagreement with the items on a 5point scale ranging from Strongly Disagree (1) to Strongly Agree (5). The survey also included measures gauging socio-demographic characteristics, travel behaviour, Internet use and skills, and social media perceptions and engagement in general and in the context of travel. Innovativeness was measured with three items on a 5point scale adapted from Goldsmith and Hofacker (1991).

Table 1. Properties of Measurement Scales

Construct Name & Items	Mean	Factor Loadings	Eigen Value	% of Variance	α
Opinion Leading	**3.03**		**3.362**	**42.0**	**.94**
When they choose travel, other people turn to me for advice.	2.96	.890			
People that I know pick travel products based on what I have told them.	2.98	.890			
My opinion on travel seems to count with other people.	3.15	.880			
I often influence people's opinions about travel.	3.03	.878			
Opinion Seeking	**3.18**		**3.318**	**41.5**	**.93**
I like to get others' opinions before I buy travel products.	3.19	.908			
I feel more comfortable buying travel when I have gotten other people's opinion on it.	3.18	.899			
When choosing travel products, other people's opinions are important to me.	3.17	.864			
When I consider buying travel products, I ask other people for advice	3.19	.837			

3.3 Analysis

An exploratory factor analysis with principal components extraction and Varimax rotation showed that the opinion leading and opinion seeking constructs were indeed distinct (Table 1). The KMO score was high (.883) and Bartlett's test of sphericity was significant ($p<.001$), also suggesting that factor analysis is appropriate. The individual items loaded strongly onto the respective factors, which cumulatively accounted for 83.5% of the variance explained. Reliability tests also showed high internal consistency of the factors with Cronbach Alpha scores over .90. Therefore, two separate additive scales were constructed. The innovativeness scale also showed excellent properties with factor loadings above .92, a variance explained of 86.6% and a Cronbach Alpha score of .92. Respondents were then classified as opinion seekers and leaders based on their score for the two scales, with 3.1 serving as the cut-off point. Crosstabulation was used to examine potential overlaps of opinion leaders and seekers. Crosstabulation and t-tests were used to test for differences in opinion leaders and non-leaders as well as in seekers and non-seekers.

4 Results

4.1 Profile of Sample

The respondents were on average 45.3 years old and mostly Caucasian (81.3%). The sample included slightly more males (53.7%) than females (46.3%). Almost half

(49.0%) were married, 27% single, 14.5% divorced/separated/widowed, 9% living with a partner and 0.5% did not wish to comment. In terms of employment, 40.3% indicated they were fully employed and 18.4% were retired. Many had a college or postgraduate degree (43.1%); however, most (87.9%) had household incomes of less than $100,000. About half (53.4%) of the respondents had taken one or two trips, 25.8% had taken 3-4 trips and the rest had taken 5 or more trips in 2009. Many (40.6%) considered themselves to be advanced Internet users or at least intermediate users (35.4%). The majority (55.7%) did not see itself as particularly innovative. Over half (50.9%) indicated they generally trusted comments/materials posted by other travellers online, yet only 44.2% said they typically looked at information posted online by other travellers when planning an overnight pleasure trip. A mere 21.9% stated they had actively posted travel-related comments/materials online.

4.2 Opinion Leaders vs. Seekers

The results of the classification of respondents into opinion leaders and opinion seekers showed that 45.2% perceived themselves to be opinion leaders while a greater percentage (53.2%) thought they were opinion seekers. Flynn et al. (1996) suggest that while opinion leaders are typically also opinion seekers, not all opinion seekers are also opinion leaders. The crosstab analysis was significant (p=.000) and indicated that 76.8% of the opinion leaders were also opinion seekers, while only 65.2% of the opinion seekers saw themselves also as opinion leaders. Nevertheless, this suggests quite substantial overlap in accordance with Feick et al. (1986). Over a third of the respondents (36.3%) were neither opinion seekers nor opinion leaders and 34.7% indicated they were both. Only 10.5% of the respondents saw themselves as opinion leaders but not opinion seekers and 18.5% identified themselves as pure opinion seekers (Table 2).

Table 2. Overlap between Opinion Leadership and Seeking

	Opinion Seeking	
Opinion Leading	***No***	**Yes**
No	36.3%	18.5%
Yes	10.5%	34.7%

Demographic differences. No gender differences were found between travel opinion leaders and non-leaders. However, travel opinion seekers are more likely (p=.034) male (56.8%) than female (43.2%). This suggests that females experience greater self-efficacy when planning travel and, thus, are less likely to ask others for advice in the context of their travel planning. To look at age differences, the respondents were divided into generational cohorts. Opinion leaders are less likely (p<.01) members of the Silent Generation (12.4% vs. 18.6%) and the Baby Boomer Generation (28.9% vs. 33.6%) and are more likely to be Gen Xers (37.7% vs. 30.0%) and Millennials (21.0% vs. 17.8%). The same trend was found for opinion seekers. No significant relationship was found between opinion leadership and marital status, while the results suggest that opinion seekers are somewhat less likely

divorced/separated/widowed (11.4% vs. 18.0%; p=.048). Both opinion seekers and opinion leaders are more likely to be fully employed and are less likely to be retired or unemployed. Also, both are more likely to have university degrees (opinion seekers 47.5% vs. 38.0%; opinion leaders 36.7% vs. 50.8%). No significant differences were found for ethnic origin. As far as income is concerned, opinion seekers do not significantly differ from non-seekers. In contrast, opinion leaders have higher household incomes than non-opinion leaders (29.0% vs. 18.9% have incomes over $75,000). These results confirm previous findings from the general consumer literature in terms of opinion leaders being more likely young and educated.

Travel characteristics. Opinion leaders travel significantly more than non-opinion leaders, with 56.7% compared to 39.6% indicating that they had gone on more than two trips in 2009. No significant differences were found for opinion seeking and travel frequency. Opinion leaders are also more likely to have taken an international trip as their most recent trip (9.6% vs. 5.6%; p=.02) while no such difference was found for opinion seekers. Opinion leaders are less likely to indicate that they had no active role in planning their most recent trip (4.5% compared to 8.5%; p=.01). The same trend can be found for opinion seekers but the difference is much smaller (5.3% vs. 8.2%; p=.05).

Technology affinity. Opinion leaders are significantly (p<.01) more innovative when it comes to technology (mean=3.44 compared to 2.73 for non-opinion leaders). The difference also exists for opinion seekers but is a lot smaller (mean opinion seekers=3.24 compared to 2.84 for non-opinion seekers; p<.01). Opinion leaders are more likely to indicate that they are advanced Internet users compared to non-opinion leaders (47.1% vs. 35.2%). Differences are especially apparent for the expert level, into which 24.3% of opinion leaders classified themselves compared to only 9.9% of non-opinion leaders. Seekers also see themselves more as advanced users (46.6% vs. 33.8%) and expert users (19.7% vs. 12.6%). Opinion seekers are also more likely to have used the Internet for planning their most recent overnight pleasure trip (85.7% compared to 68.8%; p<.01). The same is true for seekers (82.0% vs. 70.1%).

4.3 Opinion Leadership and Seeking and Social Travel Media

Opinion leaders are a lot more likely to indicate that they typically look at/read comments or materials posted online by other travellers in the course of planning their overnight pleasure trips (58.0% vs. 32.9%; p<.01), as are opinion seekers (56.7% vs. 30.1%). Both opinion leaders and opinion seekers see media generated by other travellers as more important for travel planning than non-leaders and non-seekers (Table 3). Both groups place the greatest value on travel reviews and ratings by other travellers.

Table 3. Mean Differences in Perceived Importance of Specific Types of Consumer-Generated Media (CGM) for Travel Planning

Type of CGM	Leaders	Non-Leaders	Seekers	Non-Seekers
Travel reviews and ratings	3.75	3.37	3.73	3.31
Tweets	2.36	1.91	2.30	1.91
Photos posted by travellers	3.35	2.84	3.29	2.82
Videos posted by travellers	3.02	2.53	2.98	2.48
Blogs by other travellers	2.99	2.60	3.01	2.45
Postings in virtual communities	3.13	2.67	3.16	2.49
Audio files/podcasts	2.54	2.20	2.53	2.14
Postings on Facebook	2.68	2.28	2.64	2.26

Values reported are means on a 5pt scale ranging from Not at all Important to Essential; $p<.01$

As far as trust is concerned, both opinion leaders and opinion seekers trust media generated by other travellers more than non-leaders and non-seekers (Table 4). However, interestingly, opinion leaders do not trust CGM more than editorial/marketer information contained in official reviews, travel articles, guidebooks, etc. while opinion seekers do. When it comes to actively contributing contents, both opinion leaders and seekers are more likely to have engaged in posting than non-opinion leaders (31.6% compared to 13.9%) and non-seekers (28.8% vs. 14.0%). Interesting differences also exist for Twitter and Facebook use, with both opinion leaders and opinion seekers being more likely to use these social media in the context of travel (Table 5).

Table 4. Mean Differences in Trust in CGM

Type of CGM	Leaders	Non-Leaders	Seekers	Non-Seekers
In general, I trust comments/materials posted by other travellers.	3.63	3.22	3.67	3.11
I feel confident that the comments/materials provided by other travellers are posted with the best intentions in mind.	3.78	3.39	3.81	3.29
The comments/materials posted by other travellers are a reliable source of travel information.	3.62	3.17	3.64	3.07
I trust reviews, ratings, and comments by other travellers more than evaluations provided in formal travel reviews, articles, etc.	n.s.	n.s.	3.27	2.96

Values reported are means on a 5pt scale ranging from Strongly Disagree to Strongly Agree; $p<.01$

Table 5. Percentage of Social Media Users

Social Media Use	Leaders	Non-Leaders	Seekers	Non-Seekers
Follow a travel company on Twitter.	9.6	1.9	8.7	1.6
Downloaded travel-related app.	17.9	5.1	15.2	6.0
Have personal Facebook profile.	63.8	54.9	62.9	54.4
Fan of a travel company on Facebook.	36.1	19.2	33.4	19.7
Member of a travel group on Facebook.	28.4	9.0	26.5	8.0

5 Conclusions

From a theoretical point of view, the research contributed to the literature on opinion leadership in travel as well as the general literature on opinion leadership in terms of updating its relevance for the social media context. It also introduced opinion seeking as a relevant domain to be studied in the context of tourism. The findings show that travel opinion leadership and opinion seeking are two distinct domains that are highly connected, with many travel opinion leaders also being opinion seekers. This supports previous findings, which suggest the two domains are positively related (Feick et al., 1986). Some past research has argued that product involvement actually matters in the context of opinion leadership (Girardi, Soutar & Ward, 2005; Shoham & Ruvio, 2008); therefore, the study made an important contribution by examining the concepts in a high involvement context such as travel. Our findings also suggest that both opinion leaders and seekers have distinct demographic characteristics. Opinion leaders are involved in travel planning, and are more savvy and innovative technology users. Travel opinion leaders are also more frequent and international travellers, while this is not a characteristic that distinguishes seekers from non-seekers. Most importantly, both opinion leaders and seekers are heavy users of and contributors to social media for travel and trust these new information sources more than non-leaders or non-seekers. However, opinion leaders do not trust social media more than official sources while opinion seekers do. Opinion leaders probably consider themselves to be experts and will likely think they possess the knowledge that the general travellers communicate through social media. What they are looking for is insider knowledge that is provided by the industry so that they can communicate it to others. In that respect, the current study shows that the two-step communication flow model (Lazarsfeld et al., 1944) is still relevant in the social media era.

From a practical point of view, the findings suggest that travel marketers need to target those who are opinion leaders and need to make it easy for them to share information. At the same time, mechanisms could be developed to recognize opinion leaders. Virtual communities already do that to some extent by awarding influential members with rankings or trophies visible to other users. From a research point of view, now that the scales have been established, they should be further tested regarding their generalizability across cultures and their relationship with other concepts such as personality, specific travel planning behaviours, as well as travel preferences.

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Tourism Marketing in Facebook: Comparing Rural Tourism SME's and Larger Tourism Companies in Finland

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Abstract

Popularity of Facebook as a social media platform is growing. Already more than 500 million people have joined Facebook. Also companies have noticed the possibility of using Facebook as a marketing channel. However, not much is known on how hospitality and tourism businesses should correctly use Facebook for. This exploratory study compares the use of Facebook of rural tourism SME's and some larger actors in the field of tourism in Finland. The results show that there are many differences between small and large tourism companies, as smaller companies have unnecessary pages and a lot less activity than larger companies. However, causal relationships of activities and success are still unknown and more research is needed on the topic of Facebook-marketing in tourism.

Keywords: Facebook, tourism, marketing, social media

1 Introduction

Social media and Web 2.0 are popular topics in tourism marketing. In the USA use of social media among small firms is increasing constantly (USA Today, 2010). Businesses see Facebook and other social media platforms as a way to reach customers while saving money at the same time. According to a survey by Statistics Finland 2010, 86 percent of the Finnish adults have used Internet during the last three months and 28 percent follow some social network service at least daily (Statistics Finland, 2010). In Finland, 70 percent of the Internet users had browsed travel and tourism information, and 33 percent of the users had conducted online shopping. 60 percent of the value of e-commerce in Finland comes from the travel and tourism industry (Statistics Finland, 2009a).

This study focuses on tourism marketing in Facebook. Facebook can be considered one of the most important platforms in social media, especially in Finland. Facebook.com has more than 500 million users worldwide. According to CheckFacebook.com there are 1.9 million Facebook users in Finland. This number seems quite large as there are only 5.3 million people living in Finland (Statistics Finland, 2009b), meaning that around one third of the Finnish population is using Facebook. Even though the actual number of Facebook-users in Finland might be smaller, it is clear that Facebook has become number one social media service in Finland. This is an opportunity for tourism companies to reach their current and potential customers with relatively low costs.

For many companies, Facebook-page is like a second website. However, it differs from company owned websites in some ways. Facebook hosts the pages and provides companies with free analytics, but at the same time also the company dependency in Facebook increases. According to Jack Neff (2010), many big brands are already in a situation in which Facebook has become the biggest relationship-marketing provider.

2 Background of the Study

According to a first-of-its-kind research by Dholakia and Durham (2010), Facebook fan pages are an effective marketing tool. Companies using fan pages can increase sales, word-of-mouth marketing and customer loyalty significantly among a subset of their customers. The results indicate that Facebook fan pages are an effective and low-cost way to do marketing in social media (RICE University, 2010).

Facebook has been studied in many different contexts. Smith and Kidder (2010) encourage organisations to develop guidelines regarding the use of social media, particularly Facebook, in the employee application process. Waters et al. (2009) examined how non-profit organisations are using Facebook. They found out that just having a profile is not enough for organisations but careful planning and research is required to develop social networking relationships with their stakeholders. Facebook has also been studied in the context of education (e.g. Roblyer et al. 2010).

Some studies have examined user behaviour in Facebook, especially motivations. Vasalou et al. (2010) studied how page designer's intentions materialise through users' reported practices in Facebook. Their findings show that user's culture and experience with the site affect motivations for using Facebook and the way Facebook is used. Pempek et al. (2009) examined how college students use Facebook and found out that Facebook is part of students' daily routine. Ross et al. (2009) studied personality and motivations associated with Facebook use.

There is not much knowledge on how tourism companies should use Facebook and even less on how they actually use it. There has been some research on how to use social media for marketing, but studies focusing on Facebook-marketing are almost non-existent. Some industry knowledge exists, for example Walgreens found out that fairly frequent short updates work best, especially if they involve posing a question that promts a response from fans (Neff, 2010).

Mangold and Faulds (2008) regard social media as a hybrid element of the marketing mix because it allows companies to talk to their customers as well as customers to talk directly to each other. In social media managers must learn to shape consumer discussions, which can be achieved for example by providing customers with networking platforms such as company Facebook-site (Mangold & Faulds, 2008).

Buhalis and Law (2008) regard tourist complaints in the internet as a major challenge for tourism companies. Managers should locate the complaint forums and try to handle them professionally. Managers can also offer customers complaining venues such as Facebook which makes responding to complaints much easier.

Facebook marketing is also Word-of-Mouth marketing. Customers have the ability to interact with other customers through company's Facebook-site. Word-of-mouth is ranked the most important information source when consumer is making a purchase decision, and it is very important especially in hospitality and tourism as products are difficult to evaluate prior to their consumption because of their intangible nature (Litvin et al., 2008).

There are a great number of rural small and medium sized tourism enterprises (SME) in Finland, but there are not many studies on how these companies use the Internet for marketing. The goal of this study is to compare rural SME's and larger tourism companies in Finland in order to find out, how they use Facebook for marketing tourism services and products. It is very interesting to examine, if smaller tourism companies can learn something from larger companies or from each other. This study is exploratory by nature.

3 Method and Data

To study Facebook use in the Finnish tourism industry, a wide variety of companies had to be included in the study. To represent rural SME's 270 companies listed on the www-site of Finnish Rural Tourism Enterprises (SMMY) site were chosen. The complete list of companies can be found from SMMY´s website http://www.smmy.fi/app/companies/list (accessed October 2nd, 2010). The member companies of SMMY represent rural tourism in Finland quite well, as they come from all parts of the country.

To represent larger companies, four popular Finnish hotels in Facebook, calculated by the number of followers, were included in this study. Site www.fanilista.fi (accessed October 2nd, 2010), which lists the most popular Finnish Facebook pages, was used to find out what are Finnish tourism companies in Facebook have most fans or followers.

Facebook offers companies many different pages for their Facebook-sites. The pages encountered in this study were Wall, Info, Video, Photos, Links, Notes, Events, Discussions, Reviews and company generated custom pages. Facebook also offers the possibility to link company address to bing.com map service.

Data was analyzed by examining the tools and features tourism companies use in Facebook. As the study is exploratory, companies studied first were small rural companies with lowest number of features in their Facebook-pages and continued to largest companies with most fans. Every time a previously unaccounted way to use Facebook was found its use was also examined for the other companies.

To examine the company and fan activity, two different week long periods were chosen. The first week was the last week of August, which can be regarded as definitely last week of summer season, and the other week was the week before this study was conducted, 4.9.-11.9.2010.

4 Results

4.1 Small Rural Tourism Companies

Of the 270 rural SME's studied, 40 had Facebook-pages. One company had private pages and it was excluded from the study. A total of 39 Facebook-sites were examined for this part of the study. These sites had on average 116 fans or followers. Most rural SME's have less than 50 fans, but then there are also some companies that have several hundred fans.

Table 1 represents the features rural SME's use on their Facebook-sites. All companies except for one had uploaded pictures of their company and of its activities to their Facebook-site. Most had less than 25 pictures, but there were some companies with more than 100 uploaded pictures. Only 18 % of companies had uploaded video material, typically of their accommodation and different activities which they offer to tourists. Some companies also had commercial video for their company in Facebook or a YouTube-link to it.

Almost all the companies had contact information on their Facebook-site, either telephone number or e-mail address. 92 % provided users with a link to the actual internet site of the company and 72 % had links to other Facebook-sites or internet-sites. Only one company used the possibility of creating own Notes-page.

Table 1. Facebook-page features in SME's

Number of pictures uploaded		Number of followers	
0	1 (2.6 %)	0-49	19 (48.7 %)
1-24	25 (64.1 %)	50-99	3 (7.7 %)
25-59	7 (17.9 %)	100-199	7 (17.9 %)
50-99	2 (5.1 %)	200-299	5 (12.8 %)
More than 100	3 (7.7 %)	300-399	2 (5.1 %)
Video		At least 400	2 (5.1 %)
Yes	7 (17.9 %)	Notes	
No	32 (82.1 %)	Does not use	35 (89.7 %)
Calendar / Events		Yes	1 (2.6 %)
Yes	12 (30.8 %)	No	3 (7.7 %)
No	27 (69.2 %)	Link to company www-site	
Contact information		Yes	36 (92.3 %
Yes	36 (92.3 %)	No	3 (7.7 %)
No	3 (7.7 %)	Company description	
Links to other sites / Facebook-profiles		Yes	34 (87.2 %)
Yes	28 (71.8 %)	No	5 (12.8 %)
No	11 (28.2 %)	Map	
		Yes	30 (76.9 %)
		No	9 (23.1 %)

Table 2 presents companies activity on Facebook as well as how active their fans are. As can be seen from Table 2, most rural SME's do not update their Facebook-site weekly. There were almost no differences between the two different weeks. Average number of posts in a week was 0.62. Also the user activity on rural SME's Facebook-sites was very low, only 13 % of sites had any user activity between 4.9.-11.9.2010. Last week of August was somewhat more active, but nonetheless 72 % of companies did not have any activity on their site during that time period.

Most of the rural SME's used Reviews-page and Discussions-page on their site. However, they were often empty. Only six companies had any discussions and 11 companies had user reviews.

Table 2. Facebook-activity of rural SME's and their fans

Number of updates during 4.9.-11.9.2010		Number of user comments or posts during 4.9.-11.9.2010	
0	27 (69.2 %)	0	34 (87.2 %)
1-2	10 (25.6 %)	1-4	4 (10.3 %)
3-4	1 (2.6 %)	5-9	1 (2.6 %)
At least 5	1 (2.6 %)	At least 10	0
Number of updates during 24.8.-31.8.2010		Number of user comments or posts during 24.8.-31.8.2010	
0	26 (66.7 %)	0	28 (71.8 %)
1-2	10 (25.6 %)	1-4	7 (17.9 %)
3-4	1 (2.6 %)	5-9	4 (10.3 %)
At least 5	2 (5.1 %)	At least 10	0
Discussions		Reviews	
Does not use	5 (12.8 %)	Does not use	12 (30.8 %)
0	29 (74.4 %)	0	17 (43.6 %)
1-2	5 (12.8 %)	1-2	11 (28.2 %)
At least 3	1 (2.6 %)	At least 3	0

4.2 Medium-sized hotels and larger travel companies

Facebook-sites of four hotels (hotels Luostotunturi, Kuninkaanlähde, Helka and Pyhätunturi), three tour operators (Finnmatkat, Aurinkomatkat and Suomen matkatoimisto), two cruise companies (Silja Line Suomi and Viking Line Suomi), Finnish air travel company Finnair, skiing destination Levi and Finnish tourism board (I wish I was in Finland) were included in this study. The average number of fans in these pages was 16 778.

All of these twelve companies used pictures in their Facebook-site (Table 3). One-third of the companies had uploaded more than 100 pictures. Most of the companies had also uploaded videos. Almost all of the larger companies had links to other sites or Facebook-profiles and provided users with contact information and description of what the company does. Half of the companies used Events-page and 50 percent used the bing.com map Facebook-offers. All companies had links to their own internet-site. The four hotels each had less than 3000 followers, on average 932 fans. Cruise ship company Silja Line Suomi had most followers, 76 000. This is more than twice as many followers as tour operator Aurinkomatkat, that came second with 37 000 followers. The large number of Silja Line Suomi followers can be explained by their successful marketing campaign to promote their presence in Facebook (http://www.rbt.fi/case/siljaline-socialmedia/).

Eight companies had created their own custom pages to their Facebook-site. Finland's NTO's I wish I was in Finland has a page called "Let's put Finland on the map", which allows user to place their favourite places in Finland on the map. Tour operator Aurinkomatkat offers the possibility to check for and book last-minute travels. Aurinkomatkat also offers a page called "Los recommendantes arrivos!" in which people can place their own picture in a video commercial and share this video through social media.

Air travel company Finnair has two custom pages: Welcome and PlusShop. Welcome can be used to plan and book trips and find information on Finnair Plus points. It is also possible to subscribe to Finnair newsletter. In PlusShop Facebook-users can purchase different products with their Plus points. Skiing destination Levi, cruise ship company Viking Line Suomi and tour operator Suomen matkatoimisto have own page for RSS-feed and blog. Tour operator Suomen matkatoimisto also has own pages for fligh and fligh + hotel offers. Cruise ship company Viking Line Suomi has a customer page called "Viking Line" which is very similar to their www-site home page and has links to different Viking Line websites.

Table 3. Facebook-page features of larger tourism companies

Number of pictures uploaded		Number of followers	
		Less than 3000	4 (33.3 %)
0	0	3000-4999	1 (8.3 %)
1-24	3 (25.0 %)	5000-9999	3 (25.0 %)
25-59	3 (25.0 %)	10 000-19 999	0
50-99	2 (16.7 %)	20 000-29 999	1 (8.3 %)
More than 100	4 (33.3 %)	30 000-39 999	2 (16.7 %)
Videos		At least 40 000	1 (8.3 %)
Yes	9 (75.0 %)	Notes	
No	3 (25.0 %)	Does not use	8 (66.7 %)
Links to other sites / Facebook-profiles		Yes	3 (25.0 %)
Yes	11 (91.7 %)	No	1 (8.3 %)
No	1 (8.3 %)	Link to company www-site	
Contact information		Yes	12 (100 %)
Yes	10 (83.3 %)	No	0
No	2 (16.7 %)	Company description	
Calendar / Events		Yes	10 (83.3 %)
Yes	6 (50.0 %)	No	2 (16.7 %)
No	6 (50.0 %)	Map	
Other		Yes	6 (50.0 %)
Custom pages	8 (66.7 %)	No	6 (50.0 %)

The larger companies in Facebook update their status at least weekly, most of them several times a week. Average number of updates in a week was 3.1. This seems to affect user participation as almost all companies had several posts from their fans on their Facebook-wall. During the week before the study was conducted, tour operator Aurinkomatkat had most posts on their wall, a total of 207 posts or comments. During the last week of August tour operator Aurinkomatkat had 161 posts or comments, second to only I wish I was in Finland, which had more than 250 posts or comments.
It seems that tour operator Aurinkomatkat has a very active community that discusses mainly about different destinations that Aurinkomatkat offers. Users are recommending different destinations and writing about their travel plans and asking for advices. However, during last week of August Finland's NTO's I wish I was in Finland managed to get more than 250 comments or posts from their users with only six status updates of their own. This is remarkable as I wish I was in Finland has only one-tenth of the fans Aurinkomatkat has.

Most of these larger companies do not use Discussions or Reviews. The reason is clear when looking at those rural companies that use these pages: users are not interested in discussions or writing reviews. Hotel Luostotunturi has special offers just for those that are hotel fans in Facebook. Hotel Helka has custom pages for competitions and lunch list.

Table 4. Facebook-activity of larger companies and their fans

Number of updates during 4.9.-11.9.2010		Number of comments or posts during 4.9.-11.9.2010	
0	3 (25.0 %)	0-9	4 (33.3 %)
1-2	3 (25.0 %)	10-24	3 (25.0 %)
3-4	3 (25.0 %)	24-49	1 (8.3 %)
At least 5	3 (25.0 %)	50-99	3 (25.0 %)
Number of updates during 24.8.-31.8.2010		At least 100	1 (8.3 %)
0	3 (25.0 %)	Number of comments or posts during 24.8.-31.8.2010	
1-2	4 (33.3 %)	0-9	6 (50.0 %)
3-4	1 (8.3 %)	10-24	1 (8.3 %)
At least 5	4 (33.3 %)	24-49	2 (16.7 %)
Discussions		50-99	1 (8.3 %)
Does not use	8 (66.7 %)	At least 100	2 (16.7 %)
0	2 (16.7 %)	Reviews	
1-2	1 (8.3 %)	Does not use	9 (75.0 %)
At least 3	1 (8.3 %)	0	2 (16.7 %)
		1-2	1 (8.3 %)
		At least 3	0

5 Conclusions, Limitations and Further Research

The use of Facebook as a marketing channel is a very interesting but little studied topic. More and more companies are joining Facebook and most of the rural SME's in this study had joined Facebook during the last year. This study aimed to examine the differences in Facebook use by small and large tourism companies in Finland. Several differences between small rural tourism companies and larger companies were found. Larger companies are more active, adding more pictures and videos as well as posting status updates on their wall. SME's and larger companies also differ from the pages they use in Facebook. Smaller companies give their customers option to start discussions and write reviews whereas larger companies have more custom pages and do not have pages for reviews or discussions.

Many rural SME's had not updated their Facebook-site during the two weeks this study was conducted in. This is alarming, as it seems that small companies do not put much effort into their Facebook-presence. From Walgreens example it can be seen that updating and posting content is probably the most efficient way of marketing in social media, but nonetheless this seems to be the most difficult thing for many companies. It can be questioned if company should even have Facebook-pages if they do not have plans to update its content.

Based on the results of this study, it would seem that the content a company posts in their wall affects customer participation. Tour operator Aurinkomatkat had most posts by their fans in their wall. They had five times as many posts as their competitor Finnmatkat, which has almost as many followers as Aurinkomatkat and almost as many updates. Also I wish I was in Finland has very good fan participation, as they only have little more than 3000 fans.

Larger companies seem to have a Facebook strategy, in which no useless pages or tools are used. They do not have review pages or discussion pages, probably because there is not much use for them. Smaller companies have pages for discussions and reviews, but they are only seldom used.

There are some limitations for this study. Managers or entrepreneurs were not interviewed or contacted regarding this study. Because of this there is no first hand information on marketing activities in Facebook. More research is needed about how companies measure their success in Facebook. This study only measured companies' Facebook-presence in a very crude way. More in-depth content analysis using qualitative methods is needed to find out how to use Facebook successfully in tourism marketing. Also best practices from other industries should be studied and their use in tourism industry discussed.

This study focused on Finnish tourism companies in Facebook. Every Facebook-site in this study was in Finnish except for Finland's Tourism Board's I wish I was in Finland, which was in English. Even though every Facebook-site was in Finnish, many companies also answered questions by English-speaking users posted for example on their wall. Interesting topic would be to research how tourism companies in other countries use Facebook and how their methods could be used to promote Finnish tourism companies in Facebook.

There is not much information on how customer behaviour is affected by Facebook marketing. It is also unknown how tourism companies should market themselves in Facebook. Is simply a presence enough or should companies aim to maximize the number of followers in Faecbook?

It seems that most large companies already have Facebook-pages whereas only circa 15 percent of rural SME's use Facebook. The situation can be different in other industries, but in tourism Facebook-marketing is a new and little studied topic. This can also be the reason why only so few of the rural SME's use Facebook: they do not have information on why and how they should market themselves in Facebook.

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Distribution channel and efficiency: An Analytic Hierarchy Process approach

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Abstract

This paper investigates the efficiency of the ratio benefit to cost in a given hotel, taking into account (as a discriminatory variable), the distribution channels (DCs) available for that hotel; namely, direct, Expedia, Booking.com, Venere and other travel agencies. The microeconomic case study will address the concerns owners have about the efficiency of each channel. Operational and transactional factors are included to ensure the holistic nature of the analysis and the hierarchical aspect enables the splitting of either the cost or revenue into levels which include weights of each leaf in the tree. Operational costs include breakfast, cost of the occupied room, guest laundry services and other food/beverage consumption. Transactional cost includes commissions paid to credit card and distribution channels. The Analytic Hierarchy Process is a powerful tool, which is suitable for this kind of framework. The ratio between revenue and cost for each channel gives the final ranking of efficiency. The primary data are transactions collected from the property management system of the hotel over a six week period. Participant observation provided a precise view of different check-in times for each channel and this factor is also included in the framework of cost.

Keywords: Analytic Hierarchy AHP, effectiveness, revenue/cost evaluation, distribution channels

1 Introduction

Technology provides useful tools, which can enhance profits (Varini & Murphy, 2006). For example, to identify revenue opportunities (business intelligence tools), to define the right price (revenue management systems), differentiate the product (dynamic packaging), to widen the marketplace (the Internet), to improve service quality (self service technologies, customer relationship management tools) or to provide post sales benefits (through social media). Although managers already know that technology provides benefits, the extent has not been proven therefore decisions to invest often depend on the degree of awareness of the manager or owner.

Moreover, it is complex for small firms to effectively evaluate the impact that e-mediary generated business has on TE without a support tool. Web 2.0 has supported the emergence of price comparison sites, self-service technology and social media.

This has provided consumers with the tools to assess prices more easily, become co-producers of the service experience. This provides opportunities to promote collaborative innovation in product development and marketing (Shaw, Bailey & Williams, 2010). Hence dynamic networking and increasing customer's sophistication generates new operational challenges such as a need for customizable offers, more in-depth models to conduct profit analysis and subsequently provide better rewards to more profitable consumers.

The main aim of the study is to develop a conceptual framework that will aid firms to identify optimal incoming sales mix by raising understanding of the drivers of transaction efficiency (TE) in the frame of the holistic analysis of revenues and costs. The study used a medium sized (SME) lodging operation as the vehicle for accomplishing the study aim. Small and medium sized businesses do not usually have the resources to develop highly effective, direct, online selling strategies; neither do they have opportunities to generate a rapid return on technology investment, due to the more limited range of sales.

2 Literature Review

2.1 The Internet, distribution channels and hotels

Technology available to hospitality firms has evolved rapidly. The Internet has become the most important sales medium for the majority of hospitality firms (Starkov, 2010), and is where most sales growth has occurred most recently (Suri & Sappal 2010). When consumers need to book accommodation, the Internet provides a convenient platform to assess value offered, without interacting with a hotel representative. Paradoxically, this has led to lower levels of trust between customers and hotels. Dynamic approaches to pricing create confusion due to perceived rate inconsistency (Gazzoli, Kim & Palakurthi, 2007) causing consumers to become more price oriented and as a result, they often perceive hotels services just as commodities (Carroll & Siguaw, 2003).

Technology knowledge can help firms better exploit opportunities especially when market forces are dynamic in nature. Businesses to business (B2B) relationships are important for firms that are active within the tourism arena especially where these widen market reach (Medina-Munoz & Garcia-Falcon, 2000). In general hotels were slow to adopt new technology (Egger & Buhalis, 2008) as lacked the skills needed to capitalise on new e-commerce opportunities (Martin, 2004). As the Internet started to evolve more rapidly, larger hotel chains began to engage in ecommerce activities using technology to promote distribution options (dynamic inventory and pricing management, lower cost of customer acquisition, demand stimulation, up to date information). Eventually a significant proportion of SME businesses embraced the Internet as a useful way of attracting business, but struggled to maximize opportunities (Irvine & Anderson, 2008).

The Internet enabled independent firms to compete directly with large hotel chains for direct business which led to the high cost of transactions, generated by major online retailers and wholesalers, being challenged (Carroll & Siguaw, 2003). The increasingly complex ecommerce environment has made the efficient management of inventory and prices, across the different distribution channels, increasingly difficult (Thompson, 2005) bringing about a shift in how hotels evaluate the value their customers generate (Sigala, Lockword & Jones, 2001). However, hotels do not yet have access to a resource with which to effectively evaluate the contribution that online travel agents (OTA) generate.

When first engaging with ecommerce, hotels valued the business generated by online travel agencies (OTA) (Egger & Buhalis, 2008), especially in the period after the 9/11 attacks when intermediation generated extra sales when travel declined significantly- Rate parity emerged as an agreed price control strategy to reduce customer confusion and to ensure all parties would not quote lower rates than those offered on the hotels direct online channel. This put pressure on OTA margins hence some intermediaries shifted their focus to independent hotels who were less likely to have a strong direct channel. These had historically underestimated the need for an effective online marketing strategy whereas OTA had invested heavily in Internet marketing and aggressive conversion techniques (Egger & Buhalis, 2008). The fact that online intermediaries are likely to continue to play a central role in the sale of hotel rooms changes the opportunities that small and medium sized independent hotels have to maximize profits.

Rational pricing and rate parity are seen as fundamental approaches in contemporary hotels. A comparative study conducted by Gazzoli, Kim & Palakurthi (2007) in the US identified that hotels are getting better at selling their lowest prices on their direct online channel. This is done by, for example, rewarding customers with discounts for early direct bookings or by making some products exclusive to the direct online channel. Also US hotels are getting better control of rate parity across all channels thus impeding customers from finding lower prices on third party channels. This allows the provision of a best rate guarantee on the hotels direct online channel which can boost direct online sales as increases consumer trust, reducing the need to spend time scanning the web for a better deal. However this approach alone may not always maximize profits in small and medium sized firms as the management of the direct online channel can be expensive and challenging. The science of Internet marketing has grown in complexity and generating traffic to the direct channel and converting the consumer requires daily attention. Also, the net room revenue generated by third party sales varies significantly between intermediary partners (Starkov, 2010).

2.2 AHP methodological approach of efficiency

In this research "efficiency" is the ratio between revenue and cost (Hsieh & Lin, 2010; Scholochow, Fuchs, & Höpken, 2010). In the hospitality sector, other researchers refer to this ratio as "productivity" (Sigala, Jones, Lockwood, & Airey, 2005). Studies in tourism that used the Data Envelopment Analysis (DEA) model to evaluate the ratio between output and inputs, have other common characteristics,

namely, the use of hotel cross panel data. For a general review of publications in hospitality using DEA, see Barros (2005). The general idea is that each observation, namely each hotel corresponds to a Decision Making Unit (DMU) in the DEA's jargon, they are the "performance" or "productivity" units the research wants compare mostly as primary data surveys.

Nevertheless, the DEA model was not considered to be suitable in this case given that the number of virtual DMU is five, one for each channel under study, namely Direct, Expedia, Booking.com, Venere and mainly Travel Agencies. The number of inputs and outputs against the number of virtual DMUs violated the 'rule of thumb" which sets the number of DMUs to be at least 2 times the number of inputs times the number of outputs (Dyson, et al., 2001, p. 248). Hence the Analytic Hierarchy Process (AHP) was chosen as a better approach.

This research has a different approach, as there is only one hotels and the aim is to compare the efficiency between different commercial channels. The assumption made is that each channel corresponds to a virtual DMU. On one hand, the data does not violate the homogeneity assumption because production and services are the same as they refer to the same hotel. On the other hand, the data comes from the IT management system of the hotel and repetitive observations, from the evaluation of the check-in time and not from a survey.

Tourism researchers have used AHP to a greater degree than hospitality researchers. Some of them use AHP for benchmarking of hotels (Min, Min, & Chung, 2002), for evaluating the selection of corporate social responsibility programs and costs evaluation in the international tourist hotel industry (Tsai, Hsu, Chen, Lin, & Chen, 2010). Other fields of tourism cover the evaluation of major sport events in Switzerland (Brand & Scaglione, 2009), evaluation factors in hotel investment decision making (Newell & Seabrook, 2006), or development of a web based intelligent framework that travel agencies could use to improve service responses in tourism destination planning (Alptekin & Büyüközkan, in press). As an extension of the AHP, the analytic network process approach is used as the bases of an expert system that assesses the service performance of travel intermediaries (Lin, Lee, & Chen, 2009).

3 Data

Over the first half of 2010, 87% of the hotel's room night production came in via e-channels. 24% of this was from the hotel's own website, 28% from Booking.com, 12% from Expedia, 12% from Venere and 23% came from miscellaneous travel agencies. The number of electronic transaction cases collected over the six weeks observation period was 652. Although observation began on July 16th, critical records were not collected in the initial 2 days of the field investigation. Dates where electronic transactions were recorded and analysed were effectively July 18th to August 8th (22 days). The following tables provide an overview on collected data.

Table 1. Records collected and analysed

Source	*Data type*
From Fidelio v.6, Hotel PMS	Transaction data relating to arrival and departure dates, number of guests, room type etc.
Expected Arrivals	The amounts on folios of departed guests were noted each day in order to assess final expenditure related to each transaction.
Expected Departures	Each day mini-bar consumption was tracked by reviewing coupons that floor attendants had to provide to re-stock each minibar
In-house guests	Floor attendants recorded rooms where more cleaning than normal was noted.
	Staff in the restaurant recorded excess consumption from the breakfast buffet and noted who effectively consumed breakfast.

In order to assign a transaction cost to each direct web booking, total costs of web development were evaluated. Aside from the initial sunk costs, marketing costs cover online marketing (Google Adwords) and search engine optimization activities. Labour costs, such as salaries of staff dealing with email and telephone requests as well as reservations, were not included in cost breakdown as front desk personnel use similar procedures for all reservations coming through online channels. Variable costs include commissions paid to intermediaries as well as transaction costs.

During the observation time, the duration (in minutes) of check-in was measured and an average calculated for each channel (Table 2). Timing does not contain 3 minutes extra of administration equal to every intermediary.

Table 2. Check-in duration for different channels

Intermediaries	**Check-in (minutes)**
Direct	6
Expedia	2.86
Booking.com	2.67
Venere	5
Travel agencies (10%)	3.17

Finally, a customised program was developed in SAS SQL V9.1 in order to build a database compatible with the objectives of the research.

4 Methodology

AHP is a method used to solve complex decision problems using a hierarchy in several sub-problems or levels or dimensions, each of them representing a criteria or an attribute that characterizes the corresponding sub-problem. The goal is the comparisons of elements, in our case, the distribution channel (DC). The breakdown of the problem in these sub-problems or dimension in a hierarchy structure allows evaluation in terms of pair wise comparison, in a systematic way (Saaty, 1995, 2000). AHP has three main phases (Alptekin & Büyüközkan, 2011; Saaty, 2000).

1. Breaking down the decision problem into hierarchical sub problems.
2. For each level of the hierarchy, calculating the relative importance weights of decision using pair wise comparisons.
3. Evaluating the decision alternatives taking into account the weights of decision criteria.

From a mathematical point of view, the research has to itemize these phases in six steps:

Step 1: Decompose the decision problem into a hierarchy with a goal on the top, the levels and sub-levels contains criteria and sub-criteria below and decision alternatives are the final leaves of the hierarchy or tree. Figure 1 (left panel) shows the hierarchy in the present research for the analysis of cost whereas figure 2 shows the hierarchy for revenues.

Goal: Studying the cost of different channels of distribution for the hotel lambda 1. Operational cost (L: .617) 1.1. Breakfast (L: .150) 1.2. Occupied Room (L: .179) 1.3. Executive Room (L: .034) 1.4. Extra (laundry, bar , etc.) (L: .062) 1.5. Check-in time (L: .575) 2. Financial/transaction cost (L: .383) 2.1. Credit Card Commission (L: .321) 2.1.1. Room Revenue (L: .718) 2.1.1.1. Catarsi (L: .808) 2.1.1.2. Diners+Amex (L: .192) 2.1.2. Extras+paid Breakfast (L: .282) 2.1.2.1. Credit cards (all together) (L: 1.000) 2.2. Channel commission (L: .679)	Direct Expedia Booking.com Venere Travel Agents (10%)

Fig. 1. Hierarchy in cost study on left panel and alternatives in right panel (explanation of abbreviations and figures in text, refer to step 6 hereafter)

Goal: Studying the revenue of different channels of distribution for the hotel lambda 1. Room Revenue (L: .427) 2. Extra Revenue (L: .147) 3. Transactions (L: .427)	Direct Expedia Booking.com Venere Travel Agents (10%)

Fig. 2. Hierarchy in cost study on left panel and alternatives in right panel, ("Transactions" contains the number of transactions by channel, see table 1)

Step 2: The assessments of each alternative in respect to the decision criteria yields a decision matrix. This assessment could come from a scale comparison. Saaty (2000)

proposes scales of 1-9. In this context, the assessment of 1 indicates equal importance, 3 moderately more, 5 strongly more, 7 very strongly and 9 indicates extremely more importance. The values of 2, 4, 6, and 8 are allocated to indicate compromise values of importance. In the case of the present research, this assessment comes evaluation figures in the hotel property management system, therefore, the comparisons based on scale do not apply, therefore, the problem of inconsistency that could arise from human judgment will not be treated in this review of the AHP method. Figure 2 shows the decision matrix corresponding to cost of breakfast for each channel. In order to calculate this, the average cost in Euros for breakfast, per overnight by channel each pair wise ratio. The value of 0.93 in the line Direct and column Expedia shows that the cost of Direct is slightly lower than for Expedia (around 7%).

Step 3: This step consists of the comparison in pair of elements of the constructed hierarchy. In the present research, this is taken as a comparison of the number of overnights evolved in each criterion. Table 3 shows the relative importance of operational cost items.

Table 3. Pair wise comparison criteria for operational cost

	Breakfast	**Occupied Room**	**Executive Room**	**Extras (Laundry, bar etc)**	**Check-in Time**
Breakfast	1.00	0.83	4.35	2.43	0.26
Occupied Room		1.00	5.21	2.91	0.31
Executive Room			1.00	0.56	0.06
Extras				1.00	0.11
Check-in Time					1.00

Step 4: Calculation of an inconsistency index (or consistency ratio) to reflect the consistency of decision maker's judgments, nevertheless, in the present research this calculus is not need because all ratio yield from figures of the data, no decision judgment is included in this case.

Step 5: Normalization of the comparison matrix, this process consists on the division of each column by the sum of entries of the corresponding column, in that way the sum of the column element is 1, for details of the process see Brand & Scaglione (2009). After this normalization process, the calculation of priorities could begin.

Step 6: It calculates the eingenvalues of the normalized matrix, this gives the relative which give the relative weights of criteria. The relative weights obtained in the third step should verify:

$$\mathbf{A} * W = \lambda_{\max} W$$

Where matrix A represents the pair wise comparison matrix and λ_{max} the highest eingenvalue. "If there are elements at the higher levels of the hierarchy, the obtained weight vector is multiplied with the weight coefficients of the elements at the higher levels, until the top of the hierarchy is reached. The criterion with the highest weight

coefficient value should be taken as the most important element" (Alptekin & Büyüközkan, p. 4).

Figure 1 shows the weights relative of each elements of the hierarchy for its sub-tree, they are called *local levels* in brackets preceded by L. Therefore, the interpretation, for example in the first level of the tree, is the following: operational costs (L= .617) represented around two third of the total cost where as financial / transaction cost (L=0.383) the remaining third. All the weights of the elements of the tree other than leaves are calculated based on the number of overnights involved in each case, whereas those of leaves, namely those of the alternatives, are calculated based on cost (for Figure 1) or revenues (Figure 2) in Euro per overnights involved in each case. The sub-tree weights ratios depend on quantity and leaf or alternative comparison on price or cost. In Figure 2, room revenues has the same weight as transaction channel given that each room is paid and also each of them has come necessarily through one channel.

In order to study the efficiency, this research adopted an extended AHP approach that means that from one of simply making a best choice to a more complex construct where the alternatives are based on benefits and cost. Here one constructs two hierarchies, one for benefit and another for cost. One is for the benefits where one answers the questions: which alternative yields the greater benefits. The other is for the cost where one answers the question of which alternative incurs in greater costs. After a synthesis, one forms the benefit to cost ratio for each alternative and reflects the alternative which the largest ratio (Saaty, 2000).

5 Results

Expert Choice (version 11.1.3805) yields the results described in this section. All the calculus in Table 4 shows the synthesis of the ratio revenue to cost for each intermediary. The column cost gives the evaluation for cost; the lower the intermediary cost the better, the opposite happens for revenues.

Table 4 shows that the intermediary order by decreasing ratio of revenue/cost. Nevertheless, this order changes if we take into account marginal ratio. Once the table is ordered on decreasing costs, the marginal ratio is calculated as the successive differences ratios of differences of the benefits and cost to the next alternative from the previous one. If the marginal cost is negative, the alternative one eliminates this alternative (Saaty, 2000, p. 150). From this point of view, even if Booking.com shows a revenue to cost ratio (0.950) lower than Direct (0.938) from the point of view of the marginal cost, Booking.com is better. As a result, the intermediaries' order changes (see first column of Table 4).

Table 4. Final analysis of AHP analysis based on the ratio revenue to cost with check-in time cost included

Final Order	Intermediary	Cost	Revenues	Revenues/ Cost	Marginal Revenues/ Cost
1	Expedia	0.126	0.176	1.397	1.397
2	Travel Agents	0.178	0.196	1.101	0.385
3	Direct	0.210	0.197	0.938	0.031
4	Booking.com	0.221	0.21	0.950	1.182
5	Venere	0.266	0.221	0.831	0.244

The authors calculated the cost AHP model excluding the sub-tree of the check-in analysis. Table 7 shows the synthesis of this analysis.

Table 5. Final version of AHP analysis based on the ratio revenue to cost (without check-in time costs)

Final Order	Intermediary	Cost	Revenues	Revenues /Cost	Marginal Revenues/ Cost
1	Travel Agent	0.178	0.196	1.101	5.618
2	Direct	0.194	0.197	1.015	0.063
3	Booking.com	0.197	0.21	1.066	4.333
4	Expedia	0.208	0.176	0.846	**-3.091**
5	Venere	0.223	0.221	0.991	3.000

In this latter case, namely without check-in cost inclusion, direct booking channels comes after Booking.com from the view of the marginal cost. Moreover, one should theoretically eliminate Expedia, given that its marginal cost is negative. This is in line with the perception of hoteliers; nevertheless, in the model with the inclusion of check-in cost (Table 4), Expedia is the channel that outperforms (Revenue/Cost=1.397) all the others. The importance of cost of Expedia in Table 5 (without check-in time costs) is 0.208 whereas in Table 4 (check-in cost) this importance drops to 0.126, which is around 60% lower.

Another important feature of AHP is that it allows the analysis at different levels of the hierarchy of the model. In order to illustrate this feature, Figure 3 shows the performance analysis of revenue. Expedia has the lower level for the Room Revenue and for transaction revenue, at the same level of Direct. Nevertheless, from the point of view of Extra Revenue importance, Expedia is in the top and even slightly higher than Booking.com.

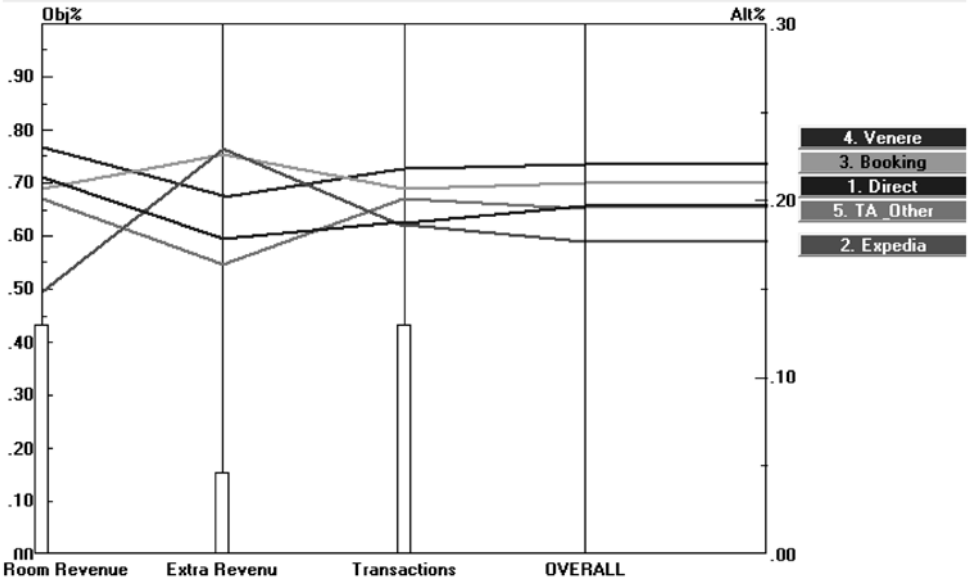

Fig. 3. Performances analysis of intermediaries for revenue.

6 Conclusions and Limitations

In the hospitality and tourism industry a range of technology is utilized for profit optimization. The study aimed to explore how small and medium sized firms might better assess the profitability of contemporary sales transactions in an environment where e-commerce is emerging as a significant influencing factor. A simple lodging operation was utilized as the vehicle to achieve the research objectives.

The study attempted to unravel the complexity of contemporary sales transactions and provide a deeper insight into sources of profit. Traditionally the contribution margin derived from the sale of room products was generally high. However, as prices have fallen/become more competitive, and technology costs have increased (while at the same time allowing for a greater level of analysis), room contribution has declined. This has generated the need for a greater insight into the profitability of single transactions. Moreover, contemporary consumers play a greater role in the personalization of products and services. This further raises the level of complexity of the business as the relationship between costs and revenues changes dynamically, making the analysis of profitability more challenging.

The study developed a draft framework to utilize in further case studies. Data collection methods involved participant observation and scrutiny of hotel records such as arrivals list, guest folios, charges to guest accounts and stock control of complimentary items.

The analysis incorporated aspects of cost and revenue structures over a limited period. The authors plan a deeper research with more data and more extended structure for cost and revenue. Because of sake of space, the authors do not discuss here the sensibility or dynamic analysis of AHP models. This kind of analysis allows the changes of importance of alternatives, in this case, intermediates, as the weights of the elements or sub-trees change.

This research shows that AHP could be a valuable method to answer this micro-economic problem when traditional ones like DEA are not applicable. Moreover, the decomposition of the problem in a hierarchical structure gives a new insight of the underlying structure of costs or revenues. This allows researchers to establish different scenario using the dynamic feature of the model. A closer analysis of the transaction data demonstrated that the channel that was perceived by the hotel as being least performing generated more profitable transactions because the cost of servicing these customers was lower and opportunities to cross-sell non-commissionable items was higher. This demonstrates that the value of contemporary transactions cannot be distinguished without deep analysis of all relevant variables.

To maximize profit, small and medium sized independent hotels need tools to help them better assess the full benefit that different types of electronic transactions generate in order to make better decision with regard to price and inventory control. Hence the next step will be to standardise the data collection process in order to automate the daily analysis of hotel transactional data. Aside from enabling a more efficient analysis of profitability, further patterns may emerge which may provide the researchers with the ability to put in place early detection systems to enable hotels to better determine optimal booking mix, before the majority of rooms are sold.

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Affiliate Marketing in Tourism: Determinants of Consumers' Trust

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Abstract

Affiliate marketing (AM) is regarded as one of the promising and fast growing customer acquisition tools in eTourism. The present study aims to identify the key variables affecting consumer trust in tourism related affiliate websites. A mixed method approach was adopted to explore both the consumer's perspective via focus-group interviews as well as that of tourism affiliate practitioners via an online questionnaire. The main findings comprise firstly that there is a distinction between pivotal determinants of trust and trust enhancing factors. It is suggested that affiliates need to expose their competence and integrity to consumers. Affiliates that feature integrated booking engines need to reduce consumers' uncertainty by structural assurances and by providing background information on their website.

Keywords: Consumer Trust, eTourism, Affiliate Marketing

1 Introduction

The Internet has gained vital importance for the promotion and distribution of tourism services. Increasing tourism demand, lower distribution costs, higher revenues and a larger market share from suppliers' perspective at the one end, as well as ease of purchase activities and information accessibility from consumers' point of view at the other; have driven the wide-scale adoption of e-commerce in tourism (Law *et al.*, 2004; Buhalis, 2003). Accordingly, it was reported that for the first time, online sales volumes exceeded offline sales in the U.S market (Marketing Vox, 2008).

Based on this premise, numerous traffic-building approaches have been implemented by tourism businesses in order to attract website visitors and hence increase revenues. Affiliate marketing (AM) has emerged as one of the fastest growing methods to acquire customers and increase sales (Fox & Wareham, 2007). It is based on the idea of promoting services or goods of another company in order to receive sales commissions (Goldschmidt *et al*, 2003). Recent research (Mariussen *et al.*, 2010; Daniele *et al.*, 2009) indicated an elevated importance of AM for the tourism industry, as it is a major strategic component for customer acquisition and revenue generation.

Research focussing on merchants and affiliates predominate the affiliate marketing literature (*e.g.* Benediktova & Nevosad, 2008; Fox & Wareham, 2007, Libai *et al.*, 2003). However, there is a real research gap with regard to the third crucial element of the AM value chain – the consumers' perspective. Given the importance of AM for tourism businesses, it is important to begin to understand how consumers are attracted by affiliate websites (Daniele *et al.*, 2009).

With regard to exploring relationships between consumers and websites the lens of trust has gained considerable attention among e-commerce researchers. It has been identified as one of the key factors in relationship building between consumers and commercial websites (Mukerhjee & Narth, 2007). Based on the identified importance of the concept of trust, a large number of different studies sought to explore and verify influencing factors as well as implications and consequences of online trust among visitors (Yoo *et al.*, 2009; Schaffer & Mills, 2005; Yoon, 2002). However, there is a gap in the literature on trust in the context of AM. Given that the success of AM campaigns depends on the number of generated leads (Goldschmidt *et al.*, 2003), establishing consumer trust in affiliate websites is of overriding importance. Therefore, this study aims to identify determinants of trust in travel related affiliate websites from a dual perspective of consumers and AM practitioners.

2 Background

2.1 Principles of Affiliate Marketing

In the context of eMarketing, AM programs have emerged as one of the fastest growing methods to acquire customers and increase sales on the web (Mariussen *et al.*, 2010; Fox & Wareham, 2007). Hence, AM is progressively gaining importance in the strategic marketing considerations of businesses in general but also of tourism businesses in particular (Daniele *et al.*, 2009). Even though it is difficult to find precise estimates of the AM market size, several studies indicated that the global AM sector has been subject to continuous growth during the past years (Cageymedia, 2009; Precision Marketing 2008). AM is defined as "the online act of promoting someone else's goods and services to earn commissions from sales leads provided" (Hoffmann & Novak, 2000; p.44). It comprises an agreement between a firm (merchant) and an affiliate, who gets compensated by the merchant for generating transactions from its users. In practice, it involves a merchant providing links in the form of text and/or images that affiliates can promote on their websites, given that they agreed on the proposed terms and conditions. Instead of paying for placing the link, the merchant gives a commission for every transaction that derives from these links (Brear & Barns, 2008; Goldschmidt *et al.*, 2003; Hoffmann & Novak, 2000).

2.2 Online Trust

E-commerce in a B2C context is no longer a new phenomenon, but the understanding of the wide variety of factors that influence the transactions between companies and their consumers is still limited (Koufaris & Hampton-Sousa, 2004). The concept of

trust has been identified as a crucial ingredient for successful B2C relationships in the online environment (Grabner-Kräuter & Kaluscha 2003) as it exerts significant influence on consumers' online purchase behaviour (Chen, 2006). It represents a crucial element in the initiation and maintenance of long-term relationships, and consequently customer-loyalty (Harris & Goode, 2004). Moreover, consumer trust has been shown to reduce the perception of risk (Bart *et al.*, 2005), to increase perceived reliability of information (Lee & Lin, 2005) and to augment the willingness to recommend a website to others (Chen, 2006).

Research on online trust in commercial environments has revealed a wide variety of elements that abet the development of trust between e-companies and their consumers (Corbitt *et al.,* 2003). Especially the concept of trusting beliefs has been widely used in order to explain the initiation of trust between companies and their consumers (Schlosser *et al.*, 2006). They represent individuals' beliefs about attributes and characteristics of the trusted party that are a prerequisite for the formation of trust relationships. Several studies in online trust research have made attempts to cluster the large variety of proposed trusting beliefs into frequently recurring themes (McKnight *et al.*, 2002; Papadopoulou *et al.*, 2001). Despite marginal differences in terms of wording the following categories emerged: benevolence beliefs (the company places the consumer's interests before its own), integrity beliefs (consumer's confidence that the company is committed to agreements, professional standards and moral principles) and competence beliefs (consumer's confidence in the company's ability and expertise to deliver the promised product/ service)

Chen (2006) and Wang & Emurian (2005) found that the website's interface (physical appearance - *i.e.* the layout, structure and content) plays a crucial role in inducing consumers' trust. Also Basso *et al.* (2001) stressed the importance of high quality graphics on commercial websites to gain consumers trust. Other studies have considered the structural assurances that decrease consumers' uncertainties about the trusted party. It was found that while third party mechanisms such as escrow services and seals of verification have a less significant impact on consumer's decision to trust, community- and reputation-based assurances (*e.g.* feedback mechanisms) are an important trust-influencing factor for commercial websites (Pavlou & Gefen, 2004). Finally, a number of studies have argued that a company's reputation exerts a significant influence on the perceived trustworthiness of e-vendors (Koufaris & Hampton Sousa 2004; Jarvenpaa *et al.*, 2000).

Other important determinants of online trust are knowledge-based. The concept of knowledge-based trust builds on the idea that individuals evaluate a company's trustworthiness based on their ability to predict a company's behaviour and intentions (Koufaris & Hampton Sousa, 2002). Taking this into consideration, Chen (2006) posited that the consumer's capacity to predict can be created and enhanced by providing clear information about a company's structure, goals and motivations. However, in the context of AM there are potential problems with this approach. Affiliate websites promoting tourism services by recommendation (e.g. content providers or comparison websites) commonly aim to maximise their profit through generating sales volumes and attracting commission. Therefore, fully exposing their

business model may not be desirable due to potential concerns of consumers as to the biased nature of the services offered. On the other hand, many loyalty and reward websites that share commissions with their consumers have an elevated interest in proactively communicating their business model, as costumers feel that they are being rewarded by carrying out transaction through these types of affiliates (IAB, 2008).

3 Methodology

In order to capture both the consumers' perspective and that of tourism AM practitioners, a mixed-method approach was used. Three experiential focus group interviews with consumers were conducted during the month of September 2009. As participants were required to be familiar with purchasing tourism services online, purposive sampling was used. The sessions started with each participant designing an itinerary – containing flights, accommodation, a restaurant and a sightseeing activity – for a one-week trip to a defined destination, by using only four specific affiliate websites. Moreover, they were required to carry out the booking transaction up until the stage of entering the payment details. Asked only to focus on the trustworthiness of each website, participants were not informed about the affiliate nature of the websites. Subsequently, focus group discussions were held, and recorded on tape and video camera. The data was then transcribed, coded and analysed using nVivo to identify key themes.

During September and October 2009 invitations to a web-based survey were posted in the tourism sections of five major English-speaking affiliate online forums. Based on a review of previous e-commerce online trust studies (*e.g.* Chen, 2006; Koufaris & Hampton-Sousa, 2005; Wang & Emurian, 2005; Mc Knight *et al.,* 2002; Shim *et al.,* 2001) and generic affiliate marketing literature the questionnaire contained a total of 24 items, divided into six main sections: trusting beliefs (6 Lickert-scale questions), institution-based trust (3 Lickert-scale questions), affiliate business model (2 Lickert-scale questions, 1 yes/no response item), web interface design (6 Lickert-scale questions), company background (2 Lickert-scale questions), respondents characteristics (2 socio-demographic questions). All Lickert-items were measured on a five-point scale. (1=strongly disagree/ not important at all; 5=strongly agree/ extremely important). The data-set was analysed with SPSS 16. Data analysis mainly comprised descriptive statistics and some bi- and multivariate analysis.

4 Findings & Discussion

4.1 Composition of Sample

A total of 18 respondents participated in the three focus group sessions, out of which 13 were females and five males. Average age of the respondents was 26 with the oldest participant being 35 and the youngest 23. All respondents spent average (17hrs per week) or above average time online (Nielsen, 2009) and had prior experiences of purchasing tourism services online. A third of the participants had heard the term AM before, but only two participants were fully aware of its operating principles.

A total of 63 questionnaires were included in the analysis. In terms of size 43% of respondents belonged to rather smaller hobby sites (<10,000 visitors per month), 33% were super-affiliates (>50,000 visitors per month) and ultimately 24% belonged to medium sized affiliates (10,000 to 50,000 visitors per month). Respondents' AM backgrounds covered a wide range of different types of AM (IAB, 2008), including *loyalty and reward sites* (share commissions with users via cash or reimbursement via loyalty point systems), *content providers* (generate high quality traffic by offering rich content and placing banners and hyperlinks on their websites), s*earch affiliates* (Generate traffic by bidding on keywords for sponsored links in search engines) and *co-registration affiliates* (provide registered users special offers from third party companies). 10% of respondents claimed to be involved in two or more types of AM.

4.2 Classification of Determinants of Trust

The analysis of the findings showed that trust determinants in affiliate websites differ with regard to their impact on consumers' overall trust. This is supported to some extent by McKnight *et al*. (2002), who argue that specific trust determinants are of overriding importance and that their absence can entail the failure of a commercial trust relationship. In the present study, this line of reasoning serves as a basis for a dyadic differentiation of trust determinants into *core-determinants* and *additional trust enhancing factors.* Core determinants of trust comprise factors that are considered by consumers as pivotal for entering a trust relationship. They are regarded as indispensable for the induction of consumer trust in affiliate websites. In contrast, additional trust enhancing factors increase consumers' perceptions of the affiliate's trustworthiness. However – unlike core determinants – they are not a pivotal prerequisite for trust in affiliate websites.

4.3 Trusting Beliefs

Trusting beliefs in the context of AM refer to beneficial characteristics that are ascribed in the visitor's perception to an affiliate website. The findings suggest that mainly two trusting beliefs represent core determinants: competence and integrity.

Consumers defined an affiliate's competence as possessing the expertise to give useful recommendations and/or to handle bookings professionally. It was found to be a core determinant for trusting affiliates, as 13 out of the 18 respondents made statements with regard to its importance. This included both positive*: 'I can entrust this website my money, because they actually give me the impression that they know their business and know what they are doing'* as well as negative*: 'I would not trust this website. They didn't seem professional to me'* statements. Moreover it was found that especially affiliate websites with either a very specific thematic area or product range were perceived considerably more competent. Also affiliate practitioners advanced the view that competence beliefs represent an essential trusting belief for consumers (*cf.* Table 1). A comparison of mean values showed that content providers ascribed significantly higher importance to exposing competence than other affiliates (independent T-Test: 2-tailed sig.=0.4). This supports the previously outlined link between topical specialisation and competence beliefs.

Table 1. Trusting Beliefs of Affiliate Practitioners –Mean Values

Type of Affiliate	Competence Beliefs		Integrity Beliefs		Benevolence Beliefs	
	Item 1	Item 2	Item 1	Item 2	Item 1	Item 2
Content Provider	4.2	4.3	4.2	4.4	4.3	4.2
Other	3.8	3.9	4.0	4.1	4.0	4.0
Average	4.0	4.1	4.1	4.2	4.1	4.1

The second significant trusting belief was integrity. Similar to competence it was found be a core determinant of trust. The data suggested that adding independent information to product descriptions enhances integrity beliefs: *'The fact that most of the information is written by themselves ... makes it actually trustworthy for me'*. Some participants argued that large numbers of pop-up advertisements and other random cross-selling attempts by affiliates raised doubts about their integrity*: 'That gave me the impression they just want to sell me as much as possible, but not what I have asked for'.* The analysis of the online survey confirmed the results from the focus group sessions. Affiliate practitioners considered the perceived integrity also as important to consumers for their decision to trust (*cf.* Table 1). Particularly content providers attached great importance to integrity perceptions, as the entire group 'agreed' (4) or 'strongly agreed' (5) on both integrity belief items. This finding reflects to a certain extent the above-mentioned consumers' perception that providing independent product information enhances integrity beliefs.

The detected importance of competence beliefs and integrity beliefs about an affiliate is in line with several other online trust studies (Corbit, 2003; McKnight *et al*, 2002; Papadopoulou *et al.*, 2001). If consumers perceive an affiliate as competent but not as integer (or *vice versa*), trust between the two parties will not be established. However, in contrast to online trust literature (McKnight *et al*., 2002) as well as the survey results (*cf.* Table 1), consumers do not support the view that benevolence plays a role in the induction of trust. Unlike integrity (acting in compliance with reached agreements), benevolence is rather based on altruism (the 'goodwill' of the company) and affiliates in fact take only a mediating position in the process of value creation of tourism services. Thus consumers do not expect an affiliate to explicitly subordinate its interests to theirs (*benevolence)*, as long as the promises made will be kept (*integrity)* and the affiliate possesses the necessary skills and expertise to fulfil its mediating function in the value chain (*competence)*.

4.4 Structural Assurances

Consumers regarded in particular two types of structural assurance as crucial when trusting affiliates: verification seals for secure credit-card processing and tourism specific certifications. There existed a clear consensus about the importance of credit card seals among focus group participants, and it was found that the absence of such

seals is a reason to mistrust an affiliate website: '*I couldn't find certificates ... I would never book through a non-secure website*'. But also tourism-specific labels and certifications, such as 'ABTA Protection' or IATA, enhance affiliates' trustworthiness. *'When I saw the ABTA logo, I knew that there is nothing dodgy about the site'*. Nevertheless, whereas credit card seals represent core-determinants, tourism labels are not regarded as pivotal for trust, but rather as trust enhancing factors.

Surprisingly, the entire sample of affiliate practitioners dismisses credit card transaction verifications, trust seals and tourism labels as irrelevant to consumer trust in affiliate websites. While this result indicates that the importance of structural assurances is partly underestimated by AM practitioners, it reflects the findings from further studies (Chen, 2006; Pavlou & Gefen, 2004), which suggested that trust seals bear no importance due to a lack of consumers' awareness of their validity.

Customer reviews and feedback mechanisms were also found to be trust influencing structural assurances. While practitioners attached great importance to it (4.4) the opinions of consumers were rather two-sided. A large group of respondents argued that reviews and feedback enhance trust: '*if someone has commented on a product I will trust the website more*'. Some respondents however, raised strong concerns about their truthfulness. Taking these concerns into consideration it is concluded that feedback and customer reviews are not pivotal for trust in affiliate websites, but rather represent a trust enhancing factor. This is partly supported by Pavlou & Gefen (2004), who contend that above all market-driven assurances – such as user-generated reviews and ratings– influence consumers' decisions to trust an e-vendor.

4.5 Knowledge Based Trust

The present study sought in particular to explore whether the awareness of the affiliate business model, thus the commission based nature of affiliate websites, influences consumers' trust. After the focus group respondents had been fully briefed about the basic concepts of AM, they univocally stated that the commission-based model of affiliates did not affect their decision to trust. This opinion mainly derived from the facts that it is the nature of every business to generate profit: '*they have to exist on something*' / '*no matter where you go, there is going to be a commission on everything*' and that commissions from e-companies are perceived as lower than those of offline distribution channels: '*the commissions on the Internet are lower anyway'*.

In contrast affiliate practitioners regarded this issue as more distinctive and sensitive. In total 52% advanced the view that an awareness of the affiliate business model among consumers exerts influence on the decision to trust (positive or negative). Furthermore, 76% found that making consumers proactively aware of the underlying business model of affiliate websites would not enhance the overall trust. However, respondents engaged in loyalty and reward sites regarded it as unanimously important to raise consumers' awareness about the business model. This can be traced back to the fact that these type of affiliates share commissions with their customers. In conclusion, affiliate website visitors' concerns about consumers awareness of the

business model are without reason. Hence AM represents a – consciously or unconsciously – accepted distribution channel in the tourism sector.

Evidence was found that background knowledge about an affiliate website increases consumers' trust. This applies particularly to affiliates with integrated booking engines. During the focus group sessions some respondents argued that above all providing different communication channels to the company: '*different contact details (hotline, e-mail, etc.) make you feel more secure about a website, especially with these affiliates ... because you never know who they are and what to expect*' as well as information on the business itself: '*I want to know, whom I am giving my money and my credit card details*' help reducing uncertainty and doubts, if the website is handling sensitive data. The authors suggest that providing company related information is not essential for the formation of trust, but is considered to be a trust enhancing factor for affiliates that deal with sensitive customer data.

4.6 Website Reputation

Website reputation was found be a major trust-determining factor. Especially when the affiliate deals with personal information and banking details, trust in well-established and reputable affiliates was found to be considerably higher. Focus group participants saw a strong linked between an affiliate's reputation and the expected support service in case of service failures or booking adjustments. However, some respondents also regarded a websites reputation as an indicator for their integrity: '*I feel assured that I won't be screwed, because ... the website has some kind of reputation*' as well as competence '*Reputation is for me that the company has proven that it is able to recommend places that are good*'.

These findings are consistent with those from previous studies on commercial websites (Chen, 2006; Jarvenpaa *et al*., 2000). The strong influence of reputation on the perceived integrity beliefs about the affiliate is partly supported by Jarvenpaa *et al.* (2000). The study showed that reputation is associated among consumers with elevated investments of the company in building positive customer relationships. Hence, the higher the reputation of a company, the greater its penalty will be from violating customers' trust by breaking commitments. Therefore it is concluded that reputation is not only a core determinant for overall trust, but also influences consumers' competence and integrity beliefs.

4.7 Google's Search Results

Interestingly, throughout the focus group sessions it was revealed that Google's natural search results are regarded by some consumers as an independent and objective judgement infrastructure that delivers credible results in terms of trustworthiness. In general, it was found that Google's search results are used as an indicator of trust in two different ways. The first approach is centred on a websites' position in the ranking of natural search results. More precisely, being ranked among the top three to five results represents an indication for its trustworthiness '*If the site is on the top three Google search results, I know that it's trustworthy, because Google*

wouldn't push dubious sites'. The second approach bases the perception of affiliates' trustworthiness on the frequency, by which they are listed within the top search results of different keyword searches '*The sites that Google suggests me at almost every enquiry are the trustworthy ones*'. While Google search results have not been addressed by the literature on determinants of online trust, a study by Pan *et al.* (2007) on online search behaviour supports such results to some extend. The study revealed that Google's page ranking impacts the path of information search behaviour substantially, because people have strong faith in Google's ability to rank results according to their true relevancy.

4.8 Web Interface Design

Web interface design factors were found to be a core determinant of consumers' trust in affiliate websites. A detailed examination of what shapes the perception of a trustable web interface showed that, in line with previous studies, (Wang & Emurian, 2005; Koufaris & Hampton-Sousa; 2004) a clear and easy-to-use structure is essential to both AM practitioners (*cf.* Table 2) and consumers: '*if I use a website for the first time I should be able to handle it, otherwise how can I trust it, if I don't understand what is going on*'. In addition it was found that structure design is also influencing competence and integrity beliefs. Regarding competence beliefs, respondents claimed that an unclear and confusing structure of the content indicated a lack of professionalism: '*it was so confusing ... I had the feeling that it was run by amateurs*'. In terms of integrity beliefs, evidence was found that complicated navigation raised concerns about a websites honesty: '*when it gets complicated I get suspicious and ask myself for what reasons they try to overcomplicate it*'.

Table 2. Web Interface Design –Mean Values

Graphic Design Factors	**Mean Value**		**Structure Design Factors**	**Mean Value**
Overall layout	3.1		Ease-of-use	4.3
Use of high quality pictures	4.3		Simple design & navigation	4.1
Use of professional colour schemes	4.1		Hygiene factors	4.5

The second major determinant of trust concerning web interface design factors comprised the affiliate websites' graphic design and overall layout. Similar to findings from previous studies (Chen, 2006; Wang & Emurian, 2005) both AM practitioners (*cf.* Table 2) as well consumers attached great importance to layout and design factors such as use of pictures and colour schemes. An interesting finding was that consumers use graphic design as an indicator for both competence beliefs: '*They don't look decent. It's that the colours and the fonts they use make them look very unprofessional*' and integrity beliefs: '*Good pictures and videos give you the*

confidence that the product is good'. McKnight *et al* (2002) partially confirmed the influence of web design factors on trusting beliefs. The authors found that general website quality correlates highly with trusting beliefs. In essence, similar to a salesperson in offline commerce, customers see a website as a representation of a company itself, its resources and its capabilities.

4.9 Summary of the Findings

The findings of this study suggest that determinants of trust in tourism related affiliate websites are divided into core determinants and additional trust-enhancing factors. Core determinants are crucial for the formation of consumer trust, as their absence might entail the failure of the trusting relationship. Determinants falling into this category were found to be consumers' competence and integrity beliefs about the affiliate, the affiliate's reputation, and consumers' perceptions on the web interface design, in particular with regard to its structure and graphic design. In addition it was found that the latter two (web interface design and reputation) not only determine overall trust, but also competence and integrity beliefs about and affiliate.

Further factors that are not pivotal for engendering consumers' trust, but exert a positive influence (trust enhancing factors) are tourism specific labels, user generated feedback and review as well as the affiliate's appearance in Google's search results. Moreover, structural assurance such as credit card seals is a further core determinant of trust for affiliate websites with integrated booking engines. The provision of contact details and an interpersonal communication channels with consumers are suggested to enhance the perception of overall trust.

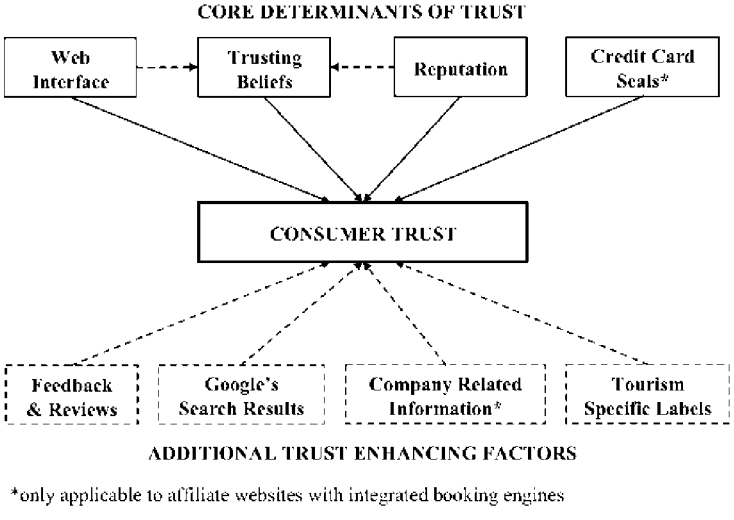

Fig. 1. Determinants of Trust in Tourism Related Affiliate Websites

5 Conclusions and Managerial Implications

In general it was found that AM websites are an accepted and trustable distribution channel in the perception of consumers. The commission-based nature of the affiliate business models does not hold consumers off from trusting these websites. However, in order to gain consumers' trust and bring about a purchase decision, AM practitioners have to take determinants of trust into consideration when designing their websites. Competence and integrity are suggested to be the most important trusting beliefs, which imply that affiliates need to put emphasis on illustrating them to their customers. Against this background it is particularly important for content-based affiliates to be critical with recommendations and to prevent the impression that up-selling products is the main business goal. Moreover this can be achieved by adopting a professional layout (high quality graphics) and a simple and clear structure of the homepage. Consumers are increasingly concerned about privacy and fraud issues in online environments. AM practitioners underestimate this issue and are therefore strongly advised to incorporate trust seals for credit card transactions and make them visible to the customer. In order to further reduce consumers' uncertainty affiliates should provide contact details in order to give customers an access point in case of problems occurring during the booking process.

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An Analysis on Human Personality and Hotel Web Design: a Kohonen Network Approach

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Abstract

Having an eye catching and attractive website could help hotels to compete in the vigorous online market. This study attempts to examine the relationship between human personality and the web design preferences. Kohonen Networks were adopted to cluster people with similar personality characteristics and identify their differences on web design preferences. Empirical results indicated people with similar personality traits have similar design preferences. For example, to attract those who got high scores in agreeableness, conscientiousness and openness but low score in neuroticism, a web page should start with a language selection page with introductory movie, one large image on the web page showing hotel interior design with hotel guest in the photo, and with background music.

Keywords: Kohonen Networks, Big-Five Personality, web design, clustering, user behavior

1 Introduction

In 2001, 28 million websites were available; whereas in 2010, it has an eight-fold increase to 226 million websites (Netcraft, 2010). Apparently, the number of websites is growing in millions sites every month. Prior research found that users took less than one second to judge a website's acceptability (Lindgaard, Fernandes, Dudek, & Browñ, 2006). If a website does not satisfy the users, they will search for alternatives immediately. To attract users to stay, web masters need to improve the first impression of the website. However, different people have different aesthetic view points, so web designer should consider individual differences caused by personality traits and cater for different users' needs (Chung & Ahn, 2007; Cunningham, Thach, & Thompson, 2007). Currently, many of the existing hotel website evaluation studies calculate the mean score of each attributes and use the total score to represent the performance of the website (Bai, Law, & Wen, 2008). However, these scores only reflect the overall performance but personal preferences were not considered. The objective of this study is three-fold, to: i) cluster people with similar personality

characteristics, ii) examine the web design preferences by different personality traits, and iii) analyze the relationship between each design preference and the Big-Five personality.

2 Literature Review

2.1 Five-Factor Personality and Human-Computer Interaction

Many personality psychologists hypothesize that traits are reasonably stable over time, relatively consistent over situations, and make people different from each other (Allport, 1961; Larsen & Buss, 2008). The Five-Factor model, also known as the Big Five model, categorized a large number of traits into five groups of *Neuroticism*, *Extraversion*, *Openness*, *Agreeableness*, and *Conscientiousness* (Goldberg, 1990; McCrae & Costa, 1987). Personality is "an important and easily-measured individual difference among users" (Nass & Lee, 2000, p.330) and it can influence individual cognition, motivations and behaviors (Ryckman, 2008). Several prior studies have indicated that individuals interact with computers according to their personality (Isbister & Nass, 2000). As human factor is an important factor in Human-Computer Interaction (HCI) design, individual differences must be considered when designing system interface. People with extraversion and neuroticism show different patterns when they access the Internet (Hamburger & Ben-Artzi, 2000), and it demonstrated the Internet can no longer be perceived as a general and undifferentiated medium (Amiel & Sargent, 2004). Incorporating individual personality difference into future interactive system design is thus required (Amichai-Hamburger, 2002) because different personality types have different artistic preferences on artistic items (Rentfrow & Gosling, 2003) and color preferences (Kobayashi, 1998).

2.2 Hotel Website Design and Aesthetic Preferences

Many hotel website usability evaluation methods concentrated on ease of use, and efficiency considerations (Au Yeung & Law, 2006) but aesthetics of the website were rarely examined. The design of a website can influence the way a user interacts with the page (Michailidou, Harper, & Bechhofer, 2008). Prior studies indicated that the aesthetic aspect of website context serves as an important role especially in HCI (Schenkman & Jonsson, 2000). In addition, usable products are not equivalent to pleasurable products (Jordan, 1998). As such, if a website is not attractive, customers will leave immediately before they can experience how well the usability is. By manipulating a website's visual components such as colors, text style and size, images and animations, users' perceptions on the website could be altered (Zettl, 2008). A positive first impression of a website could prolong the web usage time (Kim & Fesenmaier, 2008). Furthermore, creditability and acceptability of a website are probably made within a second and this first impression will directly affect whether a user will stay or not (Robins & Holmes, 2008). Obviously, aesthetic is a key factor in the first impression but some researchers also highlighted individual evaluators may differ in terms of their tastes on aesthetic (Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006). Visual aesthetics, as a strong determinant of interactive enjoyment

(Jordan, 1998), could affect the perceptions of ease of use, and the overall impression and website preferences (Schenkman & Jonsson, 2000).

3 Methodology

3.1 Personality Segmentation Study

Segmentation refers to the process of forming groups of people that are homogeneous in terms of demand elasticity and accessible via marketing strategies (Brey *et al.*, 2007; Kim *et al.*, 2003). The advantages of segmentation analysis include the identification of appropriate segments for target marketing, competitive advantages through product differentiation, and the ability to target customers more effectively. The need for in-depth knowledge of segments thus remains an essential element in understanding the behavior and expectations of groups of consumers (Bowen, 1998; Cooper *et al.*, 2006; Lieuz *et al.*, 1994). From a methodological point of view, clustering algorithms learn to group data patterns by inspecting the similarities between different input records, and the clustering result is that the degree of similarity among users within the same group is maximized; whereas that between/among different groups is minimized. Clustering serves several purposes in this study. First, it allows us to inspect the entire group of online users and immediately find those who appear to be significantly different from others. Second, clustering allows natural grouping structures to emerge, which gives us an alternative view of the entire group of online users. Observing and modeling the behavior and expectations of each natural group, as distinguished by the characteristics of the data, may be a more insightful approach than observing the behavior and expectations of pre-defined groups. Once a natural grouping structure has emerged, the result could be used as a prediction tool for future data. Rather than examining individual personality trait, this study clustered users with similar personality traits in Big Five as a whole and examine their preferences on web design attributes.

3.2 Kohonen Networks

A Kohonen Network algorithm originated from neuro-physiological experiments (Kohonen, 1995; Mazanec, 1994), and it can be considered as a feed-forward neural network with two layers of nodes. The first layer contains all the data samples as the input nodes that are fully connected with the output nodes on the second Kohonen layer. Each node on the Kohonen layer has a weight vector ω, and the component of this vector represents the strength of the synapse connection to the "input" node. Moreover, the location of each Kohonen node also depends on its weight vectors. The more similar the weight vectors of the input nodes are, the closer they will be mapped on the Kohonen layer. When a new input node is added into the network, it is compared with the weight vectors of the output nodes on the Kohonen layer. Once the most similar weight vector is found, the weights of the winning node and its neighbors are strengthened to reflect this similarity. For its visualization capability, Kohonen Networks can be utilized to do market segmentation. Comparing with traditional clustering-based methods such as K-means, Kohonen networks can automatically determine the best number of segments, while preserving a 2D or 3D

visualization map which is easy for understanding. Successful applications can be found in Rong, Li and Law (2009).

4 Experiment and Analysis

4.1 Data Collection

A database which contains 98 Hong Kong hotel website links and 15 web design attributes were used in the online questionnaire. For each design attributes, websites were divided into two groups with contrasting design. In June 2010, a total of 80 hospitality and tourism undergraduate students were invited to participate in this study.

Table 1. Attributes in Personality Data Set

Attribute	Description
Personality Attribute	
Agreeableness Tendency to be compassionate and cooperative	**High Scorer** - Soft-hearted, good-natured, trusting, helpful, forgiving, gullible, straightforward **Low Scorer** - Cynical, suspicious, irritable, rude, uncooperative, vengeful, ruthless, manipulative
Conscientiousness Tendency to show self-discipline and aim for achievement	**High Scorer** - Organized, reliable, hardworking, ambitious, persevering, self-disciplined, punctual, scrupulous, neat **Low Scorer** - Aimless, unreliable, lazy, careless, negligent, lax
Extraversion Tendency to seek stimulation	**High Scorer** - Active, sociable, talkative, optimistic, person-oriented, **Low Scorer** - Reserved, sober, unexuberant, task-oriented, retiring, quiet
Neuroticism Tendency to experience unpleasant emotions easily	**High Scorer** - Worrying, nervous, emotional, insecure, inadequate, hypochondriaca **Low Scorer** - Calm, relaxed, unemotional, hardy, secure, self-satisfied
Openness Tendency to curiosity, unusual ideas and adventure	**High Scorer** - Curious, broad interests, creative, original, imaginative **Low Scorer** - Conventional, down-to-earth, narrow interests, inartistic, unanalytical
Web Design Related Attribute	
q1: Language Selection	Prefer hotel home page has a language selection page?
q2: Introductory Movie	Prefer hotel home page contains an introductory movie?
q3: Background and Font Color	Prefer dark background and light text color or vice versa?
q4: Pop-up Window	Prefer to have a pop-up window on the web pages?
q5: Menu Bar Location	Prefer to have a menu bar on the top or left of the web pages?
q6: Image Size/Number	Prefer one single large image or several small images on home page?
q7: Slide Show	Prefer to have a slide show of the hotel photos?
q8: Scrolling Text	Prefer to use scrolling text to show promotional information?
q11: Staff in Photo	Prefer to have the hotel staff inside the photos?
q12: Guest in Photo	Prefer to have the hotel guests inside the photos?
q13: Staff or Guest in Photo	Prefer to have hotel staff or the guests in the photos?
q9: Background Music	Prefer to have background music when you are browsing?
q10: Video	Prefer to have a video shown on the web page?
q14: Hotel Building / Interior Design	Prefer to see the hotel building or the interior design images?
q15: Additional Text Description	Prefer to have additional hotel information or selection menu only?

A self-administered online questionnaire which contains 15 questions on website design preferences and ten Big-Five personality scales which was adopted from Rammstedt and John (2007) were distributed. Each of the 15 design questions

randomly display two Hong Kong hotel websites with contrasting design (namely "*A*" was displayed on left hand side and "*B*" was on right hand side). Students were asked to indicate their preference of designs and styles between these two hotel website from "strongly like A" to "slight like A", "no preference", "slightly like B" to "strongly like B". Table 1 listed the details of each question. The personality characteristics were also questioned for each student. Five major personality categories are considered in this work: agreeableness, conscientiousness, extraversion, neuroticism, and openness. As considering the nature of the human personality, three labels (*weak*, *neutral*, *strong*) were used to measure the expression degrees of each personality category. Each student was given five labels for these five personality categories respectively. For example, a set of personality labels like "agreeableness = *neutral*, conscientiousness = *strong*, extraversion = *neutral*, neuroticism = *weak*, openness = *strong*" is given to a person who is hard-working with an opened mind but maybe not very sensitive to the other external effects. In this way, the personality of the students is not simply classified into one single category, but to make it possible to shown the mixture of several personality characteristics on the same person. That is, the result could represent the personality in a more natural way. Totally, 76 students had completed the online questionnaire, representing 95% response rate, and formed the experiment sample data set for this study.

4.2 Results and Discussion

Profile Segmentation Based on Personality Categories. Based on the similarity of the five personality characteristics, all data samples were mapped into a 2-dimensional *xy*-space ($x = [0,3]$ and $y = [0,3]$). The 76 data samples were grouped into 9 segments (Seg_A to Seg_I), as shown in Figure 2. Each segment corresponds to a group of people with similar personality characteristics.

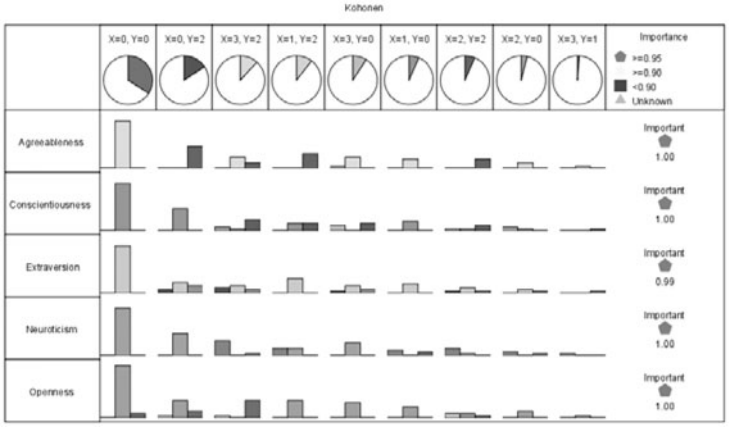

Fig. 1. Segmentation Results Based on Personality Categories

Seg_A contains more than 34% of the people in the data set, in which the majority have no noticeable personality. In this group, the people do not show any particular deviation to any one of the five personality categories. Thus is similar to the people in Seg_F, who are neutral on most of the categories, but none of them is neutral in Neuroticism. In contrast, people in Seg_C have significant personality characteristics.

According to Fig. 1, there are high scores in both Conscientiousness and Openness, but low scores in Neuroticism. People who are considered as agreeable, conscientious but not neurotic are grouped into Seg_D and Seg_G. The difference between these two segments is that people in Seg_D are more neutral in both Extraversion and Openness than those in Seg_G. Seg_B also has people who received high score in agreeableness; however, these people have *stronger* characteristics on both Extraversion and Openness personalities. Besides, people with strong Conscientious characteristics were segmented into Seg_E. Those who received low scores in both Neuroticism and Conscientiousness were grouped into Seg_H. Only one person was separated out from all others, who has a very strong personality on Conscientiousness and Extraversion but very weak on Neuroticism. This person is too special for fitting into any other segments. Therefore, Seg_I was filtered out to hold this special case. The profiles of all nine segments are briefly summarized in Table 2.

Table 2. Segmentation Results Based on Personality Categories

Segmentation	Profile Characteristics	Percentage
Seg_A $(x=0,y=0)$	People with no noticeable personality characteristics	34.21%
Seg_B $(x=0,y=2)$	People who received high scores in agreeableness, extraversion, and openness	15.79%
Seg_C $(x=3,y=2)$	People who received high scores in agreeableness, conscientiousness, openness, but low scores in neuroticism	11.84%
Seg_D $(x=1,y=2)$	People who received high scores in agreeableness and conscientiousness but low scores in neuroticism	10.53%
Seg_E $(x=3,y=0)$	People who received low score in agreeableness but got either high or low scores in conscientiousness	9.21%
Seg_F $(x=1,y=0)$	People who are received either high scores or low scores in neuroticism	6.58%
Seg_G $(x=2,y=2)$	People who received high scores in agreeableness, conscientiousness but low scores in neuroticism and openness	6.58%
Seg_H $(x=2,y=0)$	People who received low scores in conscientiousness	3.95%
Seg_I $(x=3,y=1)$	People who received high scores in conscientiousness, extraversion but low scores in neuroticism	1.32%

Results on Website Design Preference. One of the objectives in this study is to analyze the relationship between each design preference and the Big-Five personality. To achieve the expected the results, web design related attributes were applied as the associated attributes on the segments that are generated by Kohonen model. The scores given to these associated attributes would show people's preference to certain web design issues. By studying the similarities as well as the differences among all nine segments with various personality characteristics, some guides for better hotel website designs could be developed.

Language Selection (Question 1) -- Most people in this study prefer to have a language selection page on the home page. As shown in Fig. 2, all those in Seg_D and Seg_H prefer a language selection page. Furthermore, 51 of 76 people prefer to have a selection language first before they enter the main page.

Introductory Movie (Question 2) -- Introductory movie is the most favorable option to be requested on the hotel website, which has the highest percentage (77.63%) among all attributes. It is especially preferred by the groups of people who scored low in neuroticism ($Seg_{D,}$ Seg_G and Seg_H) (Fig. 3).

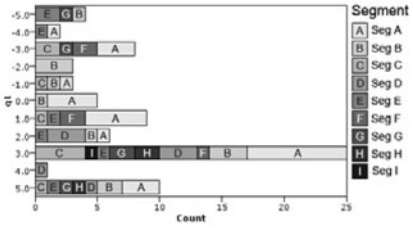

Fig. 2. Language Selection – Q1

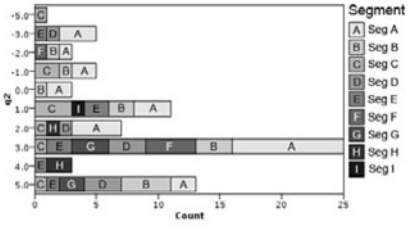

Fig. 3. Introduction Movie - Q2

Background and Font Color (Question 3) -- People with high scores in agreeableness and conscientiousness, and low in neuroticism (Seg_C and Seg_G) prefer this combination more than those with other personality characteristics (Fig. 4). Nearly 70% people feel comfortable with a combination of dark background with a light color text to display information on the hotel websites.

Pop-up Window (Question 4) -- Different to the previously mentioned three issues, pop-up window is one of the only two components that people do not like to appear on hotel websites. It is particularly disliked and avoided by those who scored low in neuroticism (Seg_C, Seg_F and Seg_G) (Fig. 5).

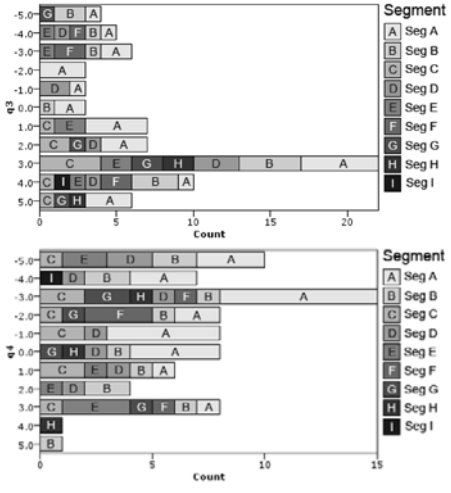

Fig. 4. Background and Font Color – Q3

Fig. 5. Pop-up Window – Q4

Menu Bar Location (Question 5) – As indicated in both Table 3 and Fig. 6, people do not care much about where the web designers put the menu bar. 26 people prefer to

have a menu bar on the top of the web pages, while 25 like to have it on the left side, and the remaining 25 people show no preference on the location.

Image Size/Number (Question 6) -- Those from Seg_D, Seg_F and Seg_G with low score in neuroticism enjoy a nice and clear web page with single large image (Fig. 7).

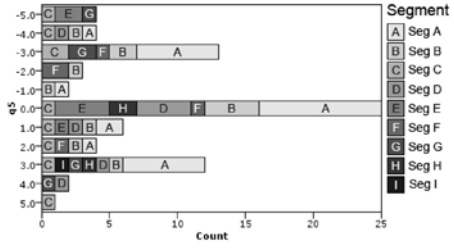

Fig. 6. Menu Bar Location – Q5

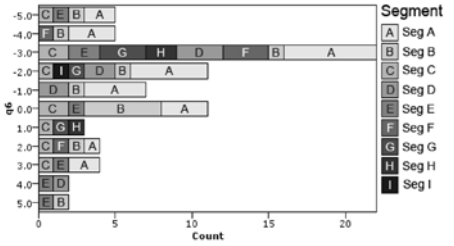

Fig. 7. Number of Images and Size – Q6

Slide Show (Question 7) -- Slide show is the second most favorable attribute on hotel website design, which achieves 76.32% support from the people. According to Fig. 8, those with relatively high scores on agreeableness, conscientiousness and low score in neuroticism (Seg_C to Seg_G) especially prefer to watch slide shows on hotel websites.

Scrolling Text (Question 8) -- Scrolling text is the second component that is not popular in all groups (Fig. 9).

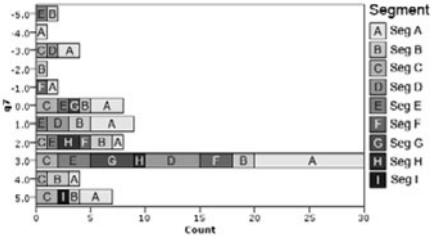

Fig. 8. Slide Show – Q7

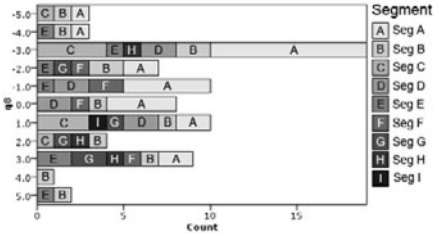

Fig. 9. Scrolling Text – Q8

Background Music (Question 9) -- Similar to the scrolling text, about half of the people enjoy the background music when they are browsing the hotel websites. However, Fig. 10 shows that people with low score in neuroticism (Seg_D and Seg_H) have higher preference than other groups.

Hotel Video (Question 10) -- Unlike the introduction movie, video of the hotel home page does not attract the majority except for Seg_G (Fig 11).

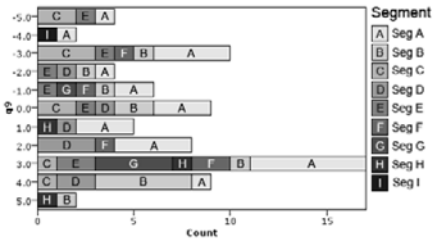

Fig. 10. Background Music – Q9

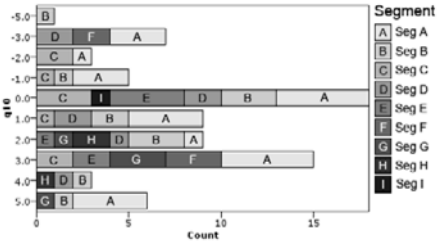

Fig. 11. Hotel Video – Q10

People in the Photos (Question 11-13) -- The answers to these three questions indicated that people like to see other people inside the photos on hotel websites. When having a close look at the preference from the people in different personality segments, Seg_F likes to see human beings inside the photos no matter it is a guest or a staff. Seg_D, Seg_E, and Seg_G prefer to have hotel guests on the photos. However, Seg_H prefer photos without hotel staff or guests (Fig.12).

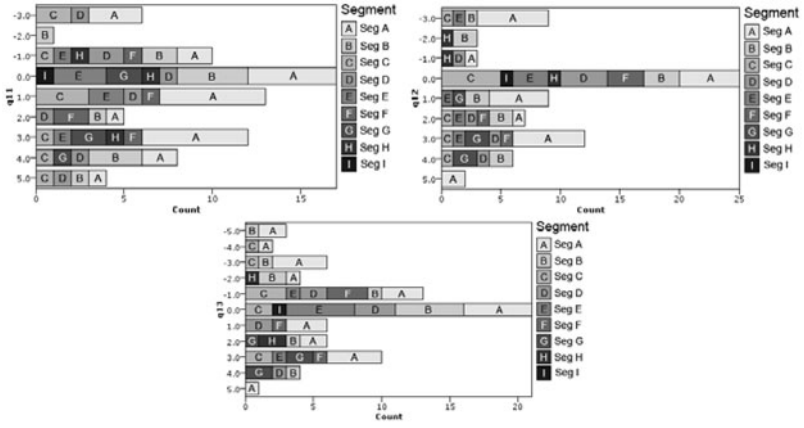

Fig. 12. Hotel Staff and Guests in Photos – Q11 to Q13 (from top left clockwise)

Table 3. Web Design Attributes Preferences

Web Design Attributes	Value/Label		Count	Percentage
q1: Language Selection	[-5, -1]	Disagree	20	26.32%
	0	Neutral	5	6.58%
	[1, 5]	Agree	51	**67.10%**
q2: Introductory Movie	[-5, -1]	Disagree	14	18.42%
	0	Neutral	3	3.95%
	[1, 5]	Agree	59	**77.63%**
q3: Background and Font Color	[-5, -1]	Light background + dark text	21	27.63%
	0	Neutral	3	3.95%
	[1, 5]	Dark background + light text	52	**68.42%**
q4: Pop-up Window	[-5, -1]	Disagree	48	**63.16%**
	0	Neutral	8	10.52%
	[1, 5]	Agree	20	26.32%

q5: Menu Bar Location	[-5, -1]	On the top	26	34.22%
	0	Neutral	25	32.89%
	[1, 5]	On the left	25	32.89%
q6: Image Size/Number	[-5, -1]	One large image	50	**65.79%**
	0	Neutral	11	14.47%
	[1, 5]	Several small images	15	19.74%
q7: Slide Show	[-5, -1]	Disagree	10	13.16%
	0	Neutral	8	10.52%
	[1, 5]	Agree	58	**76.32%**
q8: Scrolling Text	[-5, -1]	Disagree	42	**55.26%**
	0	Neutral	8	10.52%
	[1, 5]	Agree	26	34.22%
q9: Background Music	[-5, -1]	Disagree	26	34.22%
	0	Neutral	9	11.84%
	[1, 5]	Agree	41	**53.94%**
q10: Video Show	[-5, -1]	Disagree	16	21.05%
	0	Neutral	18	23.69%
	[1, 5]	Agree	42	**55.26%**
q11: Staff in Photo	[-5, -1]	With no one	17	22.37%
	0	Neutral	17	22.37%
	[1, 5]	With staff	42	**55.26%**
q12: Guest in Photo	[-5, -1]	With no one	15	19.74%
	0	Neutral	25	32.89%
	[1, 5]	With guests	36	**47.37%**
q13: Staff or Guest in Photo	[-5, -1]	Staff	28	36.84%
	0	Neutral	21	27.63%
	[1, 5]	Guest	27	35.53%
q14: Image with Hotel Building / Interior Design	[-5, -1]	Hotel building	10	13.16%
	0	Neutral	12	15.79%
	[1, 5]	Hotel's interior design	54	**71.05%**
q15: Additional Text Description	[-5, -1]	Selection menu only	18	23.69%
	0	Neutral	11	14.47%
	[1, 5]	Rich hotel information	47	**61.84%**

**numbers in bold indicated the highest percentage in that question*

Hotel Building/Interior Design Image (Question 14) -- Compared to showing hotel buildings, more people prefer to see room interior design. Interior design images are especially attractive to those with high scores in agreeableness and conscientiousness and low in neuroticism which are mainly from Seg_C and Seg_G (Fig.13).

Additional Text Description (Question 15) – Over 61% respondents prefer to have more text describing the hotel services and products; whereas the remaining 23.69% prefer have a selection menu only on a hotel main page (Fig. 14).

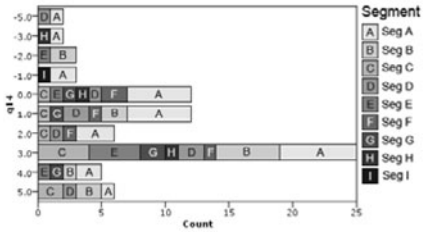

Fig. 13. Hotel Building Image – Q14

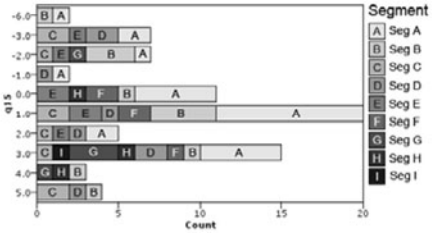

Fig. 14. Additional Text Description – Q15

5 Conclusions and Limitations

This study attempts to identify the website design preferences for people with different personality traits. Findings in this study show people with similar personality characteristics have certain similarities in design preferences. For people who belong to Seg_C (high scores in agreeableness, conscientiousness, and openness, and low in neuroticism), they prefer dark background with light color text, and the photos showing in slide show which contain a hotel's interior design. For those who belong to Seg_D (high scores in agreeableness, conscientiousness and openness but low score in neuroticism), they prefer to have a language selection page with introductory movie, one large image on the web page showing hotel interior design with hotel guests on the photo, and with background music. People who grouped in Seg_F (either high score or low score in extraversion), dislike pop-up windows but prefer rich information display on the home page. For people grouped in Seg_G (high scores in agreeableness and conscientiousness, but low scores in neuroticism and openness), they prefer introductory movies, having hotel videos and images display in a slide show which contains the photos showing hotel's interior design without hotel guests. Finally for Seg_H (People who got low score in conscientiousness), they prefer to have language selection page with an introductory movie, dark background with light color text, having a slide show showing hotel photos without individuals, and contains background music. The study of the individual differences could help develop website customization. Base on individual preferences, web designers could prepare various design templates to cater individual interests. Furthermore, individual personality could be predicted via their browsing history. In the future, website customization could be automated by the website itself.

This exploratory study has some limitations which render its inability to generalize the findings. First, the sample size is relatively small and all the subjects were undergraduate students in hospitality and tourism from one university. Therefore, result on personality test could skew towards certain personality traits. Second, all the websites displayed in the questionnaire were randomly selected from a database which contain all Hong Kong Hotels Association members' websites. The overall design of the individual website might also affect the user's preferences on a specific design attributes.

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Personality and Tourists' Internet Behaviour

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Abstract

This study aimed at relating tourists' Internet behaviours and the Big Five Factors (BFF) of personality to identify personality items that better predict tourists' Internet behaviours. Survey data from 288 domestic tourists to Busan, South Korea, was used to empirically examine the relationship between the BFF and Internet behaviours. Results indicate that Internet travel information sources vary with the BFF with the exception of extraversion, and the Internet channels used for travel information search also varied with the BFF with the exception of conscientiousness. The Internet is more widely used as a source of travel information but less for travel purchases. The results also suggest that the responses to some BFF items can substantially improve the predictability of tourists' Internet behaviours. Implications for the use of the BFF in designing travel information systems are addressed.

Keywords: Big Five Factors; personality; Internet behaviour

1 Introduction

The Internet is an influential source of travel information (Fesenmaier, Xiang, Pan & Law, 2010) as well as a facilitator of travel purchase decisions (Beldona, Morrison & O'Leary, 2005). Despite the Internet's role as a facilitator for travel information searches, it has overloaded potential tourists with information (Pan & Fesenmaier, 2006b), raising the potential necessity of a filtering or recommendation system (Fesenamier, Werthner & Wöber, 2006). Research efforts dedicated to the factors influencing tourists' Internet behaviour have identified travel motivation (Goossens, 2000), prior knowledge (Gursoy & McCleary, 2004), family life cycle and social economics (Fodness & Murray, 1999), gender (Okazaki & Hirose, 2009), education (Heung, 2003), income (Luo, Feng & Cai, 2004), cultural background (Gursoy & Umbreit, 2004), lifestyle (Schul & Crompton, 1983), and other socio-demographics (Gitelson & Crompton, 1983). From an information-system-design perspective, identifying predictors of tourists' Internet behaviour can be interpreted as a quest for the right questions to ask to provide a reasonable expectation of system users' behaviour.

Literature suggests that personality, among other individual factors, could be a plausible predictor of tourists' Internet behaviours. Since personality tends to be enduring throughout one's course of life (Costa & McCrae, 1988), it can be assumed to be a better predictor of human behaviour than other personal factors like demographics (e.g., age, income) that might change over time. Within the information-search context, personality has been applied to explain students' information searching (Heinstrom, 2005), the use of word-of-mouth (Mowen, Park & Zabla, 2007), and the preference for information type (Tidwell & Sias, 2005) with a significant relationship being observed in each case. Despite these findings confirming the influence of personality on information-search behaviour, few have examined its influence in tourism settings, where the Internet is believed to be an influential information source. Furthermore, studies that have incorporated personality to explain tourists' information behaviour have tended to focus on few specific elements of personality such as risk perception (e.g., Quintal, Lee and Soutar, 2010) instead of utilizing universal personal traits like the Big Five Factors (BFF).

This research gap comes as a surprise given the fact that personality is relatively stable and hence offers great potential for predicting tourists' behaviour. This study aimed at reducing the literature gap by exploring the relationship between personality traits and tourists' behaviour towards the Internet. This study focuses attention on applying a universal personality trait (i.e. the BFF) and addresses the following research questions: Do personality traits influence the type of travel information sought from the Internet and tourists' on-line purchases? Are there differences in the use of Internet channels by individuals with different personality traits? And, Can items used to measure personality be used to predict tourists' Internet behaviours? The study results would provide useful insights on better ways to design travel information systems for different personalities.

2 Literature Review

Fesenmaier *et al*. (2006) argue that demographic variables alone are not sufficient to understand tourists' information search behaviours. Thus, they advocate for the use of personal factors such as personality and perceptions towards the Internet. Surprisingly, studies that relate personality and travel-information seeking are scant with a few exceptions like Kah, Vogt, and MacKay (2008) and Gretzel, Mitsche, Hwang, and Fesenmaier (2004). This research gap is alarming given the contribution of psychological factors to travel information searching (Schul & Crompton, 1983). Personality refers to the distinctive and enduring patterns of thought, emotion, and behaviour that characterize each individual's adaptation to the situations of his or her life. The trait perspective propounded by Allport (1937), in particular, has been widely applied in consumer research. According to this perspective, one's personality can be identified and categorized based on one's psychological traits. The wide adoption of the trait perspective seems to emanate from its ease in use, as it employs self reports, and its 'scientific' approach, as its results are easily subjected to systematic analysis.

The Big Five Factor (BFF) model (McCrae and Costa, 1999), among other models based on trait perspective, has been widely applied in diverse disciplines because of its universality (Bandura, 1999) and high reliability across culture (McCrae & Costa, 1999). As the name of model implies, the BFF model categorizes personality traits into five dimensions that include openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability (McCrae & Costa, 1999). Openness to experience represents one's tendency to appreciate art, emotion, unusual ideas, and variety of experience, while conscientiousness is related to self-discipline, one's way of acting, and achievement. Extraversion is individuals' tendency to seek stimulation, and agreeableness represents one's tendency to be cooperative with others. Emotional stability (i.e., neuroticism) depicts the likeliness to experience negative emotions (John & Srivastava, 1999).

The Internet, with its speedy access, wider range of information, interactive nature, and flexibility (Kim, Lehto & Morrison, 2007), has changed the way potential tourists seek travel-related information. The manner in which tourists seek travel information from the Internet has been noted to vary with a diverse set of factors including attitudes towards Internet (Okazaki & Hirose, 2009), gender (Kim et al., 2007; Okazaki and Hirose, 2009), prior experience and involvement with travel products (Kim et al., 2007), age and income (Heung, 2003), country of origin (Heung, 2003), and the stage of decision making (Lee, Soutar & Daly, 2007). The understanding of these determinants is crucial as these are keys to attracting and retaining potential tourists to a specific online platform that might mature viewers into actual buyers of tourism products.

The type of information sought from the Internet is one among the descriptors of information search behaviour and one of the key considerations in designing a travel-decision aid system (Pan & Fesenmaier, 2006b). Travel information sought from the Internet includes destinations, activities, attractions, accommodations, and other travel elements (Pan & Fesenmaier, 2006a). Searches for different travel elements from the Internet have been noted to vary depending upon personality traits (Kah et al., 2008), gender (Kim et al., 2007), and frequency of Internet use (Kah et al., 2008). Kah *et al.* (2008) noted significant differences among innovators, early adopters, and late adopters with respect to the type of travel information searched. Although their study is informative in relating personality and travel information sought, the technology-adoption category does not reflect the universal personality type in the sense that it is limited to individuals' tendency to adopt technology. McElroy, Hendrickson, Townsend and Demarie (2007) argue for the use of the BFF in information studies as these are less mutable compared to other personal variables.

The Internet is a composite online information platform that is composed of websites managed by different organizations/entities, online communities, blogs, and portal websites. The use of these different Internet channels can be argued to relate to the personal factors. With the conventional travel-information channels, potential tourists have been noted to use the different sources depending on travel orientation (Gitelson & Crompton, 1983), country of origin and travel experience (Gursoy & Umbreit, 2004), and information needs (Wong & Liu, in press). Within the electronic platform,

studies relating the BFF with the use of different Internet channels appear to be lacking. Since the BFF are considered to be global and universal predictors of most human behaviours, the adoption of the five factors in explaining the differential use of Internet channels is argued for in this study. A recent study by Yoo and Gretzel (in press) is one among the few to relate the BFF and online travel information. They noted personality traits to be related to perceived barriers to content creation, motivation to engage, and the specific creation behaviour of travel blogers.

The unique characteristic of tourism consumption that entails a spatial separation between the origin of the tourist and the point of consumption experience necessitates a facilitating transaction method such as the Internet for linking suppliers and potential tourists. With the aim of understanding the personal factors that influence online travel-products purchases, studies have noted the frequency of Internet use and experience (Kah et al., 2008), innovativeness (Kah et al., 2008; Card, Chen & Cole, 2003), and perception towards the Internet (Bigne, Sanz, Ruiz & Aldas, 2010) to be influencing factors. Despite the fact that most human behaviours can be traced back to the enduring BFF, few studies have related the BFF with tourists' Internet purchase behavior. Specific personality traits like innovativeness and perceptions of the Internet can be logically linked with some of the five factors of personality like openness to experience. This study adopts this logic in testing the relationship of the five factors of personality to the Internet purchase of travel products.

3 Methods

A self-administered survey questionnaire for domestic tourists was distributed in Busan, the second biggest metropolitan city in Korea, during the period from 15th August to 26th August, 2010. Two research assistants distributed the questionnaire to conveniently selected tourists in three locations where the chances of finding a tourist were higher. In order to minimize possible bias, the research assistants were asked to distribute the questionnaire to all age and gender groups. As a result, a total of 306 questionnaires were returned of which 288 cases remained in the final data set after a cleaning process. The survey questions captured tourists' Internet-behaviour, personality, and demographic characteristics. The Internet-behaviour section had three main questions related to Internet-purchase behaviour, type of information sought and the Internet channels used in seeking travel information. For the Internet-purchase question, respondents were asked to indicate if they had purchased any on-line tourism products in the past 12 months and, if so, the type of purchased items was identified. In order to identify the type of tourism information sought from the Internet in the last 12 months, respondents were asked to check the frequency of search for different types of tourism information (refer to Table 2 for items) on a 5-point Likert-type scale from 1 ('not at all') to 5 ('for all trips'). The survey participants were also asked to indicate the Internet channels they usually used to search for travel information (refer to Table 2 for the Internet channels presented). The personality section utilized 44 Big Five Inventory items (John, Donahue, and Kentle, 1991; John & Srivastav, 1999) that were framed in a 5-point Likert-type scale (strongly disagree to strongly agree). The last section captured respondents' demographic characteristics such as gender, age, marital status, and education level. A

series of Chi-square tests and t-tests was performed to examine relationships between personality and Internet behaviour. For the purpose of identifying personality items to better predict tourists' Internet behaviour, a series of cross-tab analyses was applied. Somer's D value and correct percent were interpreted to suggest personality items with reasonable predictability for respective Internet behaviours.

4 Results

4.1 Sample Profile

Female respondents (54.2%) were slightly overrepresented in the sample. A substantial percentage of the respondents (74.3%) were at or below 39 years old while those 40 years old or over were 25.7% of the sample. In terms of education level, only 8.3% of the respondents had an education level of less than high school graduation.

Table 1. Frequency analysis of Internet behaviour (n=288)

Types of information sought	%	Internet channels used*	%
Destination	94.1	Travel agents' website	56.9
Air fare/schedule	75.0	Supplier website	39.2
Rent car	50.7	(Hotel, airport, rent car)	
Accommodation	83.7	Search engine	64.6
Special events and festivals	62.8	DMO website	12.2
Package tour	64.9	Portal websites	46.9
Attractions	84.0	Magazine and newspaper website	15.6
Itinerary	69.4	KNTO website	11.1
Restaurants and food outlets	76.4	Online community	16.0
Shopping	64.6	Mini-homepage/Facebook	20.5
Map	68.4	Blog	46.5
Internet purchase of travel products (last 12 months)*	38.9		
Accommodation	53.6		
Airline ticket	37.5		
Package tour	46.4		
Rental car	13.4		
Attraction-admission ticket	16.1		
Other	4.5	* Multiple response was allowed	

Respondents' Internet use for travel-information search and purchase are presented in Table 1. The three most common types of travel information sought from the Internet appear to be destination information followed by attractions and accommodation. Search engines and travel agents' websites among the Internet channels used in travel-information searching are the dominant ones while the national level DMO's website appears to be the least-used channel. Travel blogs and portal websites appear to be another important platform for accessing travel information. Social media such as mini-homepages and Facebook are still not prevalent as a source of travel information. Those who have purchased travel products within the last 12 months through the Internet comprised 38.9% of the respondents. Accommodation, package tour, and airline tickets were the most commonly purchased travel products from the Internet.

4.2 Big five personality traits and tourists' Internet behaviour

In order to examine the relationships between the Big Five personality traits and tourists' Internet behaviour, each respondent was grouped into either 'low' or 'high' group based on each of the five personality traits. The mean score for each personality trait was computed, and cases with a 2.99 or less mean score on the scale of 1 to 5 were classified as the low group; otherwise they were placed in the high group. This approach was chosen to clearly contract the possible differences in Internet behaviours by personality level. In testing the differences in the type of information sought from the Internet by the BFF traits, an independent t-test was performed, and the results are shown in Table 2. The results indicate that the frequency of travel-information search differs significantly by an individual's personality traits with the exception of the extraversion trait. In general, the frequency of information search on different types of travel information increases as individuals' openness to experience and neuroticism trait score increases, while the opposite direction is applicable to the conscientiousness and agreeableness traits. Among the travel information sought from the Internet, destination and package tour were observed not to be significantly related to any of the BFF. The relatively high frequency of destination-information search across different personality traits implies that destination information is a universal type of information sought in travel information searches.

Table 2. Personality and type of information sought from the Internet

	Openness			Conscientiousness			Extraversion		
Information sought	Low	High	t value	Low	High	t value	Low	High	t value
Destination	3.95	4.08	-1.16	3.95	4.05	-.65	3.89	4.09	-1.42
Air fare/schedule	3.14	3.46	-2.29**	3.29	3.36	-.36	3.31	3.37	-.41
Rental car	2.59	2.75	-1.15	2.92	2.66	1.26	2.64	2.71	-.46
Accommodation	3.37	3.72	-2.63***	3.84	3.57	1.74*	3.46	3.66	-1.37
Events	2.64	3.03	-2.98***	3.26	2.85	2.26**	2.82	2.93	-.77
Package tour	3.14	3.19	-.33	3.13	3.18	-.21	3.19	3.16	.20
Attractions	3.27	3.55	-2.37**	3.26	3.49	-1.34	3.47	3.45	.14
Itinerary	2.73	3.21	-3.84***	3.26	3.02	1.36	3.06	3.06	.00
Restaurants	2.93	3.48	-4.36***	3.50	3.27	1.28	3.17	3.34	-1.24
Shopping	2.76	3.19	-3.03***	3.16	3.03	.65	3.08	3.03	.30
Map	2.78	3.22	-3.13***	3.50	3.01	2.51**	2.94	3.12	-1.11

	Agreeableness			Neuroticism		
Information sought	Low	High	t value	Low	High	t value
Destination	3.92	4.05	-.67	4.04	4.04	-.03
Air fare/schedule	3.79	3.31	1.92*	3.19	3.82	-4.04***
Rental car	3.46	2.63	3.33***	2.54	3.15	-3.87***
Accommodation	3.83	3.59	1.08	3.51	3.89	-2.91***
Events	3.29	2.87	1.88*	2.80	3.22	-2.99***
Package tour	3.50	3.14	1.40	3.11	3.56	-1.53
Attractions	3.71	3.44	1.33	3.43	3.53	-.78
Itinerary	3.46	3.02	2.05**	2.97	3.32	-2.36**
Restaurants	3.54	3.28	1.19	3.23	3.51	-1.98*
Shopping	3.75	2.98	3.20***	2.92	3.42	-3.33***
Map	3.33	3.05	.99	3.02	3.22	-1.28

*p<.1
**p<.05
***p<.01

- Frequency of information search was measured on a 5-point scale from 1 'not at all' to 5 'for all trips.'

The relationship between BFF traits and the Internet channels used was tested by using Chi-square tests. The relationships are presented in Table 3 with openness to

experience and neuroticism both demonstrating relationships with the usage of four Internet channels. Respondents with higher scores for openness to experience are more likely to use search engines, DMO websites, and travel blogs, while those who are lower in openness to experience are more likely to use portal websites. Those high in the neuroticism trait are more likely to use travel agents' websites and mini-homepages while those with low scores in neuroticism are more likely to search for travel information through search engines and portal websites. The agreeableness trait relates to the usage of three Internet channels including travel agents' websites, search engines, and the KNTO website. Those low in agreeableness tend to use travel agents' websites and the KNTO website, but they employed less frequently search engines. Those individuals with a high extraversion trait are more likely to use newspaper and magazine websites in their searches than are their counterparts. The conscientiousness trait is less useful in segregating the difference in the use of Internet channels. The use of suppliers' websites (airlines/hotels/rental cars) and online communities did not present any statistical difference among the BFF. The results of the Chi-square tests for Internet-purchase behaviour and the type of purchased items indicate no significant relationships.

Table 3. Personality traits and the Internet channel used

	Openness			Conscientiousness			Extraversion		
Internet Channel	Low	High	χ^2	Low	High	χ^2	Low	High	χ^2
Travel agents' Website	58.5	56.2	.14	60.5	56.4	.23	55.6	57.4	.08
Airline/hotel Website	38.3	39.7	.05	34.2	40.0	.46	34.7	40.7	.82
Search Engine	55.3	69.1	5.24**	71.1	63.6	.80	56.9	67.1	2.45
DMO Website	7.4	14.4	2.90*	7.9	12.8	.74	12.5	12.0	.01
Portal Website	56.4	42.3	5.07**	36.8	48.4	1.77	47.2	46.8	.01
Newspaper/Magazine Web	18.1	14.4	.64	13.2	16.0	.20	8.3	18.1	3.87**
KNTO Website	10.6	11.3	.03	7.9	11.6	.46	11.1	11.1	.00
Online Community	13.8	17.0	.48	10.5	16.8	.97	12.5	17.1	.86
Mini Home/Facebook	14.9	23.2	2.68	18.4	20.8	.12	22.2	19.9	.18
Blog	38.3	50.5	3.80*	44.7	46.8	.06	45.8	46.8	.02

	Agreeableness			Neuroticism		
Internet Channel	Low	High	χ^2	Low	High	χ^2
Travel agents' Website	83.3	54.5	7.44***	54.0	65.8	3.10*
Airline/hotel Website	54.2	37.9	2.45	40.0	37.0	.21
Search Engine	41.7	66.7	6.01**	68.4	53.4	5.32**
DMO Website	12.5	12.1	.00	11.6	13.7	.22
Portal Website	45.8	47.0	.01	52.6	30.1	11.00***
Newspaper/Magazine Web	20.8	15.2	.54	15.3	16.4	.05
KNTO Website	25.0	9.8	5.11**	10.2	13.7	.66
Online Community	12.5	16.3	.24	15.8	16.4	.02
Mini Home/Facebook	29.2	19.7	1.21	17.7	28.8	4.12**
Blog	41.7	47.0	.25	43.7	54.8	2.69

* p<.1
** p<.05
*** p<.01

4.3 Predictability of personality items for Internet Behaviours

With the aim of assisting system designers in developing tailor-made travel information systems through the Internet, the 44 Big Five Inventory items were related to different travel information behaviours. In order to simplify the data and better represent behaviour, cases with midpoint answers (i.e., a score of 3 on the

scale) for personality items and frequency of information search were excluded from further analyses. This was deemed necessary since the midpoint answers fit into neither the disagree nor the agree sides. Consequently, the resulting data after simplification were categorical in nature having yes/no or agree/disagree responses. The simplified data pertaining to personality and information behaviour were then subjected to a series of cross-tab analyses.

For each cross-tab analysis, Somer's D value, an asymmetric PRE (proportional reduction in errors) measure, and correct percent were used to evaluate the predictability of each personality item for Internet behaviours. Since the significance of Somer's D value means that the errors in predicting Internet behaviours can be significantly reduced by knowing individuals' responses to personality items, only those personality items with significant Somer's D scores were considered for the calculation of correct percentages. The results reported in Table 5 represent items with the highest correct percent for each of Internet behaviours.

Table 4. Significant personality items for tourists' Internet behaviours

Internet Sought		Internet Channel Used		Internet Purchasing	
Destination	PI41 (−, 75.1)	Online travel agency	PI26 (−, 57.9)	Internet purchase	PI05 (−, 55.4)
Airfare and schedule	PI30 (+, 68.1)	Airline/hotel/rental car	PI12 (+, 63.4)	Hotel	PI24 (−, 64.7)
Rental car	PI39 (+, 67.1)	Search engine	PI04 (−, 68.3)	Air ticket	PI02 (+, 68.7)
Accommodation	PI04 (−, 76.4)	DMO website	PI20 (+, 49.3)	Package tour	PI15 (+, 66.2)
Special event	PI29 (+, 66.7)	Portal website	PI19 (−, 65.7)	Rental car	PI41 (−, 33.7)
Package tour	PI42 (+, 62.3)	Newspaper/mag. website	PI32 (−, 74.6)	Attraction admission	PI08 (+, 69.1)
Destination attraction	PI41 (−, 73.0)	KNTO Website	PI09 (−, 55.6)		
Event calendar	PI30 (+, 65.6)	Online community	PI44 (+, 57.3)		
Restaurant	PI10 (+, 65.8)	Mini homepage/Facebook	PI33 (−, 76.0)		
Shopping	PI30 (+, 73.5)	Blog	PI35 (−, 59.7)		
Map	PI05 (+, 65.9)				

- (+/-, correct %): '+' indicates dominance of concordant cells in a 2x2 table. '−'indicates dominance of discordant cells.
Correct percent = (sum of frequencies in concordant or discordant cells)/total frequency
- Note: BFI items (O: openness, C: Conscientiousness, E: extraversion, A: agreeableness, N: neuroticism)

PI01: talkative (E)	PI02: fault finder (A)	PI03: thorough (C)	PI04: depressed (N)
PI05: new ideas/original (O)	PI06: reserved (E)	PI07:unselfish (A)	PI08: careless (C)
PI09: relaxed (N)	PI10: curious (O)	PI11:full of energy (E)	PI12: quarrelsome (A)
PI13: reliable (C)	PI14: tense (N)	PI15: thinker (O)	PI16: enthusiastic (E)
PI17: forgiving (A)	PI18: disorganized (C)	PI19: worrier (N)	PI20: imaginative (O)
PI21: quiet (E)	PI22: trusting (A)	PI23: lazy (C)	PI24: emotionally stable (N)
PI25: inventive (O)	PI26: assertive (E)	PI27: aloof (A)	PI28: persevere (C)
PI29: moody (N)	PI30: artistic (O)	PI31: shy (E)	PI32: kind (A)
PI33: efficient (C)	PI34: calm (N)	PI35: likes routine (O)	PI36: outgoing (E)
PI37: rude (A)	PI38: follows plans (C)	PI39: nervous (N)	PI40: reflective (O)
PI41: less artistic (O)	PI42: cooperative (A)	PI43: easily distracted (C)	PI44: sophisticated (O)

The positive or negative symbol associated with the correct percent depicts the direction of relationship of the two variables in each analysis. The positive symbol represents the dominance of concordant cells ('no/no' and 'yes/yes') in a 2x2 table, while the negative symbol indicates the dominance of discordant cells ('yes/no' and 'no/yes'). For example, the value of (-, 76.4) for 'PI04-accommodation information search' means that the summated frequency in discordant cells in the 2x2 table of PI04 and accommodation information search accounts for 76.4% of the total

frequency of those who answered both questions. The results shown in Table 4 suggest that the predictability of tourists' Internet behaviours can be substantially improved by knowing their response to a specific personality item. In terms of the type of information searched for through the Internet, the yes or no response to 'I value artistic, aesthetic experiences' can lead to 65.6% to 73.5% predictability for airfare and schedule, event calendar, and shopping information search. Personality item 33 (i.e., efficient) is noted to be associated with the usage of social media such as mini-homepages and Facebook. That is to say, individuals' use of social media in searching for travel information can be predicted with a correct percent of 76% if the individuals' yes or no response to the 'I do things efficiently' item is ascertained first. By the same token, a yes or no response to 'I am ingenious, a deep thinker' can lead to a 66.2% correct prediction of individuals' purchase experience of package tours through the Internet.

5 Discussion

The results of this study demonstrate the utility of the BFF in explaining tourist information search on the Internet. Among the BFF of personality, openness to experience and neuroticism appear to be relevant in explaining the type of travel information sought and the channels used. Furthermore, the study results affirmed the utility of the BFF items in designing a tourist-information system by demonstrating that the response to specific BFF items can substantially improve the predictability of tourists' Internet behaviours. From a theoretical point of view, this study extends the usability of personality traits to understand tourists' information-search behaviour. The results are in line with previous research (e.g. Heinstrom, 2005; Tuten & Bosnjak, 2001) that argues for the usability and universality of the BFF in explaining information behaviour. Taking into account the fact that personality traits are relatively stable throughout one's course of life (Costa & McCrae, 1988) and immutable across culture (McCrae & Costa, 1999), this study advocates the use of personality traits to understand tourists' information behaviours.

The results suggest that those individuals with a high openness to experience trait and neuroticism trait are, in general, more likely to search travel information from the Internet. It is also logical to assume that the characteristic of openness to experience will influence more diverse information searching. The positive influence of neuroticism on diverse travel-information searching can be interpreted based on the nature of the trait. Individuals' tendency to worry and to be nervous might compel them to seek more travel information to minimize negative emotions while planning their trip. The results indicate the wide use of the Internet for travel information searches but not for travel-related purchase. This finding reflects Kah *et al.*'s (2008) and Qi, Leung, Law and Buhalis's (2010) that indicate an unbalanced gap between Internet search and purchase of travel related products with the former outweighing the latter. One possible explanation of the low conversion of travel information search to travel Internet purchase is the risk perception on the Internet purchase held by the potential tourists (Qi et al., 2010).

From a marketing perspective, these findings can be capitalized upon through the inclusion of message characteristics targeting open-to-experience and neurotic

individuals, such as catch phrases in their electronic platforms that might appeal to them. Moreover, the differential use of the different Internet channels by the various BBF suggests system designers should place unique information contents and graphics individually in the different channels to attract and satisfy the discrete personalities that are likely to visit the respective channels. For instance, those higher in agreeableness and neuroticism are more likely to use travel agents' websites, thus implying the designers of such sites should include specific information types, like rent-a-car information, that is likely to be sought by individuals having more traits for these two personality factors. With respect to the type of information sought from the Internet, openness to experience and neuroticism appear to be better predictors where 4 and 3 items for openness to experience and neuroticism respectively reflect 10 of the information types. For Internet channel used, some unshared items from all of the five factors of the BFF are likely to be used in predicting the preferred channels. However, for Internet purchases, only 6 items from amongst all the BFF appear to be likely candidates for the prediction of the different travel elements sought from the Internet. Specifically, BFF items that capture the artistic and aesthetic trait (item 30) and its less-artistic opposite (item 41) are likely to predict the type of travel information sought from the Internet.

Finding reinforces the importance of openness to experience in predicting the search for travel information on the Internet. The practical utility of the BFF items in travel-information-system design to simplify tourist information searches will require the use of the specific BFF items that predict Internet use. For instance, the use of the two openness BFF items (items 30 and 41) together with item 5 (originality) can be used as a filter question to direct information seekers to the appropriate types of information. To appeal to the different personalities that visit the various Internet channels and those who are likely to purchase specific travel components through the Internet, messages accompanying the websites can be designed to appeal to the likely personalities that will visit these channels for information. National tourism-organization websites like that operated by the KNTO can use messages that appeal to neurotics as this category of personality appears to prefer such websites. Such a process reflects Internet information personalization (Fesenmaier et al., 2006)

Despite the current study's revealing the influence of the five personality factors in online travel-information searches, a number of limitations prevent the generalization of the findings. Since the sample was solely drawn from Korea (an Asian country), application of the results to non-oriental nations should be taken with caution as cultural background is noted to influence travel-information search behaviour (Gursoy & Umbreit, 2004). The reliance on attitudinal questions in capturing behavior might not provide an accurate description of actual information search behaviours. This study focused attention in the use of the Internet in a trip planning stage and did not cover other stages of tourism consumption such as on-trip and after trip stage. Future research that extends this study to other countries and designed to observe actual tourist information behaviours in different consumption stages would provide a more comprehensive understanding of the relationship between personality and tourist' information behaviours.

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Travel Enjoyment and Website Sensory Features

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Abstract

With the enhancement of Information Communication Technologies tourism websites increasingly have the potential to create a greater impact on the experience and behaviour of web users. Though sensory experiences play an important role in structuring tourism experience, the sensory dimensions of experiences remain largely unrecognised, under-researched and under-applied in tourism marketing. The aim of this research is to discover whether sensory descriptions of tourism websites affect web surfers' enjoyment, which in turn should enhance the quality of trial experience of tourism products, shape expectations and alter behaviour of potential travellers. In order to establish a conceptual framework for the study, a comprehensive literature review was undertaken in experience construct, the potential of experiential marketing and the important role of sensory elements. The focus of the study is on the significance of ICTs in enhancing the experience in cyberspace of consumers. This conceptual model is followed by a Web-based experiment and a qualitative exploratory study. The findings show that sensory descriptions have strong impacts on emotions and virtual experience of the web surfer and, as a result, influence feelings, attitudes about the destination and impacts consumers' behaviour.

Keywords: Sensory descriptions, experience, information search, website, e-marketing

1 Introduction

Undoubtedly, the incredible growth of ICTs, with its tremendous opportunities and applications, has dramatically shaped the behaviour of both consumers and producers/providers. These dramatic changes in the business environment have created a great urge for tourism enterprises to re-vitalise, re-think and refocus the concept and functions of marketing communication in order to reflect contemporary practices (Buhalis & Law, 2008, McCole, 2004). Creating a long-lasting relationship with customers through providing values and compelling experience has become a core task of contemporary marketing (Niininen, Buhalis & March, 2007). In this light, experiential marketing has been receiving great interest and attention among academics and practitioners as a new tool to differentiate and create unique selling points for tourism providers. Obviously, in the tourism industry, information search plays a critical role in travel decision-making (Ho & Liu, 2005), because tourism is an information-based industry (Staab et al., 2002). The Web represents the future of e-marketing communications (Ghose & Dou, 1998) due to its potential of providing high levels of information as well as creating virtual product experiences (Klein,

2003; Qi, Law & Buhalis, 2010). Therefore, customer experiences on a website are of great interest to both academics and practitioners (Niininen, Buhalis & March, 2007, Sicilia et al., 2005). For communication research, the focus on Web user's experience indicates a perspective shift in which the Web is not seen as textual information, but as the space in which user experiences take place (Vorvoreanu, 2006). As the consumption and decision-making processes related to tourism are considerably driven by hedonic and emotional aspects (Vogt & Fesenmaier, 1998), experiential marketing needs to not only appeal to the heart and the mind of a customer but also to his/her senses (Gretzel & Fesenmaier, 2010). Though sensory experiences play an important role in structuring tourism experience, the sensory dimensions of experiences remain largely unrecognised, under-researched (Gretzel & Fesenmaier, 2003; Gretzel & Fesenmaier, 2010) and under-applied in tourism marketing (Gobe, 2001). In this light, the research attempts to improve the understanding of how sensory elements of websites can make an impact on the experience, attitude and behaviour of Web surfers.

2 Literature Review

It can be assumed that the interaction between potential travellers and tourism providers' or destinations' websites play an important role in shaping the traveller's expectations, attitude and behaviour toward the tourism products, providers and destinations. Tourism has been at the forefront of staging experience where experience has served as a key construct in tourism and travel research as well as destination positioning (Oh et al., 2007). The tourist's quest for an authentic experience (MacCannell, 1989 cited by Oh et al., 2007) and searching for self-identity (Cohen, 1979) could be placed in the centre of the tourist's experience. Being able to evoke deep and significant memories and emotions, senses play a critical part in the customer experience as human beings gather information about the world around them through senses (Shaw, 2005). According to Gobe (2001), sensory experiences are immediate, powerful, and can lead to profound changes in consumer attitudes. Appealing to customers' five senses also possibly results in additive effects on memories because sensory-based emotional information has privileged access to cognitive processing resources leading to stronger memory formation (Pine II & Gilmore, 1999; Oh et al., 2007). Despite the fact that consumption and decision-making processes related to tourism both are considerably driven by hedonic and emotional aspects (Vogt & Fesenmaier, 1998); the significant role of sensory elements has been broadly neglected in tourism marketing (Gretzel & Fesenmaier, 2003).

Poulsson and Kale (2004) observe that until 2004 there were no systematic attempts to define exactly what constitutes an experience in marketing terms. There is also a great deal of disagreement and lack of clarity in the different ways in which the term "experience" can be understood (Tynan & McKechnie, 2009). However, consumer and marketing research has shown that experiences occur when consumers search for products, shop for them, receive services, and consume them (Brakus et al., 2009). The suitability of web-based interactive media for staging experiences has been recognised (Jack Morton Worldwide 2007 cited by Tynan & McKechnie, 2009) with

the emergence of three-dimensional (3D) product visualization technology (Daughertyet al., 2008) enabling the virtual experiences for consumers who are "informed, networked, empowered and active" (Prahalad & Ramaswamy, 2004, p. 5 cited by Tynan & McKechnie, 2009). The greatest value of a virtual experience is that it allows consumers to assess product performance prior to purchase and turning experience attributes into search attributes for products (Klein, 1998). A virtual experience is a simulation of a real or physical experience, which occurs within a computer-mediated environment, and has been construed to be located between direct (i.e., product trial) and indirect (i.e., traditional advertising) experience along the spectrum of consumer learning (Li et al., 2001). Creating a sense of interactivity and enjoyment, the Internet enables consumers to experience psychological states online, resulting in a perceived sense of control, increasing learning and discovering about the destination, altering behaviours, affecting brand attitude and influencing purchase (Daugherty et al., 2008). Huang et al. (2009) also suggest that the Internet erases the differences between search and experience of products/services because it enables consumers to learn from the experiences of others and to gather product/service information that is often difficult to obtain in offline settings (Klein, 1998; Huang et al., 2009). Website experience can be conceptualized as subjective, internal consumer responses (sensations, feelings and cognitions) and behavioural responses evoked by website-related stimuli (contents, appearance, experience stimulants, etc.) in the interactive and virtual environment (Brakus et al., 2009: Law, Qi & Buhalis, 2010).

Lee et al. (2009) suggest that tourism websites have a strong potential to convey a variety of sensory information and can have a great influence on consumer attitudes and behavioural intentions (Lee et al., 2009). Creating a compelling customers' experience online is not only the key to competitive advantage on the Internet (Jeff 1999 cited by Novak et al. 2000) but also could be even more important than offline (Bezos, 1999 cited by Novak et al. 2000). This is because it offers an opportunity to add differential values (Lynch & Ariely 2005 cited Novak et al. 2000) and more critically, contributes to strong word-of-mouth online (eWOM), which is the key driver of customer traffic to commercial websites (Cognitiative 1999 cited by Novak et al. 2000). The online interpersonal influence in a virtual interactive environment is not only the most important information source when a traveller is making a purchase decision but also could be a potentially cost-effective means for marketing hospitality and tourism (Litvin et al., 2006). Though Novak et al. (2000) have observed that very little is known about the elements that make Web interaction a compelling customer experience and of the key consumer behaviour outcomes of this compelling experience. Yet many authors have drawn the attention to the lack of factors which facilitate the hedonic needs, the fun and fantasy of the customers while planning a vacation on the web. Gretzel and Fesenmaier (2003) argue that the lack of an experiential mindset within the tourism industry is due largely to a lack of understanding of the nature of tourism experiences which results in database-driven website structures, focusing on communicating functional attributes such as price, distances and room availability (Manovich, 2001) but failing to reflect the actual consumer's perception of tourism experiences. There seems to be consensus among academics and practitioners that the use of a variety of sensory information and multimedia contents such as video, three-dimensional demos, virtual tours, high

resolution pictures, graphics, music, and motion in tourism websites will significantly enhance the richness of cyber customers' experience (Fiore & Kelly, 2007)). This can be achieved by satisfying hedonic and aesthetic needs of travellers in the process of travel information search (Vogt & Fesenmaier, 1998) and by playing an important part in contributing to enjoyment of Website interactions (Blythe et al., 2003).

Virtual Reality interface design aims to achieve full immersion of the human sensorimotor channels into a vivid computer-generated experience (Biocca & Levy, 1995). Therefore, communication technologies and perception of the user and customer experience, cannot be separated but must be considered simultaneously in the process of designing websites' interfaces. Steuer (1995) observed that there are two major dimensions across which communication technologies vary: vividness and interactivity. Shih (1998) emphasised that by consuming interactive websites, consumers may be involving in hedonic consumption because apparently the experience of telepresence is intrinsically rewarding and fun. Two variables that contribute to vividness are breadth of the sensory information, which refers to the number of sensory dimensions simultaneously presented by the medium and the depth of the sensory information, which refers to the resolution or fidelity of the sensory information (Steuer, 1995; Shih, 1998).

3 Methodology

While visual impact on the imagery processing is widely acknowledged, no research has focused on how the impacts of visual, sensory text and sound of the web influence the online enjoyment of the potential tourists. Such complex and subjective concepts require a technique that allows the researcher to flexibly explore and capture different specific aspects of a person's experience and aroused emotions. Individual focused interviews are considered to be appropriate to capture all the details of an individual's feelings. Visual and auditory are chosen to examine their influence of the participants' emotions and attitudes through the use and applications of photographs, videos, virtual tour, livecam, maps, design, colours, etc. Emotional affects are based on the Circumplex Model of Affect of James (1980), with emotions categorised into two dimensions: passive-active and positive-negative. These include: Alarmed, tense, afraid, angry, annoyed, distressed, frustrated, miserable, sad, gloomy, depressed, bored, droopy, tired, sleepy, calm, relaxed, satisfied, at ease, content, serene, glad, pleased, happy, delighted, excited, astonished, and aroused. After an extensive review of different websites, three websites of three destinations were selected: Cervinia, Courchevel and Andorra. The choice of skiing websites is firstly due to the novelty of the destinations in order to reduce the bias of individual favourite destinations. Secondly, the use of ICTs in skiing websites is found to be rather intensive with virtual tours, video, interactive webcams, interactive maps. Furthermore, the selection of websites is based on the most crucial parameters influencing overall perception of Website effectiveness by students reflected issues of Information content, Entertainment value and Site design (Mechitove et al., 2001).

Cervinia: http://www.cervinia.it/pages/Home_e_en/212
Courchevel:http://www.courchevel.com/index.php?Rub=1&L=2
Andorra: http://www.yourandorra.com/

In this research, twenty seven (27) international students in Bournemouth University were chosen as participants regarding the required characteristics of participants. In the first stage, unstructured interviews were conducted with 8 participants. In the second stage, structured interviews with Likert 7 point – scale closed questions and eight (8) open questions were carried out from with 16 participants. The interviewees were asked to imagine they wanted to travel to a skiing destination but have not known where to go yet. They were provided with three websites according to the three destinations (Courchevel, Andorra and Breuil-Cervinia). The participants were then asked to interact with the 3 websites as long as they want. After that, they had to decide which the destination of their choice is and which website they enjoy interacting with most. Interviews were conducted either at the same time while users are interacting with the websites or after they had used the websites All the questions of the interview focused on "which element of the web" triggered "what feelings of the participants", how and why. There were two stages of data analysis in this study. In the first stage, transcriptions of the focused interviews and open questions of the structured interviews were thoroughly organised, classified and themed according to their relevance to the objectives and aims of the research. In the second stage, structured questionnaires with Likert 7-point scales were coded and the data was coded and inputted in a logical way into SPSS and then analysed.

This study contains several limitations which mostly relate to the highly subjective characteristics of the topic discussed including the choice of criteria to evaluate the websites, the questionnaire design and data analysis. Distortions might appear from the stage the interviewee mentions the feelings and emotions to the phase of understanding and interpreting the data. Time and resource limitations inevitably reduced the scope in this study. The limited size of sample, limited age range, and insufficient number of male in gender and the choice of only students also restrict the generalisability of the findings. Additionally, as the aims and objectives as well as target markets for each enterprise and destination differ, the findings might not be applicable to all website contexts and usage situations. Therefore, further research is recommended for a specific context and in a more focused manner. The limitations of the methodology also indicate that further research on the field should apply an integrated methodology with multiple methods of data collection and analysis in order to enhance the quality of the project and better serve for marketing objectives.

4 Findings and Discussions

4.1 Affects of sensory elements on potential tourists' enjoyment during the website interaction

Link between website sensory elements and interviewees' emotion

Results from content analysis of the unstructured interviews revealed a link between interviewees' emotions evoked and the three websites' sensory elements used, the more sensory elements used in the web, the more emotions were evoked. After this, clearer patterns of this link were discovered by structured interviews and SPSS analysis. Results of the analysis indicate that the sensory stimulants create positive emotions and feelings. A wide range of emotions was found from "aroused", "astonished", "excited", "delighted", "happy" to "relaxed", "pleased", "at ease", "calm", "satisfied", "glad", "serene", "content". These positive affects are also discovered to be fairly strong when the interviewees were asked to rate them based on the scale of 1-5 (from very weak to very strong feeling). Accordingly, the lack and/or the low quality of these sensory elements in the websites create negative feelings, especially in the case of the Andorra website, where all interviewees agreed they felt "bored". The majority mentioned "sleepy", "frustrated". Some felt "annoyed", "distressed", "droopy" and "gloomy". However, some participants noticed that they felt "at ease" and/or "pleased" because they found it easy to "get my way around", to understand how the whole website works and to navigate the website. They felt they were more in control in the whole process. There is no consensus in the intensity/strength of the feelings when they were asked to rate these feelings from very weak to very strong (scale from 1-5). The analysis also displayed the link between visual affects and other senses (Table 1).

Table 1. Visual Impact and Imaginative Sensations

	Imaginative sensation of	Stimulant
Taste	Food	Photos of Cervinia
Touch	Movement in her hands/fingers The cold of the snow and the warmth of the sunshine The cool and relaxed feelings in the eyes Hot	Animated icons of Courchevel Photos, livecam, virtual tour Photos, colours (green, blue) of Couchevel Video of Couchevel
Smell	Trees Air Food	Photos of Courchevel Photos of Courchevel Photos of Cervinia
Sound	Music in the restaurants	Photos of Cervnia

Table 2 illustrates the percentage of participants with negative/positive feelings from different stimulants. Overall, these features are very effective in impacting the senses of viewers and bringing positive emotions if used properly. However, too many technology applications can create the feeling of "the cold of technology". Too much animation easily makes the interaction annoying, distracting and confusing. At the same time, automatic videos, pop-up advertising or unexpected applications often make the participants feel as if they lost the sense of being in control of the navigation and become frustrated and miserable.

Table 2. Website Features and Positive/ Negative Affects

FEATURES	POSITIVE (%)			NEGATIVE (%)		
	Courchevel	Cervinia	Andorra	Courchevel	Cervinia	Andorra
Photos	75.00	81.25	18.75	-	-	12.50
Videos	50.00	56.25	-	25.00	12.50	-
Sounds	31.25	18.75	-	18.75	-	-
Webcam	31.25	31.25	-	-	6.25	-
Maps	56.25	6.25	-	-	-	-
Design	50.00	50.00	12.50	18.75	12.50	62.50

Affects of sensory elements on potential tourists' feelings and imagination about the destination

Sensory stimulants not only impact the participants' emotions in general but also create feelings and trigger their imaginations about the destinations. In general they have a mix feelings of "excited" and "relaxing". The interviewees imagine how they feel, what sensation they would have, what they will do and also some characteristics and features of the destination as well as the resorts. All participants said that they could not imagine or have feelings about Andorra because of the lack of sensory stimulants. Based on the larger amount of words describing feelings, imaginations of two destinations, it can be assumed that there is a link between the degree of technology applications (the more vividness) in the website and the amount of feelings, emotions provoked. In Courchevel website, with the virtual tour and livecam, a much wider range of emotions was triggered in participants.

4.2 Connection between the most favourite website and the choice of destination

A visible connection is found between the most enjoyable websites and the desirable destination. The participants who enjoy the website also feel excited about conducting a trip to the destination. Stimulants/features of the two most favourite websites and their impact on the choice of website and destination of participants are summarized in Table 3. The impacts are more varied and more detailed in the case of Courchevel website. This again supports the existence of the link between the degree of technology applications (the more vividness) in the website and the amount of feelings and emotions provoked.

4.3 Connections between websites and interviewees' behaviours

The enjoyment of the website seems to have an impact on the interviewees' desire to book/recommend the website/destination and come back for further search (Table 4). The majority wants to book and recommend others about the websites and destinations in the case of Courchevel and Cervinia. In Andorra there are much less people who want to book/recommend the website and the destination than in Courchevel and Cernivia. The enjoyment of the website seems to strengthen the desire to learn more about the destination; yet not lessen the desire to learn about the destination if the website is not interesting as in the case of Andorra website (10 out 16 interviewees still want to learn more about the destination even though they considered the website to be boring).

Table 3. Features of Websites and Impacts on Participants

	Features/ Stimulants	Impacts
COURCHEVEL (website)	Photos (high definition, selective colours, outstanding)	More interactive, eye catching, creating strong first impression
	Design (professional, impressive)	Feeling of fun, modern, professionalism, trust and that the provider has put a lot of effort in the website
	Navigation (easy)	Wanting to playing with the website
	Content (informative, interesting)	Learning more about the destination
	Video Virtual tour (professional, impressive, interesting) Animated text, icons	Triggering the curiosity about the destination and desire to come there. Positive emotions: interesting, exciting, happy, tempted, appealed, impressed Easier to imagine/get the feelings about the place and activities
COURCHEVEL (destination)	Attracted by the web and by the photos, videos, virtual tour; Information presented in an interesting way; Good interaction; Other offerings besides skiing	Sense of trust; Sense of safety; Sense of presence; feeling real; Have general view; Trigger their imagination; Feel curious and excited; Professional, good services; Feeling that the destination fits with what they are looking for; Can see themselves there
CERVINIA (website)	Photos (nice, attractive, changing automatically)	Positive feelings, eye catching
	Video	Offering many activities
	Design (attractive, colourful, good structure); Interface (friendly to use); Content	Desire of going there
CERVINIA (destination)	The diversity of the photos in the website Videos	Inviting, caring about the sport side more, informative about the activities Interesting, price available; Can see 4 different seasons through the year, clear; Easy to find information; Providing a more holistic experience of not only skiing but other activities; Tempting atmosphere

Table 4. Interviewees' Behaviours

POSSIBILITY OF			
	BOOKING (%)	WEBSITE RECOMMENDATION	DESTINATION RECOMMENDATION
CERVINIA	75.1	81.3	93.8
COURCHEVEL	62.5	75	87.6
ANDORRA	6.3	12.5	31.3

5 Discussion

In general, the majority of interviewees agree that it is important to have the following elements in a website: photos, videos, interactive maps, live webcams, virtual tours. Interviewees think that these sensory stimulants play a significant role in:

1. Triggering their imagination about the destination and about how they would feel when they actually conduct the trip.
2. Strongly affecting interviewees' senses.
3. Providing the interviewees with an overview and holistic feelings about the destination.
4. Helping the interviewees to immerse themselves into the environment of the place and makes them actually 'see' themselves in the destination.
5. Creating the desire and wish to actually go to those places.
6. Making the website interaction more interesting, more enjoyable.

This finding confirmed the argument of Oh et al. (2007) that visiting a particular destination is typically motivated more by the powerful mental and emotional image or "pre-experience" of the tourist than by the physical characteristics of the destination. Moreover, it also shows that the website is an effective medium to convey these "pre-trip" experiences with the use of sensory information. Acknowledges that sound has no significant impact on mental imagery processing which is important for virtually experiencing a destination and leads to destination attitude. However, contrasting to research conducted by Lee, Gretzel and Law (2009) results from this research indicates that sound can help the web surfer to immerse themselves more into the virtual environment. Moreover, sound is found to have a clear impact on the enjoyment of web user. It is expected that if there is a good match between sound, visual effects and the experience the provider wants to convey, there will be greater affects on the emotion of the web surfer. Findings of this research confirm previous opinions that creating a sense of interactivity and enjoyment will result in a perceived sense of control (Hoffman & Novak, 1996; Huang, 2006); increase learning and discovering about the destination; alter behaviours; affecting brand attitude; and influencing purchase (Daughertyet al., 2008).

6 Recommendations

6.1 Public sector

Biocca and Levy (1995) acknowledged the role of the industry and each destination in investing and supporting the cutting-edge technologies that facilitate the cyber experience of customers. Governments also play a critical role in setting strategic standards and protocols to ensure interconnection, compatibility and universal access (Al Gore 1993 cited by Biocca & Levy, 1995) and in establishing regulatory legislations in relation to health and safety problems such as those related to product safety and design and virtual property (Biocca & Levy, 1995). Governments are different levels are also essential in order to pool and link all information and resources of destinations together for an effective marketing campaign. This can facilitate unprecedented opportunities for the coordination of SMTEs in order to enhance their competitive advantages; resulting in an interactive accessible collection of computerized information about a destination – Destination Marketing System (DMS) (Buhalis, 1998).

6.2 Private Sector

The research demonstrates that in order to catch the attention and create compelling experience for the web surfers, the website needs to: 1) Incorporate both visual and auditory stimulants in web design, 2) Convey the information of the destination in many forms and ways such as texts, photos, videos, maps, virtual tours, etc and the whole design of the website, 3) Assure that the information in any forms must be up-to-date and of high quality, 4) Ensure a consistent quality and consistent feelings of these forms of information, 5) Provide a user-friendly interface so that it is easy, fast and convenient to get access to the information in different forms and navigate the website, 6) Offer a visual and auditory design that fits together well and fits the experience and feelings that the tourism providers wish to convey. It is important to provide the customers with a playground where they can upload pictures, videos and share their own experiences. Linking a third party website and/or other necessary and relevant websites, such as TripAdvisor, with the rating and comments about the tourism provider would also help facilitate its transparency and credibility as well as make it more convenient for the consumers. Constant research on related fields is highly recommended in order to efficiently establish a strategic sensory marketing plan to the target market.

7 Conclusions

Most of the findings of this study concur with previous related research on how strongly sensory information can affect the customer's experience and shape their expectations as well as attitude and behaviours. In general, it has been found that senses have great impact on emotions and the website's sensory elements considerably contribute to the enjoyment of web surfers. Visual is still the dominant factor all participants agreed on having the strongest impact on their emotion. An

interesting finding is that sound does make considerable impact on the emotion of the participants and affects the telepresence of each individual in different ways. Either negatively or positively, sound clearly influences the overall impression and experience of the web surfers. The sense of control is also noticed as an outstanding factor, which could lead to the changes in the users' enjoyment, attitude and behaviour. The study also indicates that in order to enhance the experience of customers in cyber space, it is critical to facilitate the telepresence of customers, which in turn, means the website design needs to focus on increasing the vividness and the interactivity of the web and a balance of the two must to be identified in order to assist the progress of experience. It is evident that sensory information will be a critical source of competitive advantage for the future.

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