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Abstract
The rapid growth in the use of smart phones and respective mobile applications has created new ways for the tourism industry to connect with their visitors while travelling. This paper proposes a taxonomy of mobile apps in tourism from two perspectives: a taxonomy on what services travel-related apps provide to the user and a taxonomy based on the level of customization the user has with the mobile application. The taxonomies provide insights into app development trends as well as gaps in the mobile app landscape. Understanding the opportunities currently provided by apps is also critical from a marketing perspective.

Keywords
taxonomy, mobile, applications, tourism

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A Taxonomy of Mobile Applications for Tourism

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Abstract

The rapid growth in the use of smart phones and respective mobile applications has created new ways for the tourism industry to connect with their visitors while travelling. This paper proposes a taxonomy of mobile apps in tourism from two perspectives: a taxonomy on what services travel-related apps provide to the user and a taxonomy based on the level of interactivity the user has with the mobile application. The taxonomies provide insights into app development trends as well as gaps in the mobile app landscape. Understanding the opportunities currently provided by apps is also critical from a marketing perspective.

Keywords: travel; mobile applications; taxonomy; mobile marketing; app design.

1 Introduction

The growing use of smart phones is driving the mobile applications (apps) market to be one of the fastest-growing media outlets in the history of consumer technology (Newark-French, 2011). Within the mobile apps business, travel apps are the seventh most popular category of apps being downloaded (Mickaiel, 2011). According to TripAdvisor, 60 percent of smart phone users have downloaded travel apps and of those individuals, 45 percent plan to use the apps for travel planning and research (Mickaiel, 2011). Furthermore, 55 percent of travel apps are purchased within 3 days of travel or while travellers are at the destination (Mickaiel, 2011), which helps demonstrate how important mobile apps are in influencing en route decision-making. With tourism apps being so popular, it is important for the tourism industry as well as mobile technology developers to have a firm understanding of the landscape of mobile apps that are on the market and to see what may be lacking. It is also important from a theoretical perspective to examine whether apps can be classified using dimensions typically seen as drivers of technology use experiences. Therefore, this paper aims at classifying travel-related apps by determining how the apps relate or do not relate to each other according to criteria derived from theoretical concepts.

2 Background

Taxonomies are classification systems that serve as conceptual frameworks for understanding differences and similarities in the objects that were classified. Taxonomies are well recognized in the field of information services and provide a foundation in establishing a common language under which objects can be defined and explored (Nickerson, Muntermann, Varshney, & Isaac, 2009). Although there

have been a few attempts to create taxonomies for mobile apps (Dombroviak & Ramnath, 2007; Heinonen & Pura, 2006; Nickerson, et al., 2009), there has not been a taxonomy created specifically for travel-related apps using classification criteria of relevance to this specific context. Heinonen and Pura (2006) developed a taxonomy of mobile apps from a customer centric perspective and used type of consumption, context, social settings, and relationship as the aspects of categorization. Dombriviak and Ramnath (2007) researched mobile and pervasive computer apps and created a taxonomy based on app characteristics. Nickerson et al. (2009) developed a taxonomy of mobile apps based on the meta-characteristic of the interaction between the user and the mobile app. Lehmann and Lehner (2002) looked at the previous taxonomies and were critical of the recent approaches, suggesting that fundamental conceptual models regarding the nature and relationships of mobile apps should be established. For this paper, two theoretical perspectives were identified as important dimensions of mobile travel apps. The first uses a customer-centric value chain perspective to classify apps according to the services provided. It is thus a functional perspective focused on the value added that can be derived from using these apps. The second uses interactivity as the classification criterion and therefore adopts an interactional perspective. Interactivity was defined as extent of user control over various aspects of the app such as content, display format, etc.

3 Research Approach

Only those apps available prior to July 2011 were included in the research. Some of the most popular apps listed by travellers are not travel applications at all (Murdock, 2011), for instance Google Maps, Facebook, Twitter, and Skype. We took into account apps that are specifically targeted to travellers as well as those used in a typical travel context. We used a phenetic approach for building the taxonomy, meaning we looked at the characteristics of the apps and grouped like items together (Nickerson, et al., 2009). The process began with gathering lists of tourism apps and included searches on the smart phone platform websites iTunes and android market. As the apps were analyzed, a list of categories was created and expanded if new categories or sub-categories emerged. Where possible, the app was downloaded and used so that its capabilities could be understood from a user perspective. In cases where the app was not available to download, the general description of the app was used to judge the capabilities and the level of interactivity. Once the taxonomy of tourism apps was compiled, each app was evaluated according to the established criteria. It is important to note that some apps are not exclusively in one category because of the complexity of the app.

4 Taxonomy of Services Provided

In analyzing the travel-related apps from a value chain perspective, 7 categories emerged: Navigation, Social, Mobile Marketing, Security/Emergency, Transactional, Entertainment, and Information (Figure 1). Apps under the navigation category help visitors find their way around the area. The sub-categories under navigation include Global Positioning System (GPS), augmented reality, and way finding. The social

category includes apps with a sharing, collaboration, communication or social component. Probably the most obvious of these would be social media outlets where people share their photos, thoughts, and recommendations. The social category also includes methods of communication, like texting and skype.

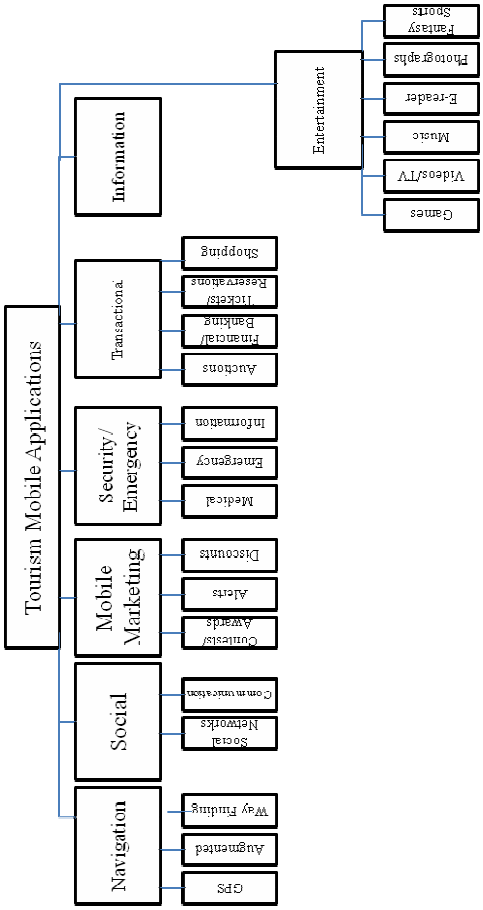

Fig. 1. Tourism Mobile Applications by Service Provided

Mobile marketing apps are used to receive marketing messages, such as text messages for coupons, contests, etc. Security and emergency apps include emergency locator services, health monitoring, weather alerts, etc. The subcategories in this section include medical reporting, emergency services and emergency information. Transactional apps involve a transaction of some sort, although there does not have to be a money exchange. The different kinds of transactional apps are auctions, financial/banking, tickets/reservations, and shopping. Entertainment apps provide entertainment options like games, movies, e-readers, etc. While some of these may

not directly involve tourism apps, they are apps that could be used while on vacation and participating in tourism events. Entertainment is separated into categories of games, videos/television, music, e-reader, photographs/editing, and fantasy sports. The information classification contains apps that give guests a variety of information related to tourism. This category contains a vast array of information sources, from a general information search to self guided tours without GPS, event schedules, translator/conversion apps, etc.

Interactivity Type	Level of user interactivity	Sub-categories	Description	Example
Preferences	Medium	Medical	Local pharmacies, clinics, medicine reminders, advice, medical tourism	MediApp Korea
		Personal Taste	Translation, Unit converters, style of travel	Visit England
		Purchase	Area coupons/discounts	Living Social, Tourism Auction
		Health	Exercise tracking, pedometer	
Location Sensitive	Medium	Aug Reality	Camera Phone point & click	Discover Hong Kong
		Market Alerts	Local Text alerts	NYC in the Pocket
		Mapping	Finding	Easy Park, Near me Now
		RFID Tagging	Tags on Exhibits with further info	Xenagos
Security	Medium	Data Retrieval	Push/Pull	Email
		Access to Info	User choses public/private profile information	Social Networks
Control through Web	Medium		Frequent flier programs, e-books, e-banking, itinerary compilation	TripIt
Content Added	Low		Travel logs, blogs, medical diary, photography storage and editing	My Travel Log, Mosaic, Photopedia Heritage
Aesthetics	Low	Non-Gaming	Changing the appearance of the application to fit the users personal preferences for style, color, etc	
		Gaming		Grinwalk
Same for all	None		Navigation, texts, mapping, event schedules, weather, video	Weather Zone, Text plus

Fig.2. A Taxonomy according to the level of user interactivity

5 Taxonomy According to Level of User Interactivity

The taxonomy for user interactivity involves seven main areas, namely personal preferences, location, security, through the web, content addition, aesthetic changes,

and finally those applications that remain the same for everyone (Figure 2). The apps that reside in the same for all category are those apps that offer no interaction. Aesthetics deals with changes in the look and feel of the app, through colour choices, layouts, etc. Content added apps change as content is added to them. These types of apps include travel logs, blogs, social media, and photo sharing. There are many apps that offer interaction but are limited or not changeable through the actual mobile device app. Rather, they require the user to interact through a webpage. Security refers to the control of who can see the user's information. In the case of mobile apps, the common areas of security are control of the data retrieval and access to personal information. The apps in the location sensitive category give the user the opportunity to interact with the app by changing location information. These apps sometimes have a GPS component to them. The areas within this classification are augmented reality, marketing alerts, radio frequency identification (RFID) tagging, and mapping. The preferences section of this taxonomy covers a broad area of personal preferences that can be changed, with medical, personal taste, purchase, and activity being sub-categories defined based on the types of preferences catered to.

6 Discussion

While these taxonomies are extensive and provide a guideline for further classification of tourism apps, they may not be totally inclusive. The most important characteristic of a taxonomy is to be extendible (Nickerson, et al., 2009). This is also important in light of the rapid development of new apps. Because they are built on theoretical considerations rather than empirical data, this is the case for both taxonomies. The two taxonomies clearly illustrate the diversity of travel-related apps. However, while applications were found for each category and sub-category, some categories are very sparsely populated, suggesting there is room for development.

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