Magdalena Kachniewska*

Warsaw School of Economics

TOURISM VALUE ADDED CREATION THROUGH A USER-CENTRIC CONTEXT-AWARE DIGITAL SYSTEM

Abstract

This paper seeks to focus on the idea of a user-centric context-aware digital system and its rationale in a process of tourism value creation. The purpose of the study is to offer an understanding of the context-aware applications in order to analyse their usefulness in tourism marketing. This is achieved through a literature review of existing research and the demonstration of several applications in travel and hospitality which might enrich the set of marketing tools adopted by tourism regions and enterprises.

Keywords: context-aware system, mobile applications in tourism, digital tourism, tourism value added

Introduction

Contemporary tourists like to change their itinerary during the trip and to combine several purposes with travelling, such as business, leisure, entertainment and education. The result is what can be called "bleasure" and "edutainment" tourism (Tala *et al.*, 2011; Kachniewska, 2014). The "postmodern tourists" look for the possibility to compose their tourism packages personally and to modify them during the trip according to their personal needs and interests (Kachniewska, 2011) thus becoming what Toffler defined "prosumers" (Toffler, 1970). They are not likely to invest a great deal of time to pre-plan a travel schedule in detail. For

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*   Adres e-mail: magdalena.kachniewska@sgh.waw.pl.

all the reasons they need pragmatic and logistic information within an easy reach (available anytime and anyhow) during their travel.

On the one hand, modern tourists' requirements constitute a new challenge for destination marketers. Traditional web sites and old-school CRM systems no longer provide organisations with marketing tools which could meet requirements of the advanced tourists or provide them with adequate and sufficient information. On the other hand, once having access to new marketing technologies the marketers gain a unique chance to get information about tourists' needs and habits, to affect travellers buying behaviour and provide them with the customised information on the destination attractions.

Tourism industry has been strongly influenced by the IT growth, which affected the change in marketing strategies of tourism regions and companies. Information and communication technologies (ICT) have created innovative ways for providing value to clients. The adoption of mobile devices has grown tremendously and their characteristics of mobility and connectivity support on-demand services that are tailored to users and their specific situations. With the advent of Web 2.0 digital systems became collaborative, bringing a social layer to the Web. Wearable sensors are feeding user information to social, medical and edutainment networks – there is no reason why not to use them in tourism marketing. The more that virtual communities show new opportunities for tourism firms and destinations.

Mobile value services create customer value with the support of mobile technology. While using the applications customers provide useful information on their interests and preferences thus enabling more precise market segmentation and better targeting. The future competitive advantages for a successful tourism industry will most probably be built around effective mobile value services, but few tourism destinations have already started leveraging customer relationships and building loyalty ties through virtual communities and mobile applications.

This paper is focused on the idea and the role of a user-centric and context-aware digital system. The main purpose of the study is to offer a deeper and clear-cut understanding of the context-aware applications in order to analyse their usefulness in tourism. This is achieved through a literature review of existing research and the demonstration of several applications in travel and hospitality which meet the criteria of context-awareness.

1. The idea of the user-centric context-aware digital system

With the emergence of mobile technologies, new communication platforms are emerging, making the delivery of services available through a variety of multi-channel mediums without losing their integrity or quality of their content. Inevitably, this increases user requirements: as the available products and services become more and more sophisticated, users expect to be able to personalize a service to meet their individual needs.

The explosive growth in the size and use of the World Wide Web may lead to orientation difficulties, as users often lose sight of the goal of their inquiry, look for stimulating rather than informative material, or even use the navigational features unwisely. To alleviate such navigational difficulties, researchers try to identify the peculiarities of each user group and design systems that could deliver a personalized content. Challenges therefore range not only from adapting to the heterogeneous user needs and user environment issues, such as current location and time (Panayiotou and Samaras, 2004), but also to a number of other considerations with respect to multi-channel delivery of applications. The personalisation of mobile services needs a new way of thinking about the user's role in a digital system.

A **digital system** is a distributed, adaptive, open socio-technical system with properties of self-organisation, scalability and sustainability inspired from natural ecosystems (Briscoe and Wilde, 2006). The "digital ecosystem" metaphor has been applied to a number of business areas related to the production and distribution of knowledge-intensive products and services (Damiani et al., 2007). The perspective of the research in this field is providing tools to achieve a set of objectives, e.g. sustainability, fairness, bounded information asymmetry, risk control and gracious failure as well as the context-aware designing and user centricity.

Context is any information that can be used to characterise the situation of an entity. An **entity** is a person (e.g. a tourist), place or object that is considered relevant to the interaction between a user and an application (Lau, 2012). For example, modern tourists expect location-aware information about the destination domain, including history, culture, folk, art, economics, environment and nature. They also expect individualised information and services taking into account their own interest and history of their activities (Poslad et al., 2001). By analysing users' needs and emotional sides organizations can better understand

customer demographics, buying patterns and feelings, thus planning so called "total experience design" (TxD).

Researchers have proposed different **context types** in their definitions of context. Dey and Abowd (2000) defined context to include location, temporal elements, identity and activity. Context-aware mobile tourism applications are designed to support different context types: location, identity, social and environmental context as well as network and device contexts (Cheverst et al., 2002; Setten et al., 2004; Poslad et al., 2001). Some context types, such as the identity context and social context, are supported by rich contextual properties. They include the user's name, age, preference in food, lodgings, information-seeking trend, shopping lists and travel agenda (Pashtan et al., 2003; Poslad et al., 2001; Setten et al., 2004) as well as information on tour companions and other tourists' comments (Cheverst et al., 2002).

2. The rationale for context-awareness in tourism marketing

Naturally mobile tourists need mobile information. The trend has been strengthened by new technological means. Independence and an easy access to information constitute one of the priorities to modern tourists. The application of QR codes was one of the first efforts made in this field.[2] Placed on the buildings, facilities and tourist attractions, QR codes provide quick and effortless access to the website with the appropriate information. Though it seems to be a good answer for the tourists' search for information, it is still the traveller who needs to get to a place and look for more information about the attractions. The development of mobile technology and context-aware applications has opened absolutely new possibilities to communicate with (potential) tourist and to shape marketing strategies.

An important approach to personalise tourism services is based on automatic user localisation.

The current position of a user can be used to specify the user's request and further filter the relevant information. If a tourist is moving in a region, this can be used as a clue to his interests (when he or she visits palaces – he or

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[2]   "Odkoduj Łódź" ("Decode Lodz city") was one of the most spectacular projects of this kind in Poland.

she might be interested in some other historical buildings). Users generate a lot of events when walking around - this can be exploited for the user modelling, to detect and anticipate relevant user interests and to offer him individual tourists context-aware recommendations and services based on his geographical location.

Recognition of different context types seems to be easier than ever: GPSs are appearing in buses and taxis, providing unprecedented volumes of location data. Social networks (like Facebook or Twitter) are collecting information on everything from events to personal tastes and behaviours. Tourism virtual communities (TripAdvisor, SocialTravel) make it easy for people to obtain information, maintain connections, deepen relationships and meet people they would otherwise never have met. The reach and efficiency of online communities enhance the dynamics of social learning processes relative to exchanges that are face-to-face or facilitated by other media (Miller et al., 2009).

A professional system has to include all the digital spaces where the users' context might be available and where new services might be offered. The same way advertising is moving from billboards to interactive, context-sensitive displays. Corrigan and Miller (2011) anticipate that in the nearby future there will be no need to deliberately connect to the Web or an application platform as all manner of devices will follow a user through a typical day, transparently connecting at just the right times to enhance users' willingness to make some orders – whether they are working, playing, traveling, eating or even sleeping. "GPSs, activity monitors, cameras and mobile phones will seamlessly collaborate in providing data about user behaviour, buying preferences, social patterns and work habits, adjusting room temperatures, posting energy consumption data or carbon footprints or issuing reminders to pick up a roast for dinner" (Corrigan and Miller, 2011).

Although tourists were certainly a central consideration in traditional desktop marketing, nowadays the user's context has shifted to a dynamic, mobile setting involving a myriad of interactions with other people (Bradley and Dunlop, 2004). As user centricity moves up the value chain, more organizations are approaching usability as strategy (Schaffer and Weinschenk, 2009). The economy and prevalence of technology are redefining user-centric computing. In the age of mobile applications systems adapt to users, not vice versa.

Research into mobile context-aware computing has uncovered new ways in which to support people in their daily lives. Application areas include tourist guides (e.g. Cheverst et al., 2000) as well as navigation systems for visually

impaired people (e.g. Helal et al., 2001). In order to supply users with digital services that ensure value creation, mobile applications are to be designed as "self-learning systems" and "context-aware systems" (Lau, 2012).

The context types depend on tourists' characteristics and trip scenarios (e.g. visiting places of interest, watching performances, purchasing souvenirs, selecting restaurants). Different kinds of travel scenario generate different information needs which can be then grouped into several context types (e.g. temporal, identity, location, environmental, social). Tan et al. (2009) give some examples of context types concerning the restaurant information needs. In the temporal context they include time of day and time of year as tourists' selection of restaurants depends on whether they are planning for breakfast, lunch or dinner. In the identity context, they include preferences such as preferred price range, preferred transport, preferred portion size, acceptable waiting time and acceptable hygiene level. In the location context, they include nearby available food and route to the nearest restaurant. Finally, tourists may wish to classify what others were eating in the same place and how others rated the restaurant (social context).

Carlsson and Walden (2010) proved that contextual information is important when adapting information to meet tourists' needs, however tourist information needs are to be studied from different perspectives. In the consumer behaviour framework, tourists are seen as decision makers using various information search strategies to support their pre-visit and onsite decisions, such as choice of destination, accommodation, transportation or activities (e.g. Sirakaya and Woodside 2005). In the pre-visit phase information is sought for destination assessment, itinerary planning and logistics (transportation, accommodation); onsite, ad-hoc information is sought on directions, recommendations and activities on location; in the post-visit phase tourists want to recollect views from the trip and share them with others, information is collected to support the storytelling. There are some marketing possibilities at every stage – provided marketers are equipped with context-aware applications.

The idea of the user-centric digital system implies the complete integration of physical space and cyberspace and reaching out to the tourist with possibly wide information they might be interested in. In the digital system, the user should be the centre of an integrated collection of interaction channels. The most successful organizations as well as the most competitive tourism destinations will be those that can leverage such channels not only to engage tourists but also to alter their behaviour and provide them with a value added.

3. The role of context-awareness in a value creation process

Organisations focus on creating value by providing clients with the service they require (i.e. client-perceived value). In the context-aware user-centric systems, this value creation is achieved through a combination of technology-driven processes and human inputs. Kitson (2011) states that everyone involved in the development of a product or service, needs to understand that ultimately his decisions affect the user's experience and perception. These build a transaction environment that allows customers to be the centre of the transaction, helping him design the product features and informing them about new products relevant to them. The client-perceived value is regarded as the fundamental basis for marketing (Parasuraman, 1997), a key strategic variable to help explain repeat purchase behaviour, brand loyalty and commitment (Patterson and Spreng, 1997) and one of the most successful competitive strategies of the 1990s (Ravald and Grönroos, 1996).

Adapting the Maslow's hierarchy of needs Bradley (2010) argues that it is analogous to the user experience (UX). Once the availability and basic support needs are satisfied, users move to an experience that gives them significance (connection, growth or personal contribution). Interaction platforms that can successfully address user needs and emotions promote a viral and addictive effect among their users, resulting in higher user satisfaction rates.

According to Gronroos (2008), customers are not predominantly interested in goods or services but in how these can be used for value creation. Therefore, tourism application designers need to focus on understanding their customers' everyday practices and value-generating processes so that they can assist in customers' value creation. They should not aspire to create value for customers – the focus should be on finding ways to co-create value with customers. This insight is a guiding principle for building mobile value services.

Saracevic (1996), Mizzaro (1997), Albers & Kim (2002) and Setten et al. (2004) have demonstrated that context can be used to measure the relevance of information such that only appropriate information is presented. Delivering the right content for the right context has always been crucial for successful marketing. The adaptation of services and contents to the tourists' personal interests and their current location is pivotal in the process of value creation. Information filtering process is based on a user profile describing his or her interests, abilities and characteristics. For these reasons, applications in different

fields (tourism, medicine, office automation) are designed with context-awareness features (Kjeldskov & Skov, 2004).

Mobile value service for tourists makes it possible to carry out activities that would be either unknown to them or impossible to accomplish without it (Carlsson & Walden, 2010). While getting the right information in the right moment they might change their mind about the specific activities or about their plans for the evening. They might suddenly decide to leave a place or to prolong the stay easily changing reservations for a flight or accommodation. While reading the comments of the social community they might get to know about the place they didn't know about before. They can make comments influencing the others' plans, share photographs and information, acting as the "destination's ambassadors".

Compared to the Internet, mobile technologies promise to offer tourists a new level of freedom to explore various sites and thereby opening the site for new experiences. However, it appears that plenty of mobile services have been launched on the market because they are technically feasible, even when not necessarily wanted by consumers. Grönroos (2008) points the way when he states that value is not created by the provider but rather in the customers' value-generating processes. In other words, mobile services cannot be designed for the tourists to create value for them but possibly in cooperation with tourists – that is why contextual properties are so important.

4. Context-aware applications in tourism

Rasinger et al. (2007) state that mobile tourist guides show potential for supporting tourists when they are in places which are new and unknown for them. Tourists are commonly supported with digital information throughout their travel and in sharing information with fellow travellers (Carlsson et al., 2008). The web-services developed, the advanced mobile networks (3G, Wi-Fi, bluetooth), the mobile handsets and the new generations of data-oriented mobile services are designed to offer information and entertainment to tourists. Location awareness, time sensitivity and personalization are implemented in hand devices, making them ideal for giving travellers a continuous access to interactive and personalized travel information and services. Plenty of tourism applications (Guide, Compass, and Catis) have been designed to be aware of the tourist's loca-

tion and interests. As they are sensitive to a user's context, they are described as context-aware applications.

One could expect that mobile tourist guides would have come a long way since the late 1990s (Abowd et al. 1997) as there has been much talk about them. However, most of the work seems to have stopped at working prototypes. For example, Carlsson and Walden (2010) took on the research task to find out what mobile service value should be and how it was created in cooperation between the service providers and the users (tourists). They built a prototype for a guide services on mobile phones that told the story about the Bomarsund Fortress from six different angles depending on the origin and background knowledge of the tourists.

Several other mobile services can be found on the market: the Travel Buddy service, launched in April 2006, is available for several destinations in Europe. The service provides location-based information to visitors and residents about local activities, events, restaurants, clubs as well as weather forecasts. The service is SMS-based and is operated by sending keywords to get information (good, intuitive keywords as "whatson, kidstuff, mustdo, tours, dining, clubbin, weather"). A visitor to Manchester could access the Travel Buddy service by filling in an online form or by sending an SMS "Manchester" to a mobile phone number.

Grün et al. (2008) worked through four mobile tourist guides: etPlanner is a platform for interactive mobile travel guidance for Innsbrück; Digital Concierge is a personal assistant to offer tourism content for the visitor in Singapore; Berlin Tainment offers a framework for assisting service providers in developing context-aware entertainment services and MobileStuttgart is a mobile city guide developed for the World Cup 2006 in Germany. Similar application (Polish Guide) was developed for the 2012 UEFA European Championship in Poland. The Polish Ministry of Foreign Affairs has launched a special application "Check-in Poland", which helps to look for other foreigners and communicate with them.

There are also some older systems, such as Guide (Cheverst et al. 2000), Crumpet (Poslad et al. 2001), m-ToGuide and Compass (Setten et al. 2004) which use GPS to give the tourist suggestions and recommendations and to offer guidance based on the context. The more advanced ones develop location-based services to give tourists up-to-date and context-aware information about a city (the information is based on the user's current physical location, his/her past behaviour and personal preferences). Many applications of Geographical

Information Systems (GIS) for tourism have been developed in order to allow access to regional information through the Internet. For instance, the Deep Map WebGIS integrates services and information for the city of Heidelberg (Malaka and Zipf, 2000).

More recently research projects have started to focus on the standardised, flexible dissemination of (high volume) geographic data on wireless networks for nomadic applications. This geographical information is a pivotal feature for tourism applications as tourists want their individualised information on site with details on topics such as traffic, weather, sights, availability of services, navigation aid, historical and economic background.

Pospischil et al. (2002) analyse another mobile guide – Local Location Assistant (LoL@), which uses GPS to show tourist locations and information about important tourist sites in Vienna on a map with route planning and multimedia interaction. An innovative m-ToGuide supports recording of experiences with text and snapshots for after-tour personal diaries.

In Poland the Local Tourism Organisation of "The Land of Loess Gorges" (LOT "Kraina Lessowych Wąwozów") has launched the mobile guide (for mobile phones or special devices which can be borrowed at Tourist Information Points) pointing the most interesting tourism attractions and suggesting the most interesting routes, places to stop for a snack or dinner, accommodation etc., so that the visitors get to know about any opportunities to have an attractive trip and not to miss any interesting event. The application allows tourist to plan an individual travel route. Tourist attractions are described in detail (an audio text is read by Tomasz Knapik, the well-known Polish voice-over speaker). The application – however context-aware – supports only two context types (time and location). Actually there are much more tourists' information needs and problems they encounter during their trips.

5. Main obstacles for the adoption of user-centric digital system in tourism

The process of user-centric digital system design should start with the identification of the most valuable contextual information which is to be extracted from the research on tourists information needs. The contextual information helps to validate and extend the list of context types and context properties which are to be inserted in the application so that it can support tourists' informa-

tion needs. However it is difficult to identify the context types necessary for context-aware applications as there is no standard set of context types designated for applications in each field (Kaasinen, 2003). Christensen et al. (2006) state that gathering more contextual information will not necessarily help application meet users' needs. The key lies in how to adopt the appropriate context types and interpret and use them in the applications.

As stated before, majority of tourism applications are limited to the time and location context. Few of them take into account social and environmental contexts. Travelling companions constitute a property supported only by some applications: e.g. Guide and Compass incorporate features indicating people near the tourists. The design allows tourists to prompt these people for comments and ratings of the places of interest (Cheverst et al., 2002). For example, a tourist can prompt another person located at a nearby cafe for comments. The comments given would be ranked by the relevancy, such as travelling companions with the assumption that those travelling with young children would appreciate comments from tourists with similar travel companions. Plenty of tourists make decisions by considering what others do, as people have a social urge to join in with others.

Future work should thus include refining the contextual information framework and exploring ways to fill the gaps of existing mobile tourism applications. The research should be done on the focus groups basis through participants with travelling experience, analysing contextual information based on specific tourist profiles (complying tourists' information needs by gender, age group and type of travel: leisure or business) and focusing on using social contextual data to filter information. Developing location based services for tourism in mobile apps necessitates management of large volumes of geographical data in order to allow for a broad range of functions on geo-objects for multiple clients.

Bradley and Dunlop (2004) claim that research into computing has not sufficiently addressed human and social aspects of design. Existing design frameworks are predominantly software orientated, make little use of cross-disciplinary work, and do not provide an easily transferable structure for cross-application of design principles. There is still little understanding of the user's role and place in the new digital system.

One major problem in user modelling is the acquisition of knowledge about the user and the lack of proper research in this field. How can the system determine what the interests of a certain user are? It can either ask the user

for such interests (explicit feedback) or it can observe the user's system usage (implicit feedback) and infer certain interests. The latter method is inexact but does not disturb the user. Explicitly asking the user would be more precise but it disrupts his current task, may be time-consuming and annoying. Many users are unwilling to fill in forms and here again the small displays for mobile devices are a restriction. Therefore, user model acquisition should mainly rely on implicit feedback.

One more reason why tourism destinations and enterprises do not use the concept of context-aware application is that many tourism leaders fail to grasp how user-centric design can help them achieve their promotional objectives or how they can integrate it into their existing marketing strategy. Late user-interface design, conflicting user feedback and incorrectly measuring user analytics can easily weaken a potentially successful user-experience project.

Another obstacle is a low level of information literacy among tourism marketers and the high cost of technological design as well as the need to promote an application itself.

Conclusion

Mobile devices are a communication medium that keeps people connected at any place, wherever they go and any time. Therefore, it is accounted as the most effective tool of direct marketing, while wireless marketing involves reaching and servicing customers and developing relationships with them through premium services. Furthermore, the total user's experience cannot be provided by the mobile Internet itself, "the representation of the physical world" in the wireless devices, but rather within the mobile marketplace in which different kinds of transactions take place: communication services, obtaining valuable and personalised information and wireless purchase. The mobile marketplace covers three dimensions: 1) personalisation according to local position of the holder and the relevance of information to his preferences, 2) localisation through the local based services and 3) immediacy (Germanakos et al., 2008), thus providing users with a value added.

The proper personalisation of mobile information services needs a new way of thinking about the users' role in a digital system: the pivotal characteristics of the system are users' centricity and context-awareness as they enable forming

a unique user experience, unobtainable in any other way. Despite some obstacles this is the only way of modern tourism marketing and the core of nowadays promotional strategies.

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TWORZENIE WARTOŚCI DODANEJ W TURYSTYCE W OPARCIU O KONTEKSTUALNY SYSTEM CYFROWY ZORIENTOWANY NA UŻYTKOWNIKA

Streszczenie

Celem opracowania jest prezentacja koncepcji kontekstualnego ekosystemu cyfrowego zorientowanego na użytkownika oraz uzasadnienie zastosowania tej koncepcji w procesie tworzenia wartości dodanej w turystyce. W artykule przedstawiono pojęcie, cechy i znaczenie kontekstowych aplikacji mobilnych w perspektywie ich zdolności dostarczania wartości dodanej. Następnie dokonano przeglądu wybranych aplikacji turystycznych o różnym stopniu zdolności rozpoznawania kontekstu i dostarczania adekwatnej informacji użytkownikom (turystom). Artykuł oparto na analizie literatury przedmiotu i wyników dotychczasowych badań oraz na przeglądzie praktycznych przykładów zastosowania mobilnych aplikacji kontekstualnych w turystyce.

Słowa kluczowe: system kontekstualny, aplikacje mobilne w turystyce, turystyka cyfrowa, wartość dodana w turystyce