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DEVELOPING A USER-CONSUMER TYPOLOGY IN THE CONTEXT OF LOCATION BASED MOBILE SERVICES: A MULTIDISCIPLINARY RESEARCH APPROACH

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Abstract

Location Based Services (LBS) constitute an alternative retail channel with extended capabilities. Available research, however, does not provide any theoretical framework and empirical evidence on the factors that comprise a LBS environment and on the criteria mobile users-consumers use in order to select a specific LBS application. The present paper adopts a multidisciplinary research approach and develops an integrated theoretical framework that incorporates all the environmental determinants of LBS applications (i.e. physical, social and digital environment, device and connection). Then, it provides a user-consumer typology based on the importance users-consumers attach on each of the environmental determinants during their decision making process regarding the selection of a particular LBS application in the context of the entertainment industry. To that end, a laboratory LBS application was developed and served as the research instrument employed by a laboratory experimental design. Analytical descriptions of the two resulting clusters along with the predictor variables (i.e. physical and social environment) that best discriminate the two users' groups are provided. Straightforward managerial implications and future research directions are provided at the end.

Keywords: Mobile User-Consumer Typology, Location Based Services, Environmental Determinants

1 INTRODUCTION

The penetration of Location Based Services (LBS) in the B2C relationships along with the emergence of the Multichannel Retailing phenomenon provides several research opportunities and business challenges. Love (2005) reports that LBS will provide over 40% of the B2C revenues by 2009 in the mobile business industry. The fact is, however, that current research on this fast evolving field adopts a more Information Systems rather a multidisciplinary research approach.

Despite the fact that several authors (e.g. Nakanishi et al., 2004) categorize an LBS application in the Information Services category, from a retailing perspective, LBS is a type of retailing in which the retailer and the customer communicate through an interactive location-based mobile network (Levy and Weitz 2001). The extended customization capabilities that LBS could potentially offer provide a challenging research opportunity to explore potential differences between users-consumers in order to manipulate the environmental determinants of a LBS application accordingly and meet different needs and preferences effectively (Koutsiouris et al. 2007). Similarly, Lee et al. (2009) strongly encourage further research in LBS towards identifying the factors that negatively affect consumer adoption of such services.

Thus, there is a need to define the determinants that comprise the environment through which these services are offered to consumers-users similarly to the available research both in conventional retailing formats and on the web. To that end, the present research aims to develop an integrated theoretical framework that includes all these determinants incorporating, however, all the peculiarities of the mobile business environment as well as a multidisciplinary research approach. Based on this framework this study aims to develop a user-consumer typology according to the importance consumers attach on each of the theoretical model's determinants when they select to use a particular LBS application.

The paper is structured as follows. Section 2 presents the literature review and the specific research objectives of the present study. Specifically, this paper employs literature from Information Systems (Human Computer Interaction, Electronic Commerce), Marketing (Retailing, Consumer Behavior) and

Environmental Psychology (Spatial Environmental Interfaces). Then, section 3 presents the research design hypotheses and methodology, while section 4 includes the analysis of the results and the corresponding user-consumer typology along with a detailed description of each resulting segment (i.e. cluster). Section 4 also includes a discussion on the predictor variables that seem to best discriminate the resulting segments. Finally, section 5 summarizes the main conclusions of the study along with some direct managerial implications and future research perspectives.

2 LITERATURE REVIEW

2.1 LBS Environmental Determinants

There are several variables that affect user interaction with a mobile system. According to Vrechopoulos et al. (2003) the *mobile device*, the *connection* (e.g. good coverage) and the graphical user *interface* are some of the most important criteria consumers use in order to select a particular mobile operator and a mobile service. Along these lines, while mobile device and connection are labeled as *technological environmental elements*, the mobile interface is labeled as the *digital environment* through which users interact with the LBS mobile application.

Similarly, Bitner (1992) notes that the service environment (LBS are actually a service) effectiveness and performance is strongly affected by the spatial layout of the store that provides this service. Similarly, but from an environmental psychology perspective, Charitos (2007) report that the users' *spatial location* constitutes one important parameter that should be investigated in depth since it affects the interaction process between people and mobile interfaces as well as their perceived experiences when using these applications or environmental interfaces. Furthermore, Tombs and Kennedy (2003) added the social aspect component reporting that this factor also affects consumer behavior in the services industry. Specifically, they added the *social density* and *displayed emotions of others* as two important determinants of a service environment. These variables (i.e. *physical* and *social* ones) while they are not applicable on the web retailing context (at least in the manner discussed herein for a LBS application) they are extremely important in the mobile business one where people "consume" services mainly in the physical context (e.g. on the move) and not in their office. In other words, these factors should be considered as environmental ones in the sense that they affect user-consumer behavior against a consumer service. In sum, spatial location is labeled as the *physical environment* while social density and displayed emotions of others as the *social one*. However, both physical and social environments belong to the *real environment* of a LBS mobile application.
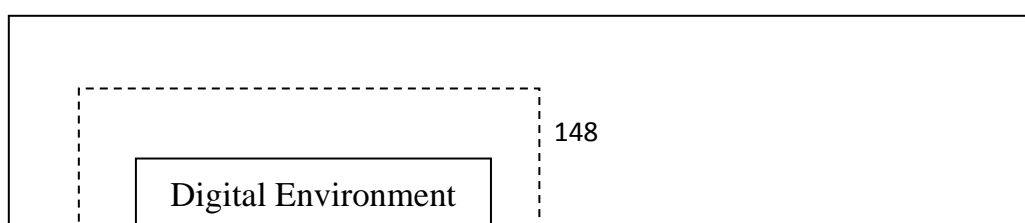
148

Digital Environment

Figure 1: *LBS Environmental Determinants' Effects on User-Consumer Decision Making Process for the Selection of a LBS Application*

Elaborating on the aforementioned discussion, Figure 1 presents all the determinants that comprise the environment of a location based mobile application as provided through a multidisciplinary research approach. Furthermore, there is strong evidence that all these factors seem to potentially affect user-consumer decision making process in terms of selecting a LBS application.

2.2   Mobile Users-Consumers' Typologies

Love (2005) and Chen (2000) underline the importance of studying consumer behavior when designing mobile services. In other words, they support that the effectiveness of these services is greatly affected by the users' requirements capturing phase of these projects. They also note that since users obtain different characteristics there is need to thoroughly investigate different behaviors and adjust the corresponding offering (i.e. the mobile service, the integrated marketing communication activities) accordingly. To that end, a direct research need is to develop typologies of mobile users in order to be able to effectively adjust (i.e. customize) the location based mobile services offering according to the environmental determinants predicting power and meet the needs and desires of different customers in a tailored manner.

Classifying objects through the development of corresponding typologies has been widely adopted both by conventional and electronic retailing in the past. Indicatively, Jarratt (1996) developed a typology according to the consumers' attached importance on a series of motivational factors that comprise the service environment in the context of conventional retailing. Similarly, Anderson et al. (1976) clustered customers in the banking sector based on the importance consumers attach on bank selection criteria

(i.e. features), while Myers and Nicosia (1968) provided a typology of supermarket customers employing only image related variables.

As far as web and mobile retailing is concerned, relevant research is quite limited. Indicatively, Laukkanen (2007 and 2008) classified customers that use mobile parking services based on the importance they attach on specific features related to this channel. Similarly, Mcgoldrick and Collins (2007) developed a consumer typology based on psychographic and behavioral data of shoppers using multiple channels to conduct purchases, while McKinney (2004) studied shopping behavior in the context of e-tailing and classified consumers according to their shopping orientation. Along these lines, Vrechopoulos et al. (2001) note that there are significant differences between different online consumer clusters in terms of the criteria they use in order to select an online store to buy products or services.

3   RESEARCH DESIGN, HYPOTHESES AND METHODOLOGY

For the scope of the present study an experimental LBS application was developed in the laboratory. The application provides services in the entertainment business in the form of an electronic guide that supports information search purposes and e-commerce transactions in this industry. Specifically, users can set their criteria and the system provides personalized service recommendations according to their profiles and the specific locations they have during their navigation within the physical environment (e.g. city center). For example, users can set their music or taste preferences to the system in order to receive personalized information (i.e. restaurants, clubs, concerts, etc.). The system's recommendation to the users in based not only on their preferences and profiles but also on their location. Finally, it should be noted that this particular application was developed within the context of a research project as thoroughly described at the Acknowledgements section at the end of the paper.

The sample comprises 110 subjects that were asked to use the application within the context of a laboratory experiment that took place during April 2009 at the University of +++++++. Specifically, subjects were asked to use this application in the city center and then fill out a questionnaire in order to evaluate this particular application. They were also asked to provide information through a Likert scale (1-5) regarding the importance they attach on each of the LBS environmental determinants (i.e. those included in the theoretical model discussed previously). Each experiment lasted for approximately 2 hours.

Cluster analysis and Multiple Discriminant Analysis (MDA) through SPSS were employed in order to develop clusters of users-consumers and provide information about which LBS environmental variables discriminate the resulting groups, respectively. Specifically, according to Coakes and Steed (1999, p. 243) "cluster analysis is widely used in psychological and business research … as a way of understanding complex domains by allowing researchers to cluster elements into homogeneous groups….In essence it produces typologies of items or elements". Similarly (p.243), they note that MDA is a suitable technique for finding which of a set of predictor variables best discriminates between two or more groups and it is differentiated from techniques such as ANOVA and MANOVA which look at how groups differ. The research design of the present study is thoroughly depicted in Figure 2.

Figure 2: The Research Design

Elaborating on the aforementioned discussion the following research hypotheses are formulated.

H1: *There are different clusters of mobile users-consumers classified according to the importance users-consumers attach on the environmental determinants of a LBS application.*

H2: *Physical, Social and Digital Environmental Determinants along with Device and Connection ones discriminate between LBS mobile users-consumers clusters that have been derived through the importance users-consumers attach on these LBS environmental determinants.*

Finally, for the operationalization of the selected environmental determinants we employed for the *social* environmental determinant the Machleit et al. (1994) *social density* construct and Mayer et al. (1998) *displaying emotions of others* one. For the *device* and *connection* we employed Roto (2006) corresponding factors and for the *digital e*nvironmental determinant Lee and Benbasat (2004) 7Cs factor. Finally, as far as the spatial location (i.e. *physical* environment) is concerned it should be clarified that the experiment was actually conducted in the city center. Therefore, users were asked to evaluate the importance they attach on this dimension when selecting to use a LBS application having in mind that such an application could be potentially used everywhere (e.g. city center, park, in a car, in a restaurant, etc.).

4   ANALYSIS OF RESULTS

The results indicate that two (2) clusters of user-consumers are formulated (Table 1). In both clusters we have 55 cases (i.e. subjects). We interpret the agglomeration schedule in order to provide information about the homogeneity of the clusters being combined at each stage and make a choice about the best cluster solution. Specifically, according to Diekhoff (1992) the point at which the distance (i.e. coefficient value) shows a sudden large increase is from stage 108 to 109 (coefficient increases from 6,108 to 8,211). This strongly supports the selection of a two cluster solution. This finding is also confirmed by reviewing the dendrogram output (there are two cluster separated by considerable distance). Furthermore, the classification results table indicates that 100% (55 cases) are correctly classified to cluster #1 and 100% (55 cases) were correctly classified to cluster #2.

Then, in order to interpret whether these clusters are reliably different and in what way do these clusters differ (i.e. whether there are significant differences between the clusters on each of the descriptor variables). According to Coakes and Steed (1999) the best alternative to do this is through Multiple Discriminant Analysis (MDA).

Clusters	Clusters' Label	Predictor Variables	Clusters' Description
Cluster #1		Physical Environment (i.e. location)

Social Environment | These users-consumers attach significant importance to physical and social environmental determinants when they select to use a LBS application |
| Cluster #2 | | | These users-consumers do not attach significant importance to physical and social environmental determinants when they select to use a LBS application |

Table 1: The Resulting Clusters and the Predictor Variables

There are not any violations on the MDA assumptions. According to Tabachnick and Fidell (1996) robustness is expected when there are least twenty (20) cases in the smallest cluster and a small number or predictor variables. Also, Box's M is not significant (p>.001), thus the assumption of homogeneity of variance-covariance matrices has not been violated. Finally, the within groups correlation matrix shows that the correlations between variables are low.

The results of MDA indicate that the two clusters are significantly discriminated by the following two predictor variables: (1) physical environment (i.e. location) and (2) social environment. Specifically, as far as the means of these predictor variables are concerned, it is observed that for cluster #1 subjects provide an average of 4,34 (in an 1-5 likert scale) for the *physical environment* predictor variable compared to 2,16 corresponding average provided for the same variable by subjects classified in cluster #2. Regarding *social environment*, respondents classified in cluster #1 provide an average score of 3,44 compared to the average score of 2,95 provided by participants classified in cluster #2.

Interpreting the aforementioned results we can conclude that subjects classified in cluster #1 attach significantly more importance to the social environment and the physical (i.e. location) one when they make their choice and select to use a particular location based services mobile application. This implies that users of cluster #1 are more sensitive to social influences (i.e. social density and displayed emotions of others) when using a LBS application. In other words, their performance on using this application is affected by the social factor. On the other hand, cluster's #2 respondents seem to be unaffected by the social environment or they are even apathetic when they use such applications. They seem to not be affected by crowding situations or by the emotions other people near them express during the usage of the LBS application. Along these lines, respondents grouped in cluster #1 seem to place emphasis on the place/location in which they use this application. Combing this finding with the social dimension one, we can conclude that these respondents seem to be affected by the *real environment* (i.e. *physical* and *social*) implying that there are sensitive to and affected by crowding and social activity indexes. In other words, these LBS environmental dimensions seem to play an important role in their decision process regarding whether to use or not such an application. For example, they may not prefer to use a LBS application in the city center (e.g. in front of an underground station) but rather in a quiet place (e.g. in a park, in a quiet road) where usually crowding is low and people being there are relaxed and happy. In addition, these findings could be probably explained by the familiarity that respondents classified in the two clusters have in using innovative technological applications. This may imply that cluster's #2 respondents are more familiar with technology and therefore they can easily use a LBS application in order to accomplish their goals, everywhere and anytime, regardless of whether the real environment is suitable and friendly.

As far as the remaining variables are concerned, both clusters provided higher than the average scores. Specifically, for the *digital environment* (i.e. mobile interface), cluster #1 scored 3,84 and cluster #2 3,87, for the *device* one cluster #1 scored 4,28 and cluster #2 4,26 and finally for the *connection* one cluster #1 scored 4,36 and cluster #2 4,27. All these imply that both clusters attach great importance to the device and the connection determinants while they attach a higher than the average importance on the graphical user interface design dimension.

Therefore, regarding H1 and H2 we can reject the corresponding null hypotheses for H1. However, for H2 we can reject only the null hypotheses as far as the *physical* (i.e. location) and the *social* environment variables are concerned. In sum, elaborating on the findings and the discussion, cluster #1 is labeled *"real environment-sensitive LBS mobile users"*, while cluster #2 is labeled *"ubiquitous LBS mobile surfers"*.

The short description of the resulting clusters along with the predictor variables that best discriminate these groups are displayed in Table 1.

5   CONCLUSIONS AND RECOMMENDATIONS

The present study develops through a multidisciplinary research approach an integrated and robust theoretical framework incorporating all the potential factors that comprise the environment through which a mobile user-consumer interacts with a location based mobile service. The added value of this research relies on the involvement of different but relevant to the research topic disciplines towards providing an integrated view of the factors that affect consumer decision making process in terms of selecting and using a particular LBS application. Furthermore, the present study introduces a classification scheme (i.e. typology) of mobile users-consumers that contribute both to theory development as well as to the provision of direct managerial implications.

Specifically, managerial implications provided through this study reflect the increasing importance of tailoring consumer services offered by interactive electronic channels through the effective manipulation of the appropriate environmental determinants that comprise a LBS mobile application. This implies that managers could exploit the typology and the corresponding classification discussed herein towards designing customized offerings to meet different mobile consumer needs and behaviors.

To that end they can use the descriptions provided for each cluster as well as the relevant information regarding the dimensions (i.e. predictor variables) that predict the differences between the resulting consumer groups. For example, since spatial location proved to be such a variable, this implies that for those customers that spatial location is an important LBS selection criterion (e.g. they do not prefer to receive personalized messages while they in a crowded place) LBS providers should take this information into account when designing their promotional strategy for this particular customer. In sum, armed with the knowledge provided by the present research attempt, managers can design effective integrated marketing communication initiatives.

Future research should further elaborate on measuring potential differences between the resulting segments/clusters in terms of their psychographic, behavioral and demographic characteristics. Furthermore, further research should investigate the predicting power of the model's environmental determinants on the overall attitude towards LBS services. Finally, future research should place emphasis on designing and executing causal research designs through manipulating one or more of the LBS environmental determinants and measuring the corresponding effects on users-consumers' behaviors.

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