PHD

Use of multimedia services within ubiquitous environments: The role of place in the usage process of mobile data services

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Award date:
2009

Awarding institution:
University of Bath

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A thesis submitted for the degree of Doctor of Philosophy

University of Bath
School of Management

May 2009

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Acknowledgements

Many people supported me in many different ways during the years I struggled through this Ph.D. process. First of all, I must acknowledge the help and guidance I received from my supervisors Prof. Joe Nandhakumar and Dr Gamila Shoib and I wholeheartedly thank them for their invaluable knowledge, support, and all the great opportunities they gave me to gain academic experience. I also like to thank my supervisor Dr Adam Joinson for managing the process of getting this PhD done. It was a truly great experience to work with them all.

I also want to express my gratitude to everybody in that fantastic place that is the Bath University, particularly to those who made this project possible, thus allowing me to complete this work. I particularly want to thank Chris Barnes for supporting me in many practical ways. Thanks for all your work and support.

Constructive discussions that I had with Dr. Niki Panteli, Dr. Nancy Pouloudi and the PhD students Xiaofeng Wang and Ioannis Ignatiadis helped me to learn useful insights on the PhD process and to source relevant literature, as well as providing me with plenty of moral support.

To my wonderful life partner Helen Z. goes all my gratitude for her patience, understanding and her invaluable help she has given me so many times introducing me to the many faces of qualitative research.

Finally, I must acknowledge the never-ceasing encouragement and support I received all the way through from my family and my friends and especially from Telwnis T. that made this dissertation possible. Thanks to you all from the bottom of my heart.

Abstract

Recently, there have been rapid developments in the fields of mobile and wireless technologies which have enabled the acquisition of information at anytime regardless of the location and mobility status of the users. However, despite the increasing popularity of mobile devices which are becoming an indispensable part of our everyday activities, the disappointing results regarding the adoption and use of mobile applications and data services lead scholars to question the understanding of the adoption and usage behaviour within these new wireless environments.

The author believes that there could be attributes which are still unexplored and could provide an explanation why the mobile data services are still unsuccessful. The aim of this study is to explore, understand and highlight the role of place in the decision of the people to use mobile data services and thus to assist professionals and scholars to consider the importance of the attributes of place in the design of new applications and in the adoption and usage models of mobile technologies and services.

In order to achieve this objective an exploratory in nature research was conducted combining conventional and innovative research methodologies. A model of place was generated which served as a sensitizing device in order to interpret, and analyse the collected data. The first phase of this research involved the understanding of the market in question and the selection of the appropriate case (mobile data services platform) to conduct the research. The second main phase of the research then sought to get a better understanding of how users experience place before deciding to use mobile data services. The research methods were applied within everyday settings with 30 users of the selected mobile data services platform, all of whom were selected according to specific criteria.

The findings tend to suggest that participants did experience the different places in a similar way before deciding to use mobile data services.

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Abbreviations

ABM	Agent Based Models
ATM	Automated teller machine
CCTV	Closed-circuit television
CFG	Customer Focus Group
CRM	Customer relationship management
E-Commerce	Electronic Commerce
EHR	Electronic Health Record
Email	Electronic mail
ESM	Experience Sampling Method
GUI	Graphical User Interface
GPRS	General Packet Radio Service
HTTP	Hypertext Transfer Protocol
IE7	Internet Explorer 7
ICT	Information Communication Technologies
IS	Information Systems
IT	Information Technology
LBS	Location-Based Services
M-Business	Mobile-Business
M-commerce	Mobile -Commerce
M-health	Mobile-Health
MIM	Mobile Instant Messaging
MIT	Massachusetts Institute of Technology
M-learning	Mobile-Learning
MMC	Multi-Media Card
MMS	Multimedia Messaging Service
MSN	Microsoft Network (Instant Messaging Service)
M2M	Machine to Machine
PC	Personal Computer
PDA	Personal Digital Assistant
R&D	Research and Development
RAD	Rapid Application Development
SMS	Short Message Service
TAM	Technology Acceptance Model
TAP	Time Affordance Period
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTU	Time to Use
TV	Television
UM	Unified messaging
UTAUT	Unified Theory of Acceptance & Use of Technology
WAP	Wireless Application Protocol
WIS	Web-based Information System
WIFI	Trade name for a popular wireless technology
WIMAX	Worldwide Interoperability for Microwave Access
WAP	Wireless Application Protocol
WLAN	Wireless Local Area Network
3G	3rd Generation

1. Introduction

This chapter introduces the background of this study. In section 1.1, the latest technology advancements which offer applications and services rich in context and information and are accessible at any time and place (ubiquitous access) via broadband wireless and terrestrial networks are briefly presented. In section 1.2 the research problem and the limitations of the previous studies and attempts in the field of usage behavior of mobile technologies and services is reviewed and the research objectives of this study are set. An overview of the research methodology adopted for the approach of the research questions - were posed in section 1.4 - is presented in Section 1.3. This study is qualitative in nature and I try to identify and highlight how users experience their environment before deciding to use mobile data services when they are in motion within different places. Furthermore the findings of the study try to highlight the aspects pertaining to the adoption and use process that are related to mobile data services' users. Finally, section 1.5 is a summary of the contributions of this study to the relevant theory and practice while in section 1.6 the outline of this thesis is presented.

1.1. Background to the study

Recently, there has been a dramatic change in the way advances in information and communication technologies have enabled unprecedented access to information enhancing thus the ability to communicate with little regard to geographic location. These rapid developments in processing and wireless technologies, have allowed pervasiveness as well as mobility and introduced new environments termed as ubiquitous information environments, pave the way for the arrival of the Ubiquitous Information Society[1]. The main characteristics of these ubiquitous environments are the capability to acquire information at anytime regardless of the location and mobility status of the users[2].

1.1.1. The technological environment

Ubiquitous environments are characterized by miniaturization of systems, the anywhere/anything/anytime connectivity, embedding of intelligence into consumer electronics (ambient intelligence) and the convergence of technologies (Lyytinen & Yoo, 2002). The feature of the convergence of technologies has brought about advanced multipurpose handheld devices known as smart-phones. For example, Apple Inc.[3] has very recently launched the much hyped iPhone[4] smart phone, selling over a quarter of a million units in its launch weekend in June '07 (Sheridan & Lonergan, 2007). The iPhone is essentially a Personal Digital Assistant (PDA) with email, messaging, web, organizer, digital camera, a cell phone and iPod, all in one product. Following this trend Nokia[5], Motorola[6] and Sony Ericsson[7] have also launched a number of multipurpose smart-phone devices. It is believed that smart-phone devices together with new promising software platforms such as the AJAX[8], the Symbian S60[9], the Google Android[10] and Windows mobile 6[11], signal the beginning of the end for the mobile Web as we know it today (Kivi, 2007) and promise to provide a better mobile web browsing experience. But still smart-phone handheld devices, such as the Blackberry[12], Palm Treo[13], iPhone, Nokia N95[14] and others, have not been adopted by the mass market (Tungare & Perez-Quinones, 2008).

[1] http://www.8mg.jp/en/outline_goals01.htm

[2] http://www.nec.co.jp/techrep/en/r_and_d/a04/a04-no1/a63.pdf

[3] http://www.apple.com/
[4] http://www.apple.com/iphone/

[5] http://www.nokia.com

[6] http://www.motorola.com/

[7] http://www.sonyericsson.com/cws/
[8] http://www.asp.net/ajax/
[9] http://www.s60.com/life
[10] http://code.google.com/android/
[11] http://www.microsoft.com/windowsmobile/6/default.mspx
[12] www.**blackberry**.com
[13] http://www.palm.com/us/products/smartphones/treo650/
[14] www.nseries.com/products/**n95**

On the other hand, the embedding of intelligence is still at its infancy regarding research, although companies such as Nokia do try to promote such kind of applications and products[15] , in contrast with mobility which is at a more mature stage of research[16]. However, mobile computing supported by broadband wireless and terrestrial networks already allows mobile phone users to have access to information and communication when they are on the move outside their homes and workplaces being thus "optimally connected anywhere, anytime".

New systems, concepts and fields have emerged due to the use of mobile devices in the whole spectrum of the social environment. For example, in the field of health the pervasive healthcare systems have been developed. These systems involve the sensing of a patient's physiological and physical parameters anywhere and at anytime and transmit them via mobile phones, to locations where expert medical personnel resides (Stanford, 2002; Hall, Vawdrey, Knutson, & Archibald, 2003). In parallel doctors can access through their mobile devices medical data bases known as Electronic Health Records from anywhere (Papadopoulos, Pappa, & Gortzis, 2007; Andrade, Wangenheim, & Bortoluzzi, 2003).

These technological advancements form a multimedia mixed environment with increased online accessibility offering thus rich in context and information applications and services, known as Mobile Data Services that are accessible at anytime and from anywhere. Mobile data services market includes, among others, WAP services, location-based services, streaming services such as Mobile-TV, machine to machine services, CRM. According to Chen and Chin (2007), these services play a considerable role in enhancing brand image since they contribute towards loyalty and retention.

Furthermore, these new smart-phones and new platforms can integrate Web 2.0[17] services in a mobile device introducing therefore a new term known as "Mobile 2.0" (Yoo, Tussyadiah, Fesenmaier, Saari, & Tjøstheim, 2008). According to Yoo et al. (2008), Web 2.0 is often referred to as "the participatory web", describing the trend in the use of internet technology that aims to enhance user-created contents, information sharing, and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based social applications such as social-networking sites (e.g. facebook[18]), simple online databases (called wikis) and blogs[19] to mention but a few. Mobile platforms as for example the twitter [20] and the12seconds [21] can support this architecture, which enables the interactive and democratic organizing of the contents by users on the move allowing mobile users to easily add contents and participate in the online community realising hence the idea of ubiquitous computing environments (Lyytinen and Yoo, 2002).

[15] www.nokia.com/m2m
[16] http://www.cordis.lu/ist
[17] http://en.wikipedia.org/wiki/Web_2
[18] www.**facebook**.com
[19] http://en.wikipedia.org/wiki/Blog
[20] http://twitter.com/
[21] http://12seconds.tv/

According to the statistical data and the predictions shown below, it could be safely claimed that leadership in the mobile data services and mobile applications market supporting WEB 2.0 services on the move is a driver of revenue growth.

Table 1 : Importance of mobile data services market

Revenues from mobile content will increase from 9 billion in 2002 to 39,7 billion in 2006	**OVUM**[22]
Revenues from mobile games will increase from 500 million in 2002 to 2 billion dollars in 2006	**Alexander resources**[23]
During 2003 ring tone sales increased by 40% to 3,5 billion dollars	**ARC**[24]
It is expected that during 2007 mobile video market to be 4 billion Euros	**Yankee Group**[25]
Mobile social networking revenues could reach US$52 billion by 2012, since there will be between 12.5% and 23% penetration of mobile social networks among mobile users globally.	**Informa Telecoms & Media**[26]
Mobile media and entertainment services' revenue (excluding messaging, mobile browsing and data charges) will grow to $6.6 billion by 2012 in the USA.	**analysysmason**[27]
mobile TV market will be worth over €4.4bn in 2011 in Asia, North America and Western Europe combined	**Screen Digest**[28]
Mobile entertainment market will generate $38.1 billion revenues worldwide in 2011	**Informa Telecoms & Media**[29] **forecasts**
Revenues from mobile content in Australia are set to explode, exceeding a fantastic $1 billion on 2009.	**Sydney Morning Herald**[30]

Furthermore, according to eMobility[31] forum, the leadership in the mobile data services market will generate jobs, economic growth and will have an economic impact greater than that of the internet.

[22] http://www.ovum.com/
[23] http://www.alexanderresources.com/reports/Report 16/index.html
[24] http://www.cellular.co.za
[25] Yankee Group - Feb 2004 "Mobile Video Services to See Strong Growth in Europe." - www.yankeegroup.com
[26] http://www.informatm.com/itmgcontent/icoms/s/sectors/handsets-devices/20017494973.html;jsessionid=B6C21813017E8D3D3C357CAB64319266

[27] http://www.analysysmason.com/
[28] www.screendigest.com
[29] http://www.informa.com.au/marlin/30000001001/MARKT_EFFORT/marketingid/20001446509/marlinsource/PDCinformaTMprodcatalog?proceed=true&MarEntityId=1209673488823&entHash=1001d2cc0eb
[30] http://www.smh.com.au/news/technology/mobile-revenue-to-top-1bn-by-2009/2006/03/29/1143441207844.html

[31] http://www.emobility.eu.org

1.2. Research Focus

The mobile phones have brought about new social norms and behaviours since these are not only used as highly personal tools, but as tools with respective implications among the others for social life, fashion and lifestyle. Furthermore, the rapid developments in the fields of mobile and wireless technologies, along with the emergence of convergence devices, provide technologies that start moving along with people, on their everyday activities (Sorensen, Yoo, Lyytinen, & DeGross, 2005). Internet connecting mobile phones with mobile data services have become ubiquitous tools[32] since we all walk around carrying them[33]. So the starting tool for the ubiquitous society can become the mobile phone which can be used as a platform for ubiquitous services (Lorente, 2005). This estimation is supported by the growth in the use of mobile phones worldwide and the expected growth in the mobile data services market[34] (LBS, video calling, TV, downloading music, MMS with photos, postcards, music and video clips). Today however the failure of WAP (Sigurdson, 2001), and the low diffusion and intend to use mobile data services in Western Europe inspite of their intense development that has been going on for years, (Anckar, 2002; Knutsen, 2005), indicate that mobile data services are not as desirable by the end users as expected. Even in the last couple of years during which mobile phone penetration rates in Europe[35] have reached 100% and although the development of new advanced smart-phones promises increase in mobile services usage rates, the basic services such as SMS, ring tones, icons and logos are still the most popular services (Carlsson, Walden, & and Bouwman, 2006b).,

Even in other parts of the world the results regarding mobile services are disappointing. For example, although mobile phone users in China alone have reached 416 million in the middle of 2006 and the number has been increasing by about 3-4 million each month (China Daily, 2006), the growth of mobile commerce seems to have largely stagnated (Hu, Li, & Hu, 2008). Furthermore, although according to studies, it was predicted that mobile payment services had promising possibilities yet with uncertain future (Ishii, 2004), the slow development of mobile payments service markets has been a disappointment to many observers (Dahlberg, Huurros, & Ainamo, 2008).

Frolick and Chen (2004), as well as Siau and Shen (2003) have argued that the complexity of the transactions, the miniaturization of the screen and the keyboard, the perception of lack of security and lack of user friendly mobile portals could explain why mobile commerce and mobile payment have not performed as expected. But although they tried to explain the disappointing results regarding mobile data services adoption and use, other scholars such as Tafazolli & Saarnio (2005), questioned the understanding of the adoption and usage behaviour within these new environments, others investigated the factors that affect usage behaviour (Lee et al., 2008) while

[32] http://www.omron.com/newsletter/200311_2.html

[33] http://goopas.jp/odakyu_top.html

[34] www.tns.global.com

[35] http://www.vnunet.com/vnunet/news/2148744/western-europe-reaches-100-per

others admitted the absence of recognizably advanced mobile applications (Smith, 2005).

This study argues that there could be factors and attributes that are still unexplored and could provide an explanation why the mobile data services are still unsuccessful.

1.2.1. Research Background and Limitations

According to Van House and Davis (2005), mobile devices are used to take pictures of everyday activities, to listen to music, to navigate, and to access web at anytime and anywhere. Thus mobile technologies introduce the concept of the "mobile" and "always connected" users, who move among different places and are able to retrieve information at anytime and anywhere. Traditionally these new forms of interaction have not concerned IS researchers whose investigations have mainly focused on static environments such as office establishments (Lyytinen & Yoo, 2002), partly explaining the limited understanding of the users' behaviour when they are in a mobility status (outside home and office establishments). In accordance with these arguments Sarker and Wells (2003), showed that what is missing is a clear understanding of the motivations and circumstances which guide consumers to adopt and use mobile devices and services.

Furthermore, as mobile devices are becoming an indispensable part of our everyday activities, the conventional conceptualization of information technology in information systems literature is increasingly becoming problematic (Orlikowski & Iacono, 2001). According to Lee et al. (2003), Legris et al. (2003) , Lucas and Spitler (1999), Venkatesh et al. (2003), Agarwal and Prasad (1998), it is questionable if the technology acceptance models which originate from organizational contexts should be used in non-organizational circumstances. In particular these scholars question the generalizability and the explanatory power of these models across different contexts and places and call for attention to important issues that influence the adoption and use of technology such as place and mobility.

Even recently, after the efforts of scholars to study the usage behaviour of mobile data services they still admit that the existing models have limitations. Lyytinen and Yoo (2002), pointed out the limitation of traditional adoption models in explaining the rapid diffusion of innovations such as mobile data services while Dickinger et al. (2006), showed that existing adoption models were not satisfying regarding highly interactive mobile communication technologies. In relation to this Carlsson et al. (2006a), claimed that UTAUT to some extent can be used as a starting point to find some explanations for the adoption of mobile devices/services and Dahlberg and Oorni (2007), tried to investigate if the generic technology adoption models would suffice to explain factors consumers take into consideration when they decide whether or not to adopt new payment services. Moreover, Mallat et al. (2006), indicated that traditional adoption models should be augmented with more attributes in order to explain the use of mobile services and hence they constructed a research model. Kakihara and Sorensen (2001) added to this model the mobility factor while Dabholkar and Bagozzi (2002) augmented it with situational factors.

Furthermore, the traditional adoption models have two more constrains. Firstly many of the studies on the acceptance of Information Systems which are based on the traditional models such as the TAM, use quantitative data while employing methods such as surveys or secondary data reviews. Yet with this data the fact that the mobility of users among different places will bring new complexities is ignored. As it is indicated in chapter 2 these studies provide only limited explanations of the users' behaviour within these new technological environments and are limited in providing rich descriptions of the research phenomena.

Secondly, users within ubiquitous environments often change context, making data collection more difficult for the researchers. Since the research design should be placed within real settings, the researchers have to address the challenges of scalability, data scarcity and unobtrusiveness, as indicated in chapter 3, and for that they have to use new techniques and technologies. But only during the last years new technologies and methods for studying behavior within real situations have been developed (Yoo et al., 2008). Thus the number of existing literature review relevant with research within ubiquitous environments is still limited.

1.2.2. Research Objectives

The above statements, lead me to conclude that the limited research conducted within everyday settings, still provides limited evidence for the role of factors such as the place in the adoption and usage process of information technologies. Thus I believe that the exploratory studies within everyday contexts could introduce and reveal the existence of factors that could support and enhance traditional adoption models.

Following the above points I approached the mobile data services adoption and use from a qualitative point of view, trying to identify how the users experience place before deciding to use mobile data services, within the framework of a case study of a successful mobile data service platform.

It needs to be mentioned that the research presented in this thesis investigates the influence of place on the decision to use mobile data services and following Bina et al. (2007), the thesis considers that there is a direct and positive effect between the decision to use and the actual mobile data services usage behaviour. Hence, since the decision to use mobile data services determines and leads to actual system usage, these two constructs are treated as inseparable and are not distinguished in this thesis.

I focused on the users' experiences and behaviour in time and space when they decided to use mobile data services as a way of understanding how the decision to use and thus the actual usage of mobile data services relates to different places. In particular, I tried to understand how users move around in time and space, interact with their surrounding environments and other people while using mobile data services. Drawing on the Tuan's theory (1977) of the four "materials of place" and Brahms' modeling technique (Sierhuis et al., 2007), (Section 2.1), I deconstructed the place into its elements proposing a model of place which led the data collection as well as the analysis phase.

I tried to address the following research objectives:

- Having recognized the gaps in the literature and research, the primary purpose of this exploratory study is to attain a deeper understanding of how individuals experience time and space when using mobile data services. Thus the first objective of this study is to conduct an exploratory in nature research to study the usage behaviour of mobile data services in real time conditions and everyday settings.

- The second objective is to understand the role of the materials of place as described by Tuan (1977) in the usage behaviour of the individuals. In other words, to understand how users experience the places they are in when they decide to use mobile data services. This might provide evidence and attributes that could complement and refine the adoption theories enhancing their explanatory power across different contexts

- Finally, the third objective is to address the field study challenges by proposing and applying a combination of conventional and innovative research methodologies

My main motivation is to understand what lies behind the low adoption and usage rates of mobile data services. I believe that by understanding how individuals experience their everyday activities as they use mobile data services and interact with their surrounding places can contribute to this research question.

The results of this research and the ramifications of the findings will be discussed and recommendations for future research will be presented in the conclusions presented in Chapters 6 and 7.

1.3. Research Methodology

For the purposes of studying the role of place in the usage process of mobile data services I investigated the behaviour of thirty "mobile" users, as well as their experiences and needs during their everyday activities. The phenomenon that was studied was the relation between place and usage of mobile data services. The data collection phase was applied in the territory of the capital of Greece: Athens. A "Phase 1" of the research was conducted and a successful mobile data services platform was identified. This platform provided the researcher with an adequate number of thirty experienced users to work with as well as enough applications to study.

The units of analysis were the end users and the findings are presented in the form of a case study. This method of study allowed me to track the variables that influence usage and concern marketing issues such as brand awareness, advertisement campaigns, pricing policy and the quality of the service itself as described in detail in chapter 4. By doing this I focused better on the relation of place and usage of mobile data services increasing the validity of the findings. For example, when I studied the variance of usage rates of mobile data services, when the users were outside Athens during summer vacations I had to be sure that this was not a result of the quality of the network in these places. The case study also allowed me a better presentation of the findings and conclusions.

Before starting the data collection phase I deconstructed place by adopting Tuan's theory (1977) of the four layers of place and the Brahms model (Clancey, Sachs, Sierhuis, & van Hoof, 1998; Sierhuis & Clancey, 2002) to generate the "ontology" of the four materials of place. Based on this "ontology" I constructed a model, which was used to form the questionnaires and conduct the interviews. I also used this model as a compass to group and analyse the data.

Since my research investigates place by adopting the humanistic geographical perspective as represented by Yi-Fu Tuan's theory, (Section 2.3.3), where places are spaces with meanings attributed through human interpretations I have adopted an interpretivistic epistemological stance which assumes the reality is subjective and socially constructed (ontological stance) (Walsham, 1995; Orlikowski and Baroudi, 1991). Starting from my interpretivistic stance as explained in more detail in Section 3.3, I collected qualitative data using conventional methods like interviews, observation and focus groups as well as media elicitation methods and a new form of feedback method.

1.4. Research Questions

One key research question and four sub-questions based on Tuan's theory of place are addressed in this study. The main research question asks:

- **How does place influence the usage of mobile data services?**

The four sub-questions that have to be addressed and answered along with the principal research question ask:

1. Which spatial factors and attributes mainly affect the user's decision to use mobile data services?

2. How does the personal layer, as defined by Tuan, affect the user's decision to use mobile data services?

3. How do the social activities and norms within a place affect the user's decision to use mobile data services?

4. Which cultural identities of a place mainly affect the user's decision to use mobile data services?

1.5. Summary of Contributions

The study is expected to have both technological and societal impact by assisting scholars, managers, mobile operators and service providers to understand how the different attributes of place relate to the usage behaviour of mobile data services and in general to the usage of information technologies within everyday settings.

Moreover, since the findings of this study concern the behavior of European citizens with specific cultural and behaviourial characteristics (Greek users of mobile data services) they will support mainly European competitiveness by assisting European content providers, application owners, mobile operators and solution providers to secure leadership into these markets.

1.5.1. Contributions for theory

One of the aims of the study is to identify and highlight the role of place in the humans' decision to use multimedia rich in content mobile data services when in ubiquitous environments. More specifically, the study tries to explore under what circumstances the place can trigger decision to use mobile data services. Furthermore, I hope that its findings will highlight broader aspects of human behaviour concerning the use of ICT technologies within different places.

Also, the aim of this study is to assist the research community to understand the role of place as a moderating factor in the adoption and usage models and thus augment traditional models and theories with specific elements of place which may affect the intention of the users to use information technologies within ubiquitous environments.

In this study I chose as a mobile data services platform, Service A, which has been launched by Company A in the Greek Market. During the "Phase 1" of the study when I tried to identify the mobile data services platform to conduct the research, the professionals I interviewed considered Service A, (Section 4.4), as a potential platform with prospects for success.Service A provided a portal, allowing users to have WAP services. Entertainment (e.g. surfing internet, downloading songs), communication (e.g. e-mail, MSN Messenger) and information services (e.g. Mobile Banking, maps, travel/booking) have been provided by Service A platform. Service A menu in Greece offered more than 100 sites at the time of launch, 2004, which were available in Greek as well as in English language. Furthermore, Service A was offering 3G transmission compatibility as well.

After 5 years in the market, Service A has been gradually abandoned by the Company A. I believe that the findings of this research which will be presented in the realm of this case study could give an insight of the low adoption rates of this platform and could justify the decision of Company A to abandon this platform.

I also expect that the research methodology introduced along with the approach that was adopted to deconstruct place into its attributes, constitute "research tools". These "research tools" could be used to facilitate researchers in future studies concerning the

interaction between the users of ubiquitous technologies with their surrounding contexts.

Finally, the findings of this study could be used by the human computer interaction research community to further improve current capabilities of mobile phone interfaces.

1.5.2. Contributions for Practice

According to scholars, many IS theoretical concepts, models and frameworks have nonetheless influential impact on practice (Galliers, 1994; Benbasat & Zmud, 1999).

Therefore, this research tries to answer the above concerns outlining some consequences related to practice. Initially, the key attributes that trigger usage and improve the users' experience when on the move are to be identified. Moreover, usage behaviour attributes of mobile technology such as preferences, perceptions, emotional needs to mention but a few, when users are in different places are highlighted. This behaviour will give practitioners a deeper knowledge of the users' needs of mobile data services when in different places.

I believe that the findings of this study will highlight hidden behavioural attributes which could lead professionals to consider the needs of the users as for example that of privacy when they are in different locations or that of the need of the older people for applications which fulfill more of their functional needs and thus develop more suitable applications. Also, these applications could support the development of rich in context applications that will serve more "functional" applications (Papadopoulos, 2008a) for older users, as for example in emergency situations, fitness and health care to mention but a few. Overall, these more advanced and suitable applications, able to support rich in context mobile data services using for example the so called Web 2.0 technologies, could increase adoption and use of mobile data services.

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1.6. Chapter Summary

In this chapter I briefly introduced the latest technological advancements in the area of the wireless and mobile technologies. This introduction highlighted the economical and business importance of these technologies to the market.

An overview of the IS research methods and models in the field of adoption and use of mobile data services revealed that these research methods have limitations and that the study of the actual mobile data services usage behavior should be studied in relation to place. This conclusion made me define the research objectives of this thesis and study the relation of place to the use of mobile data services.

Adopting the humanistic geographical perspective as represented by Yi-Fu Tuan's theory, I overviewed the research methodology, qualitative in nature that was adopted in this study explaining the interpretivistic in nature epistemological stance of the author. I also stated the research questions that were posed for this research. Finally, I summarized the contributions of this study to the relevant theory and practice.

1.7. Structure of Thesis

The structure and contents of the remaining chapters are highlighted below:

• ***Chapter 2:*** In the second chapter an overview of the information systems, ubiquitous and mobile networked environments as well as mobile handsets and mobile data services is presented. The Scholars' attempts to apply traditional adoption theories and models to study the usage of mobile data services and thus to explain the low adoption and usage rates are presented as well. It is examined in detail how mobility and mobile networked environments transform space and place perception and the lack of a detailed and in-depth study of contextual dimensions such as the place which is highlighted. Analysis of some theoretical approaches concerning the relationship between humans and the physical space is presented and the adoption of the Humanistic Geography and particularly Yi-Fu Tuan's perspective of place is justified. I use Tuan's theory of place to analyse the concept of place into its dimensions "materials or layers of place" as well as the Brahms language to further decompose these layers into the factors and attributes that these layers are made of. This analysis allows me to construct the model of place. I use this model to conduct the focus group sessions as well as the interviews and the observation phase.

• ***Chapter 3:*** Any researcher should make a number of philosophical and epistemological assumptions such as these when conducting a research, and "the intellectual basis for the research should be as transparent as possible to the reader" (Klein and Myers, 1999). Therefore, in addition to discussing the adopted data collection and analysis techniques, the philosophical and epistemological debates underlying this research are also presented. The methodology adopted from the point of view of the human nature is also justified. Then this chapter discusses the ontological and epistemological position and research approach adopted in this study. It is regarded by the researcher as being interpretive, qualitative, exploratory, and conducted in the field. The suitability and the overview of the selected case study is discussed and the research approaches for mobile technologies, the research design, the data collection and the analysis methods are presented in chapter 3 as well. Finally, the research questions are clearly stated.

• ***Chapter 4:*** In this chapter "Phase 1" of the research which was conducted in order to identify the mobile data services platform that was used for the research is described. The selected mobile data services platform which is the case of the Service A as well as the wider mobile data services market within which this study develops is described. Finally, an overview of the geographical context of the research is given, as well as the data derived from the empirical field study phase where users express their needs and their perceptions regarding Service A, are presented.

• ***Chapter 5:*** This chapter concerns the presentation and analysis of the findings from the focus groups, the interviews, the observation and the media elicitation phase. This phase of the research involved focus groups with 27 users, media elicitation data collection activities and semi-structured interviews with 9 heavy users and an observation phase with 3 participants. The model structure used for the analysis phase, the "model of place", was developed in Chapter 2.

• ***Chapter 6:*** This chapter discusses in detail the data, the findings and the emerging patterns the previous chapter provided. The discussion of the data will be conducted separately concerning the four layers of the place. Possible explanations are provided where possible introducing new literature to support these arguments. The main results and reflections of the discussion are presented as well.

• ***Chapter 7:*** This concluding chapter begins by reviewing the research objective and summarizing the research methodology. Following the research approach that was adopted in this study, the implications for those in mobile market practice, education and research as well as an outline of the limitations of the study, are presented. The chapter identifies some potential areas for further research as well.

Finally, appendix A presents the contact emails sent to the participants of the "phase 1" of the research, while appendix B consists of the interview guide used in "Phase 1" and appendix C provides the interview guide that was used for the main data collection phase of the study. Coding examples from this main phase of the research are presented in appendix D.

2. Literature Review and Theoretical foundations

2.1. Introduction

This chapter reviews the context of mobile technologies and mobile data services and tries to highlight the importance of place within mobile networked environments. An analytical overview of the theoretical foundations against which this study is set is also presented.

More specifically, a number of key terms used throughout this research (mobile information systems, ubiquitous technological environments, mobile smart handsets and mobile data services), are discussed and defined (Section 2.2).

An overview of how mobile technologies and mobility emerge the importance of place when studying adoption and use of mobile data services is presented in Section 2.3.1. Section 2.3.2 describes how the traditional adoption theories and methods approach the study of mobile data services and the problems and constraints these theories and models confront when they try to study mobile data services. This section supports the need to introduce and study place as a variable in the adoption and usage process of mobile data services.

The choice of which perspectives to adopt in this thesis was guided by the fact that I approached place not solely as a geographical entity, but as a live concept. Thus, I focused on those studies that concern the relationship between people and space.

During the course of the Section 2.3.3, I discuss those approaches that deal with the human aspects of space and with the concept of place exploring literature of space and place belonging to the areas of environmental psychology and humanistic geography.

I adopted the notion of place which tries to understand the dimensions of human experience within a physical environment, as it has been developed within the humanistic geography by Tuan. This notion overcomes the concept of space as physical geometrical structure, and considers it as a dimension involving interaction and experience, an approach which has significant methodological implications.

Within Section 2.4.1, the theory of Tuan is being reviewed which provides the conceptual model of the four layers representation. Within Section 2.4.2, I introduced the modeling tool of Brahms which has been applied within Section 2.4.3, to further analyse the four experiential layers of place. More specifically, ontology of place has been generated introducing the factors and attributes of the four layers of place. The whole construct of the four layers of place together with their factors and attributes represent the “model of place” which has been used as the basic tool to construct the research questions as presented in the 2.5. The main conclusions and frameworks are being summarized in Section 2.6.

2.2. Definition of key terms

2.2.1. Mobile Information Systems

According to Ahituv and Newmann (1990), the term information system has been defined numerous times throughout the literature and every IS-related text tends to adopt a new and divergent definition. Usually, the term is often used to refer to a computer-based information system, or at the communication technology. However, many researchers have advocated a broader definition of IS, including the social context in which the IS technology is used, rather than what Verrijn-Stuart (1989), describes as the "narrower" interpretation where the focus is solely on technology. Other Scholars have adopted a broader definition for IS describing it as "a human activity system which may or may not involve the use of computer systems" (Buckingham, Hirschheim, Land, & Tully, 1987). On the other hand, Jayaratna (1994), believes that the field of IS itself would not exist without computer systems and computer technology.

Recently, technical advances in the development of portable computers and the rapidly expanding cordless technology have provided the basis for accessing information systems through wireless connections. Also, technological advancement and the promised rewards of mobile working have led to an 'explosion' in mobile computing and telecommunications technologies in recent years (Green, 2002). This has seen a considerable growth in the use of wireless laptop computers, personal digital assistants and other handheld devices and smart-phones for data transfer and communication. Today, when users move, unplug their computer from some local area network, transport it, and plug it back to the local area network at their destination.

Wireless technology provides users with the ability to retain their network connection even while moving. This new computing paradigm is called mobile computing, leading to the rapidly developing research area of the information systems, which is the mobile information systems. Mobile information studies explore the use of mobile information and communication technologies with core areas of research interest within the information behaviour literature (Niedzwiedzka, 2003), information overload (Allen & Tidline, 1999; White & Dorman, 2000; Wilson, 2003), business models and strategic alliances (Tsalgatidou & Pitoura, 2001) and adoption, diffusion and usage of mobile information systems (Ling, 2000; Aarnio, Enkenberg., Heikkilä., & Hirvola., 2002; Pedersen & Ling, 2003; Ioanna, Damsgaard, & Knutsen, 2004).

This study explores the behaviour and experiences of the participants while they use mobile information systems within everyday settings.

2.2.2. Ubiquitous Network Environments

Today, tremendous developments in information technologies are unleashing the potential of anytime anywhere connectivity, providing environments filled with IT and useful services to the end users[36]. Such an evolution of the quality and complexity of systems and services has created already, and is expected to create more in the future, habits, new expectations and new requirements never expressed before. IS scholars and IT companies have already started to study the interconnection between mobile technologies and society. For example, NTT Docomo's Social Research center[37] promises "*to study and analyze the impact or cultural influence the mobile communication may have on our current or future society*". Furthermore, the industry[38] of mobile market believes that at the center of the research efforts should be the user needs.

Some societies as for example Korea and Japan are approaching more the state of a ubiquitous society since their inhabitants are starting to adopt and integrate parts of ubiquitous computing into their daily lives (Shiode, 2004). According to predictions, 80% of information technology users will come into contact with mobile applications (ranging from location based service offerings to ubiquitous access to information) during their daily work (Lehmann, 2004). The Internet penetration in European homes has doubled while 90% of European companies and schools are now connected, broadband connectivity is rising and a large amount of public services are now on-line[39]. According to Nokia, the use of mobile phones with Internet access was expected to have soared to approximately 0.8 billion users in 2004 while the number of subscribers with mobile Internet access in Japan, such as imode, is around 5,9 million (Eklund & Pessi, 2001).

New buzzwords have emerged due to the latest technological advancements such as mobility, pervasiveness and ubiquity. The interrelation between pervasive, mobile and ubiquitous computing as well as the positioning of this research is shown in figure 1. Have to be mentioned that although this study concerns mobile computing (mobile phones with mobile data services) the nature of mobile devices can be considered as ubiquitous meaning that they are not bound to a certain place. Thus I can argue that the findings highlight the behavior of users when accessing multimedia services within ubiquitous environments.

[36] http://europa.eu.int/comm/research/future/index_en.html
[37] http://www.moba-ken.jp/english
[38] http://www.emobility.eu.org/research_agenda.html
[39] http//:europa.eu.int

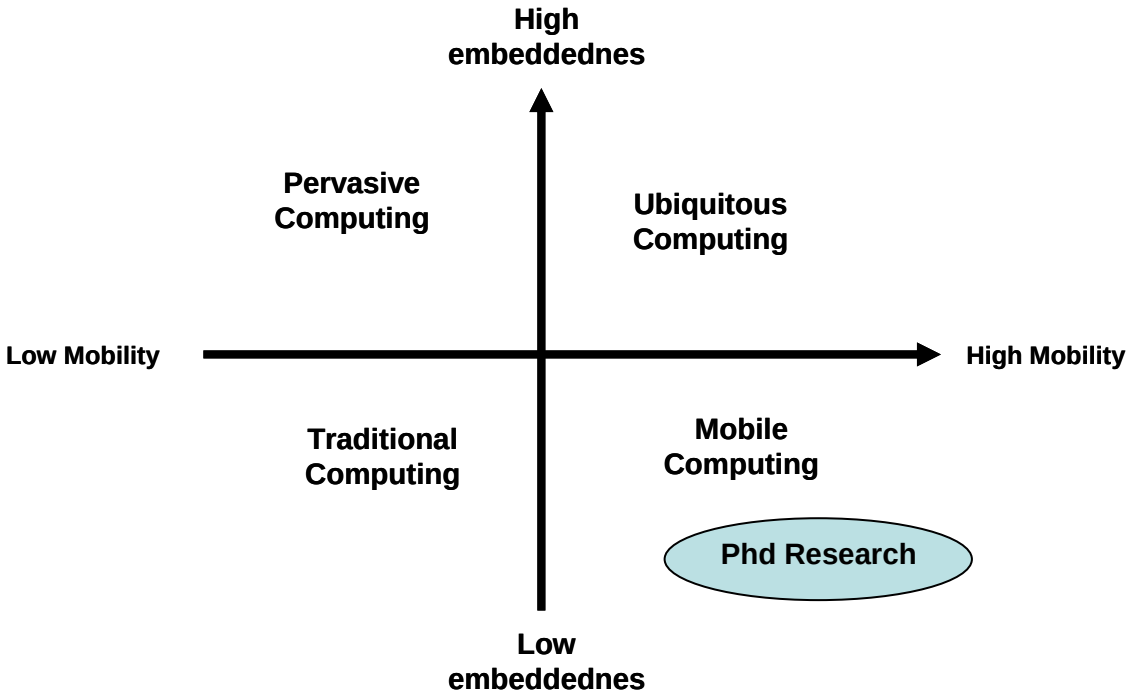

Figure 1 : Position of the PhD Research in terms of mobility and embeddednes (Lyytinen and Yoo, 2002, p.64)

Following the definitions from Weiser (1991), Satyanarayanan (2001, 2002), Lyytinen (2002) and cordis[40], mobility refers to the degrees of freedom of a single user and a mobile system within physical environment while pervasiveness measures the level of embeddedness of hardware and software in the physical environment.

Ubiquiteness integrates full scale mobility and pervasiveness (at any time in any place). Ubiquitous technologies will have a significant impact on the way users access and control customized information giving benefit to public, social and private tasks that citizens are involved in and providing personal services in a given situation and context (Watson, 2000; Wagner, Balke, Hirschfeld, & Kellerer, 2002; Wagner, 2003; Kostakos & O'Neill, 2004). On the other hand, these technologies introduce everywhere / all the time connectivity which due to BenMoussa (2003), may result in the danger of users to become "*too connected*" and due to Kuhn et al. (2003), introduce security concerns for users.

[40] http://www.cordis.lu/ist

2.2.3. Mobile smart handsets as part of our lives

Ubiquitous technologies consist of different kind of technologies such as embedded systems, mobile phones, PDAs and laptops equipped with GPRS and Wifi cards which have the access capability to communicate wirelessly, grid computing and others. In the context of this research I am studying the new generation of mobile phones (smart phones [41]), that integrate various functionalities, such as games applications, radio tuner, camera, payment facility, Internet browser, TV tuner, videoconference applications [42] etc. Mobile phones have become our everyday companions since they touch every aspect of our work, social and family lives. Considering that almost 90% of the Greek population (over 9 million users), where the study has been conducted, owns mobile phones, it is no surprise that the mobile phone has achieved a crucial role in coordinating social contacts. More specifically, the number of active subscribers by the end of 2003 was 8.9 million while within 2004 this number increased to 84.4%. Based on these figures, the penetration in the country's population is estimated to be almost 85% when the average EU penetration for 2003 is 80.9%. It is estimated[43] that in the middle of 2003 there were in total 10.4 million subscribers with more than one connection as well as inactive subscribers. The same is happening all over Europe, for example in Sweden [44] where the penetration of mobile subscribers in 2005 in the country's population is 100,1% since the subscribers are 9,07 million and the total population equals 8,98 million.

Mobile phones can be described as remote controls for our lives based on the heavy dependency on mobile telephony in every-day relations (Rheingold, 2002). Meetings with friends and family are often loosely arranged and exact meeting times or places are decided on 'just-in-time' and 'on-the-fly'. Mobile phones have also played a part in world events such as the collapse of the Philippine's political regime in January 2001. Text messages were circulated amongst one million Philippine citizens to organize demonstrations against the unpopular president Joseph Estrada (Gordon, 2004). This self-organizing and highly dynamic nature of social gathering arranged with the help of mobile communication has been branded as a phenomenon called smart mobs-the next social revolution (Rheingold, 2002).

[41] http://www.3g.co.uk
[42] http://www.mobileshop.com
[43] http://www.eett.gr/gr_pages/index2n.htm
[44] http://www.analysys.com

2.2.4. Mobile data services

The mobile systems are just the means through which "mobile" users are able to access mobile data services. Providing mobile data services[45] to customers on the move is one of the key success factors of mobile systems. Mobile data services include non-voice advanced messaging services such as SMS, MMS, Mobile Instant Messaging (MIM), and Unified messaging (UM), Machine to Machine (M2M), CRM based on technologies such as WLAN, GPRS, WAP and other. Mobile data services are defined "as an assortment of digital data services that can be accessed using a mobile device over a wide geographic area (Hong & Tam, 2006). A variety of mobile data services have been deployed, many of them need to access the Internet through the cellular-phone infrastructure. Now, internet-ready, next-generation smart-phones promise to drive rich in content mobile data services into everyday life (Lee et al., 2008).

Definitions of wireless, mobile as well as m-business and m-commerce are following. Wireless means that data is delivered to an end user across airwaves and "mobile" refers to applications, which are designed for users on the move, i.e. for applications that support users independently of their location. This means that a wireless application does not have to be a mobile application as for example the Wifi and the Bluetooth protocols. Current wireless communication networks as WIFI, WIMAX, satellite, GPRS and 3G transform our societies into "mobile societies" by providing connectivity and services to mobile phones rendering communication free from location constraints and enable people to be more mobile and more accessible.

According to Mobilocity (2001), m-business is a collection of mobile technologies and applications used to support entire markets, while m-Commerce, as subset of m-business, is defined as any transaction with a monetary value that is conducted via a mobile telecommunication network. M-business and m-commerce are carried out via mobile data services using the internet protocol. Initially the Wireless Application Protocol (WAP) was introduced to bring the Internet and its services into mobile phones. The first devices and services were introduced with great expectations at the end of 1999, but very quickly WAP turned out to be a major disappointment. Services offered were quite undeveloped, while the majority of the mobile service users were particularly willing to try them (Teo & Pok, 2003). A number of technological advances took place alongside the introduction of GPRS and 3G standards in Europe. Colour screens, cameras and Multimedia Messaging Service (MMS) became available as well as internet browsing and streaming video to mobile phones became functional, (Repo et al., 2004) and recently mobile TV. Mobile TV is an interesting service when traveling and the users are cut off from their normal TV watching routines. If mobile TV becomes important to the users and will really be missed if not available, then it could be the competitive advantage of this mobile data service although studies revealed that the users are price sensitive (Carlsson et al., 2006a; Carlsson et al., 2006b; Carlsson & Walden, 2007).

[45] http://www.mobilein.com/unified_messaging.htm

It should be noticed that these advances in mobile technology are enablers for mobile data services although from a historical point of view, GPRS and the third generation mobile telephony seems rather evolutionary than revolutionary (Nokia Networks, 2003). Another approach in the wireless protocols (using WiFi, WLAN protocols) will change the mobile data service markets by offering access to the services by bypassing operators and minimizing costs (Cheng, Tsyu, & Yu, 2003; Lehr & McKnight, 2003).

Success stories of data services over mobile networks have been the SMS, ringtones and imode. Imode[46] is a wireless communications service by NTT DoCoMo offering wireless web browsing and e-mail from mobile phones using HTTP. Imode was inspired by the drawbacks of WAP, and was considered as a success mobile data services platform in Japan (Steinbock, 2002), while its introduction in UK, Germany and The Netherlands has been very slow. After two years of developments at NTT DoCoMo, imode was launched as a mass-market product in Japan on February 22, 1999. In May 2003, Japan had nearly 63 million mobile Internet users, approximately 60% of which were using the imode platform[47].

Bharat and Minakakis (2003) and Peppard (2003) claim that ubiquitous environments and mobility generate the need to consider and represent the physical environment because mobile data services demand context-aware data. Within the mobile data services, context is important because it determines the quality of information, which relates to the possibility to generate action. Following the definition of Agre, (2001), context is the sum of architectural and institutional aspects. An example of contextual services is that of Location Based Services which utilize the knowledge of the location of a mobile device to provide services (Sorensen, Mathiassen, & Kakihara, 2002) and is considered as a potential mobile data service.

According to Landor (2002), contextual services should provide security, privacy, performance (easy and fast to be acquired, interpreted and consumed), usefulness, cost and communication values (real time alerts and convenience). Security is considered by Vines (2002) as a means of preventing unauthorized access to information, protection against possible loss and therefore the safety of information while privacy can be interpreted as an individual's concern regarding control over information and is often perceived as a very subjective notion (Cavoukian & Tapscott, 1996).

[46] (http://www.bitpipe.com/tlist/service A.html) , (http://en.wikipedia.org /wiki/Service A)
[47] www.mobilemediajapan.com

2.3. Place as important factor within mobile networked environments

2.3.1. Mobile technologies emerge the importance of place

Scholars have predicted that the future will be 'mobile' and that we will use our mobile devices anytime anywhere thus being always online. Even today people use mobile systems in a variety of different contexts, as for example walking down a high street someone can notice numerous people using mobile telephones, PDA's and others. This wide adoption of mobile systems has generated a new wave of research projects (Mobilife[48], Reality Mining[49]), research methodologies (ESM[50] by Intel) and studies that concern individuals using their mobile phones in public areas. The above research approaches, provide designers with insights into people's actual use of their mobile phones (Bell, 1998), and with a richer knowledge of how space affects the use of a mobile technology (Weilenmann, 2001). Also, "mobility" has become the latest trend in the telecommunications area as shown in the following figure.

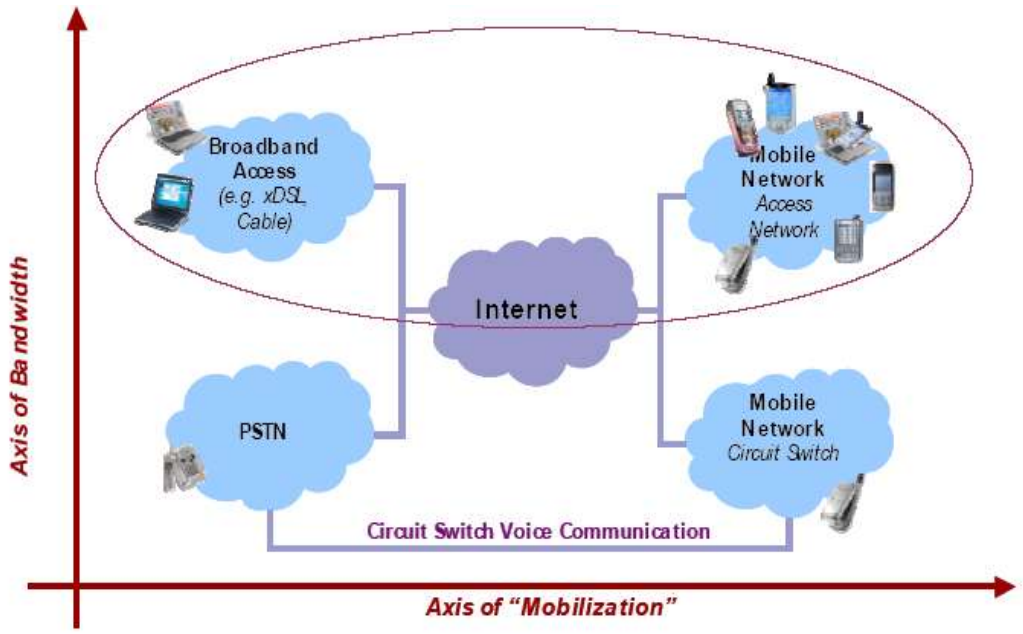

Figure 2 : The Telecom Evolution (Tafazolli & Saarnio, 2005,p.13)

Since mobility has captured the scholar's attention, a whole set of definitions has emerged. Some authors tried to define mobility in terms of user's freedom from

[48] https://www.ist-**mobilife**.org

[49] http://reality.media.mit.edu/user.php

[50] http://www.intel.com/research/exploratory/location.htm

physical and geographical constraints (Bharat, 2003), while others extended the definition to social or context mobility considering the individual navigating across different social contexts and social roles (Kakihara & Sorensen, 2002; Lyytinen and Yoo, 2002). Furthermore, Sorensen (2002), introduced new types of mobility (spatial[51] , temporal[52] , and contextual[53]), Townsend (2001b), defined types of mobility in work organization, Haddon (2000b; 2000a) and Sheng (1998), analysed the different stages[54] of mobility, the purpose[55] of travel, travel duration and travel experience in social places other than home and workplace. The concept of "mobility" I adopt in this study is the common one that denotes that users move freely between locations and places.

Mobility and mobile technologies have played a key role in changing relationships across geographical space and time (Green, 2002), and have generated an ever-increasing interest of how we interact with the physical environment emphasizing the importance of understanding the connections between places, the role of space and the use of technology (Moran & Dourish, 2002). Shiode (2004), argues that since events could be monitored and controlled online whenever necessary, this would increase further physical and social mobility bringing in the near future new meanings of time and space. I agree with the argument that mobility and mobile networked technologies transform the way we experience place and thus shift us from the conventional understanding of place as stable and fixed (Wilken, 2006), to a renewed and more loose understanding of place. For example, the increased mobility could decrease the attachment people feel with specific places (Gustafson, 2001). The way place is experienced through and transformed by mobility and networked mobility is evident by the following cases. Thus mobility and networked mobility:

- diminish the importance of place as a communication site increasing the importance of a person or a group as an autonomous communication node (Wellman, 2001), or reinforce the importance of places by young users by immobilizing their mobile phones (Yoon, 2003).
- contribute to a disassociation of place, or what Morley (2003,p.439), refers to as the "death" of geography and thus can be portrayed as mechanisms for reconfiguring space and time unsettling the stability of place since they allow us to overcome distance (Ling, 1999; Morley, 2003). They do that by complicating the social distinction between places allowing activities in any place and so experience multiple places simultaneously, e.g. business phone calls into a club.
- personalize space in public settings by insulating their selves from the environment they are actually in, creating a kind of '*psychic cocoon*' around them (Morley, 2003, p. 451), as for example having a private phone call in the street, or surfing the internet with a PDA in the bus station. Haddon (2000b), warns that personalizing space in public settings may lead mobile users to cut themselves off from the persons around them losing thus sociability and generating strong negative emotional responses by non users.

[51] corporeal travel of people, objects, symbol
[52] sequential mobility of actions
[53] blur of places and institutions
[54] preparation, actual mobility and consequences
[55] for work, holiday etc.

- distribute activities into space e.g. modern company's practices are able to be performed where the customers are (Eklund et al., 2001; Geser, 2004). This movement within space makes us understand and experience space as frequentation of multiple places rather than a unique place.
- introduce spatial zones, non-places, e.g. trains, airports, large retail outlets, road vehicles, on motorways etc., where we spend an ever-increasing proportion of our time (Augé, 1995).
- create negative emotional responses when used in some public places as theaters etc. calling for measures against their use. For example, the use of the so-called "GSM jammers" that render impossible the use mobile phones in French concert halls has been adopted. A recent survey held in France, Finland and Italy by TNS (2003) revealed that more than 3 Europeans in 4 are in favor of the use of GSM Jammers. In France, the proportion is higher since there are almost 85% of the French who claim they are in favor of them.
- refocus the individual on the experiences of places through the practice of using mobile phone cameras to life cashing, through the use of mobile applications to navigate within places (Wellman, 2001).
- support social communication at a distance, change the context of spatial proximity, minimise distance and speed the subjective experience of time (Virilio, 2000; Townsend, 2001a).
- transform the way that meetings and basic daily travel arrangements are scheduled since users are able to "micro-coordinate" their everyday activities (Ling & Haddon, 2001). These technologies allow users to be always-available and at every time "on call" transforming thus the ways they organize their activities and the ways they arrange their "schedules" affecting the sequencing of home activities, the cycles of work and family life etc. (Green & Harvey, 1999; Green, 2001).

The above statements suggest that a rearrangement of duration, time interval, sequencing, as well as issues of presence, absence, availability, cycles, and rhythms take place. This means that the speed of electronic communications involves an immediacy of action where communication and monitoring access of information can take place instantaneously resulting in an experience of instantaneous time (Lash, 1994). This attribute transforms the place to a hybrid medium of physical and wirelessly co-present context (Ito, 2003), keeping distant users always socially virtually co-present diminishing the notion of privatization. Thus even after physical co-presence has been achieved, users continue to contact other individuals that are located at a distance. This attitude is in accordance with the literature review that states that because people being influenced by an ongoing tendency of proximity (Boden et al., 1994), wish to have control over people and contexts that are far away from them. For example, people wish be able to maintain social contact while being always online and moving freely between different contexts, to have surveillance of their homes and adjust heating, cooling when away, to access their PC when away or to put their children on a wireless leash. Thus there seems to be a need to move around contexts without physical constraints.

Contemporary scholars have treated the transformation of time and space via networked technologies as a largely theoretical issue proposing abstract statements of time–space compression or convergence (Giddens's, 1990), or describing the information flow via these networks as an information landscape which covers

entirely the contemporary urban life (Wark, 1994). Furthermore, the abstract statement of "hyper awareness" refers to the social awareness that individuals share with one another by continually staying in touch across different locations (Keyani & Farnham, 2005). Mobile data services such as SMS, email, MMS and social networking services enable hyper awareness because they allow people to communicate from their current social context without breaking norms when are in banned places that prohibit voice calls. According to Woodruff and Aoki (2003), this always online communication strengthens social ties and creates new opportunities for social exchange and is being exploited by mobile social networking platforms which invest in the need of the users to be always connected as for example twitter. Other scholars explored the very strong emotional and behavioral aspects of the different environments that we find ourselves in and concluded that humans can become emotionally or behaviorally attached even to digital places as Cyberspace (Harrison et al., 1996).

Kakihara and Sorensen extended the social consequences that mobile technologies generate between human interaction, introducing three dimensions (spatiality, temporality, contextuality) that generate a fluid social topology (Kakihara et al., 2002). The spatiality dimension concerns the ability of people and systems to be more mobile, more accessible and interact freely from space restrictions. Adopting the view of Nandhakumar (2002), according to which time is experienced inter-subjectively through a process of temporal structuring, the dimension of temporality is concerned with the reordering of that "temporal structure" of our lives. Now our lives are not necessarily governed by linear time since we have the ability to socially negotiate time order (Haddon, 2000b; Sorensen et al., 2002: Prasopoulou et al., 2006). Contextuality dimension, concerns the interaction between individuals in different places, with different cultural backgrounds, moods, degrees of mutual recognition, facial and bodily expression.

According to the above statements, mobile networked technologies transform our notion about space and time, introducing the need for deeper study of the relation between these technologies and place attributes.

2.3.2. Research approaches for mobile technologies and services

This section describes the low market penetration of mobile data services. Following this low penetration of mobile data services I attempted to describe how researchers approach the study of mobile data services adoption and use and to understand the problems they confront when using traditional theories and models. The literature that is being provided highlights and emerges the importance of the role of place in the study of mobile data services adoption and use. Finally, I positioned this PhD thesis as an adoption research which conducts a micro-level study of individual end-users.

Mobile phone technology outperforms most of the communications technologies ever invented, since mobile phone users have already reached 3 billion[56] world-wide

[56] www.cellular-news.com/story/30401.php

according to reports[57]. Furthermore, it is forecasted that in the coming decade, the mobile telephony industry will generate a service revenue of US$ 800, (Wang, Ku, & Doong, 2007). Thus the actual mobile phone device is considered as the "Swiss Army Knife" of consumer electronics[58].

However, this high mobile phone penetration rate did not lead to rapid mobile data services' diffusion (Carlsson et al., 2006b), especially in Europe. Basic services such as SMS, ring tones, icons and logos are still the most popular services while the adoption of more advanced mobile data services such as mobile commerce and payments has been slower than expected (Ondrus & Pigneur, 2006; Dahlberg et al., 2007; Dahlberg et al., 2008; Hu et al., 2008). It has been argued that factors such as the high cost of the service, the complexity of the transactions, perceived lack of security, lack of user friendly mobile portals and others are factors that keep the mass of users away from mobile data services (Siau et al., 2003; Frolick et al., 2004). Furthermore, Aarnio (2002), claims that the use of mobile data services, is still in the chasm stacked in the trap of highly prices and undesirable services.

The following data supports the argument that although the majority of the European population owns a mobile phone, the use of mobile data services has not spread to the masses since the user population has not yet reached the critical mass level.

[57] http://www.3g.co.uk/PR/April2008/5961.htm

[58] http://www.cnet.com/4520-13387_1-6737990-1.html

Table 2 : Data concerning the low diffusion of mobile data services

One-third of Japanese consumers use one of the country's three mobile Internet services, while less than 2% of Europeans use WAP.	**Forrester Research B.V**[59]
Europe's 3G operators will not see break-even until 2014 since only 10% of European mobile users will use UMTS in 2007	**Forrester Research B.V**[60]
3G will be a big success but the customers will not consume vast quantities of data and in five years' time, operators can expect customers to spend only half as much more per month than they do now.	**Thinking Box**[61]
From the vast majority of users spending on 3G, 62 per cent will be on voice calls rather than data services. Multimedia messaging, web browsing and other novel services would form the remainder.	**Bbc.news**[62]
Mobile commerce has proved to be an almost non-existent channel for commerce transactions	**Ovum**[63]
Mobile internet in Europe has done little to assure operators of the future data revenue streams they need. SMS is the only successful data service.	**Europemedia**[64]
Slow adoption of mobile commerce to the still voice-centric nature of the mobile-phone industry. The majority of mobile-phone users have a general lack of interest or perceived need to use their handsets for anything other than making phone calls.	**A.T. Kearney**[65]

These studies claim that while significant investment is being made throughout the world to bring mobile data services to the marketplace, consumer acceptance is lagging dramatically. In contrast with PC and Web generic application platforms, the market hasn't achieved yet to develop too many social mobile applications to support people in their inter-personal activities outside of work and home establishments as shown in the following figures.

[59] www.strategic.gr/publications/knowledgehub/SelectedSurveys/D/D32.htm
[60] www.forrester.com/ER/Press/Release/0,1769,752,00.html
[61] http://news.bbc.co.uk/1/low/technology/2367829.stm
[62] http://news.bbc.co.uk/1/hi/technology/2367829.stm
[63] http://www.strategic.gr/publications/knowledgehub/SelectedSurveys/A/A46.htm
[64] http://www.strategic.gr/publications/KnowledgeHub/SelectedSurveys/D/D43.htm
[65] http://www.strategic.gr/publications/knowledgehub/SelectedSurveys/A/A12.htm

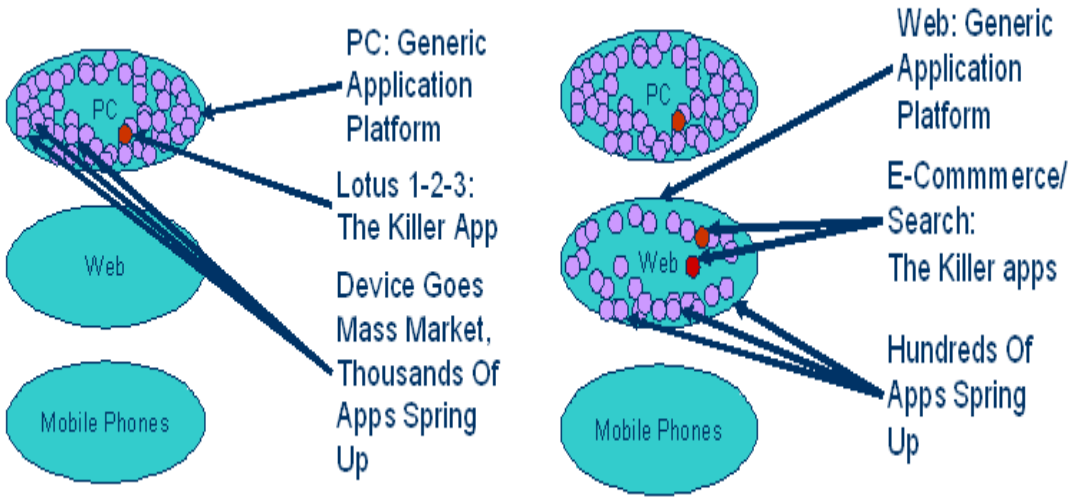

Figure 3 : Trends In Applications Development , Smith (2005,p5-6)

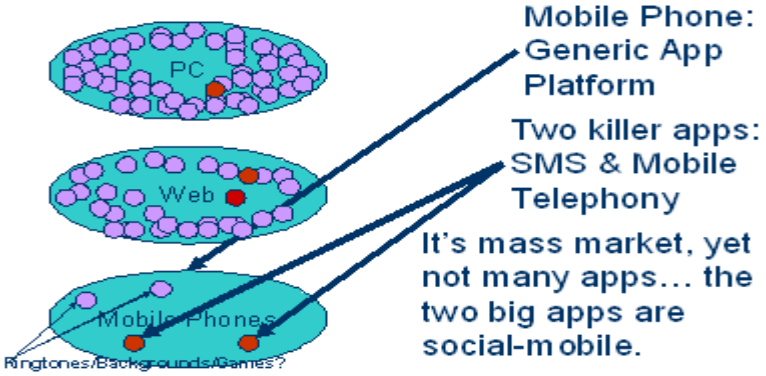

Figure 4 : Social Mobile Apps On The Mobile Phone, Smith (2005,p7)

This situation forced the major European[66] mobile key actors, relevant companies, research centers and universities to admit that in order for Europe to become the leader in the mobility market, joint and multidisciplinary research in the areas shown in figure 5 will be required.

[66] http://www.emobility.eu.org

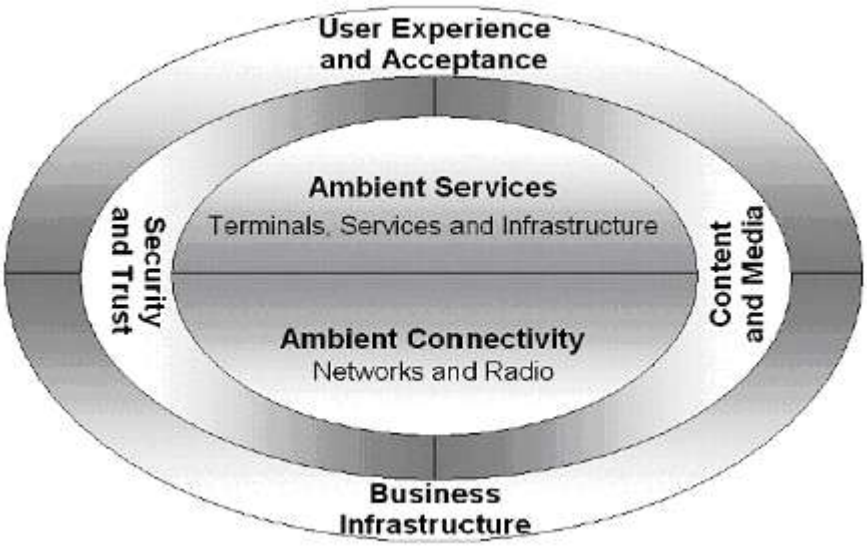

Figure 5 : Proposed research areas from the E-mobility forum (Tafazolli and Saarnio, 2005,p.7)

The above figure shows that the European industry of mobile data services market considers it as essential to turn the research and development focus on device and user-centered elements. Their vision is to move to a society where mobile network operators, equipment manufacturers software development organizations and content providers will provide users with "on demand" services that will support the needs of the citizens and will improve their life quality. As they argue, technology needs to match the growing needs of the users, both enterprises and the consumers, since above all it is the user experience that drives the adoption of new services. In fact they agree with Aarnio (2002) suggestions that in the future the research should discover users' and non-users' attitudes and opinions on mobile data services, cluster different attitudes and investigate future willingness to use these services.

For the above reasons one of their research priorities is how to ensure and improve the acceptability of services in order to enable better user experience. For example, one of their main research targets is to "*explore how context-awareness can provide rich and consistent user experiences for future mobile applications and systems*" and to "*develop a flexible context-modeling framework with efficient means of presenting, maintaining, sharing, protecting, reasoning, and querying device, user and network context information*" (Tafazolli and Saarnio, 2005, p.6). Ofcourse in order to move to new efficient and robust user-centered applications there is the need:

- For better understanding of the adoption and usage process of mobile data services and devices when users move freely within these ubiquitous environments.
- To define the service quality provided to the end-users or the enterprise customers in order to make it easy and simple for them to reach services with a minimum of effort.

The key element for achieving the above objectives is the development of the appropriate models, frameworks and theories that permited me to proceed in the field

research. But although the widespread adoption of mobile phones makes it more urgent to understand and explain the mobile data services adoption and use process, it is more difficult for applied researchers and industry players to get a general understanding of end-users' adoption behaviour. These disappointing results of mobile data services adoption and use make scholars[67] question the understanding of the adoption and usage process within these new environments. This can be explained by the introduction of new complex technological environments and the lack of appropriate adoption models. For example, human beings are more complex and thus researchers find that beyond cognitive and emotional aspects, affective aspects may have independent influence on user attitude against technology (Weiss, Nicholas, & Daus, 1999; Heshan Sun, 2004).

Traditionally information systems researchers have made significant efforts in building theories to examine and to predict information technology adoption and use. For example, the technology acceptance models (TAM) as proposed by Davis (1989) and Davis et. al.(1989), the theory of reasoned action (TRA) as proposed by Fishbein & Ajzen (1975) and the theory of planned behaviour (TPB) as proposed by Ajzen & Madden (1986), study micro, individual level behaviour and are applied primarily to explain the individual adoption and acceptance of technologies such as ICT-systems and applications in the workplace (Fishbein et al., 1975; Davis & Venkatesh, 2000). Similar to the above theories, the diffusion theory has reached an established position in innovation research since it considers that the individuals' perceptions of an innovation, affect their adoption behaviour (Rogers, 1995; Moore & Benbasat, 1996). This theory examines the factors that influence the adoption and diffusion of new technologies by categorizing adopters of different kinds into innovators, early adopters, early majority, late majority and laggards (Mahajan, Muller, & Srivastava, 1990).

But the traditional adoption models such as the TAM were originally developed for studying technology at work and most of the later enhancements and modifications to the model are also focused on business software applications (Legris et al., 2003). Ofcourse later Pedersen (2001,2002), applied the TAM model to explain the intention to use mobile commerce services. He found that the TAM model should be extended with variables including subjective norm and behavioural control and suggested applying a modified version of the decomposed theory of planned behaviour. Following that model Pagani (2004), extended the TAM model to study motivations and barriers to the adoption of 3G mobile multimedia services using an exploratory qualitative stage and a quantitative stage focused on the Italian market. Using TAM model Ling (2001), showed that an individual's text messaging use decreases as the user gets older and Karlsen et al. (2001), that use of text messaging complements voice services for economic reasons. In a recent study, a unified theory of acceptance and usage of technology was proposed and tested by integrating some of the prior models (Venkatesh et al., 2003) .

In the context of technology adoption, TRA proposes that actual use is determined by the individual's behavioural intention to use technology. Recently Barnes & Huff (2003), cover adoption in their model within the wider themes of compatibility and

[67] http://www.emobility.eu.org/documents/SRA/SRA4_051123_Final.pdf

trial ability, by applying TRA to explain how features of "imode" technology have driven its adoption dynamics and success. Pedersen (2001; 2002) applied TPB to study the adoption of mobile services with considerable success. He concluded that the influence of behavioural control will vary across mobile services and different user categories.

But although scholars have adopted traditional theories and models to study adoption and use of mobile technologies and applications, Agarwal and Prasad (1998), Lee et al. (2003), Legris et al. (2003) and Venkatesh et al. (2003), argue that the existing adoption and usage models have limitations which question their generalizability and explanatory power within different contexts. For example, the initial UTAUT study focused on large organizations and yet has not been tested in many different settings and contexts (Pu Li & Kishore, 2006). More recently Dickinger et al. (2006) showed that existing adoption models were not satisfactory for highly interactive mobile communication technologies while Mallat et al. (2006), indicated that traditional adoption models should be augmented with the use situation and mobility variables to better explain the use of mobile services. This argument follows the suggestions from existing studies which argue that contexts could play an important role in user technology acceptance (Davis et al., 1989; Taylor & Todd, 1995; Szajna, 1996).

This literature review argues that the traditional models cannot investigate efficiently the acceptance of mobile data services because these have been applied mainly to static environments as home, workplace and others and specific technologies such as TV, PC, ATM and others. Although IS researchers, Lyytinen and Yoo (2002), Landor (2002) and Urbaczewski et al., (2002), have started to study the adoption of mobile data services, in the light of radical improvements in the mobile technology as these affect new populations, research in the mobile territory is still in its infant stage (Aarnio et al., 2002). In fact there is much less empirical research in depth on the use of mobile telephony as Lacohée et al. (2003, p. 206) argue *"...while technological innovations in general have been the focus of a wealth research, telephony, and more specifically mobile telephony, is only just beginning to be studied in any depth".*

Furthermore, two other theoretical approaches have been employed by researchers in order to study end users behaviour in the mobile telephony area. The first one is the "uses and gratifications research" which studies the gratifications sought by adopters of media of different kinds. Leung and Wei (2000), applied "uses and gratifications studies" for mobile services like voice and messaging stressing that newer generations of mobile telephony introduce the telephone as a content medium as well as a communication medium identifying seven gratifications of mobile telephones[68]. The second one is the domestication perspective, in which every day life is studied. The main focus of domestication research is on the societal consequences of the domestication of technology that is the process in which the use of technology becomes integrated into our everyday life. According to Ling (2001), domestication research is dominant in studies of mobile end-user service adoption and use. Townsend (2001b), analyzed the consequences of mobile telephony on the planning of cities, while Fortunati (1998), analyzed the consequences for the family, as an institution and for individuals using the mobile telephone as a way of expressing their

[68]"fashion/status", "affection/sociability", "relaxation", "mobility", "immediate access", "instrumentality" and "reassurance"

individuality. Research has either focused on the functional use of mobile services in leisure and everyday context, or focused on how the boundary between work and leisure context is blurred by the use of such services. Findings indicate that explanations of the adoption of mobile services should be investigated across work and leisure contexts. Within this framework Palen et al. (2001), studied the impact of mobile phones adopted for functional, work-related reasons (e.g. availability, flexibility), on the users' everyday life activities.

It is only recently that mobile data services have attracted the attention of the scholars who started to explore mobile services usage behaviour. In the work context, much domestication research has been conducted on the adoption of mobile services among knowledge workers (O'Hara et al., 2001) as well as on "blue collar workers" (Brodie & Perry, 2001). The most recent trend in domestication research on mobile service adoption treats context as dynamic and end-users as managers of their multiple identities and relationships in a multiple "role" society (Green, Harper, Murtagh, & Cooper, 2001; Wellman, 2001). Applying this perspective, Palen et al. (2001), realized that the social mobility (the number and mobility of ones professional and personally roles) influences mobile service adoption and argues that the "role management" should somehow be integrated into a comprehensive model of mobile service adoption, Prasopoulou et al., (2006), found that knowledge workers as mobile phone users are becoming more vulnerable to organizational claims arguing that mobile phones emerge new socio-temporal order and render the management of the social spheres in which professionals participate while Sell and Walden (2006), conducted qualitative interviews to explore the motivations behind knowledge workers' usage of mobile digital calendars, In the field of the mobile data services Counts and Fisher (2008), studied the use of a mobile device-based social networking service and Hakansson et al. (2007), studied the role of a shared mobile music application for social interaction, Haghirian et al. (2008), investigated the attitude toward mobile advertising between different cultures while Carlsson and Walden (2007), conducted an empirical study to find out the reasons for a possible adoption and use of mobile TV in Finland. Furthermore, Constantiou et al. (2007), suggested that adoption of mobile devices does not imply homogenous use of mobile data services delineating four categories of mobile users (Talkers, Writers, Photographers and Surfers) while Kim et al. (2007), introduced the Value-based Adoption Model (VAM) to explain customers' mobile data services adoption behavior. Mobile commerce which provides services and products through mobile network (Vrechopoulos et al., 2003), has also attracted the attention of the scholars who reviewed the available mobile applications (Liang & Wei, 2004; Ngai & Gunasekaran, 2007), reported ways to stimulate and facilitate customers' participation in mobile commerce (Cho et al., 2007) and studied the trust issues in mobile commerce (Siau et al., 2003).

The term of mobility generates questions of how to conduct useful and usable studies of acceptance when researchers cannot always be in a space or an approximation of it or in public spaces to see how the user uses a system or a service. Due to Sorensen (2002), Yoo (2002) and Haddon (2003) the success of SMS and imode is an indication of the difficulty of using the adoption patterns that exist now.

On the other hand, adoption is typically studied at the aggregate level using diffusion models and leaves the individual end user out. Diffusion studies which focus on describing adoption processes at the macro level tried to offer some insights to how and why mobile services are accepted and adopted as Danaher et al. (2001), who studied mobile data services providing information and knowledge on product characteristics, diffusion stages and adopter categories. Mobile data services are first adopted by innovative users, early adopters and probably also early majority users (Mahler & Rogers, 1999). According to this categorization, Wei (2001), studied the socioeconomic characteristics of mobile phone laggards in Hong Kong and Tjostheim and Boge (2001), studied the demographic characteristics of early adopters of mobile commerce when compared to non-adopters. Rogers (2000), suggests that the difference in the adoption processes of mobile and fixed telephony may be explained by differences in social network effects (externalities) between the two technologies something that we have to keep in mind when trying to generalize diffusion models from simple mobile end-user services to 3G services. Pedersen et al. (2002), suggest that aggregate and technology based models are insufficient to explain the mobile commerce adoption process and Venkatesh et al. (2003), address the limitations of the studies that have been conducted to validate modified adoption models. These limitations concern the relatively simple technologies and services (e.g. sms, voice services), in contrast with the more complex technologies of the new generation mobile data services, the groups of the participants that are mainly students in an academic setting in voluntary usage contexts after their acceptance or rejection decision rather than during the active adoption decision-making process. According to Pedersen et al. (2002), the adoption decisions of individuals must be better understood to predict and explain the adoption of 3G services and mobile commerce.

Furthermore, despite the importance of place within mobile networked environments as this has been highlighted in the previous section most of the literature and research on the adoption and use of technology has been conducted mainly in static areas such as the workplace or home (Weilenmann, 2001). Even there, there isn't a clear understanding of the relationship between technology, the environment and the activities that take place. Venkatesh and Davis (1996), studying technology assimilation in the home space realized that there were limited theories of how to analyse and thus to understand spaces. Although they introduced two spaces in the home to explain the use of home technologies - the social space, and the technological space - they did not predict that each person during different time zones has different views of the social space. In very little of the literature the interaction between people and static technology in public areas is taken into consideration. Ruback et al. (1989), researched the use of a public telephone while Little et al. (2003), tried to understand the factors that influence the use of ATM in public areas. They concluded that in the study of the use of technologies in public areas one has to consider personal space as an important factor, especially now whereas Lash & Urry (1994), argue that mobile and ubiquitous technologies bring us in front of new forms of social distancing. These technologies made scholars start interesting of how people interact with the physical environment describing its nature through the concepts of space and place.

Recent studies of Ling et al. (2001), Pedersen et al. (2002), Shengnan et al. (2003), Sarker (2003), Pagani (2004) and Carlsson et al. (2005), argue that context and place should be a determinant of intention to use a mobile data service. Shengnan et al. (2003), on the other hand developed Context-aware Mobile Multimedia Services, within the SmartRotuaari[69] project recognizing the importance of the context in the adoption decision process. Carlsson et al. (2005), studied flexibility regarding place and time as main factors that constitute benefits and barriers to the use of mobile services while Sarker (2003) and Pagani (2004), proposed models to understand the adoption process of multimedia mobile services introducing the constructs of context and the "modalities of mobility". Pedersen et al. (2002), concluded that the extrinsic motivations of usefulness are context specific and Ling et al. (2001), researched mobile data services adoption by studying end-users multiple roles and identities across contexts. Finally, Chin et al.(2003), Venkatesh et al. (2003) and Sun et al. (2004), confirmed that the inclusions of moderating factors could enhance the model's explanatory power.

Mobile data services also are believed to be quick and the period of time users spend in the usage task is significantly short because they are on the move. So it seems to be difficult to capture the factors behind the decision to use or not a mobile data service due to insufficient information about the place the users are in. The research attempts have been applied up to now mainly to static environments using traditional adoption theories. These theories ask for a quantitative data collection approach using surveys and close questionnaires. But these methods may underestimate factors that are crucial in the decision to use or not a mobile service. I believe that since new meanings have emerged "use of IT by people on the move within different places", initially there is a need to explore the role of place where the use of mobile data services is being conducted, something that could better bring into light hidden issues, experiences and behaviours of the users who are on the move. Thus an exploratory approach has been adopted by this study to identify how users experience place before deciding to use mobile data services.

Generally, studies in mobile data services adoption choose one of the three possible approaches presented above: the adoption approach, the diffusion approach, and the domestication approach as shown in the following figure. The level of analysis distinguishes between macro-level studies of aggregate groups and micro-level studies of individual end-users. The purpose of study distinguishes between three categories, i.e. descriptive studies [70], explanatory studies [71] and studies of consequences[72].

[69] http://www.rotuaari.net
[70] describe the adoption and usage patterns of end users focusing on the observed behaviour
[71] explaining why a certain adoption behaviour is observed identifying the antecedents and determinants of the observed behaviour
[72] predicting what consequences end user's behaviour may have in society

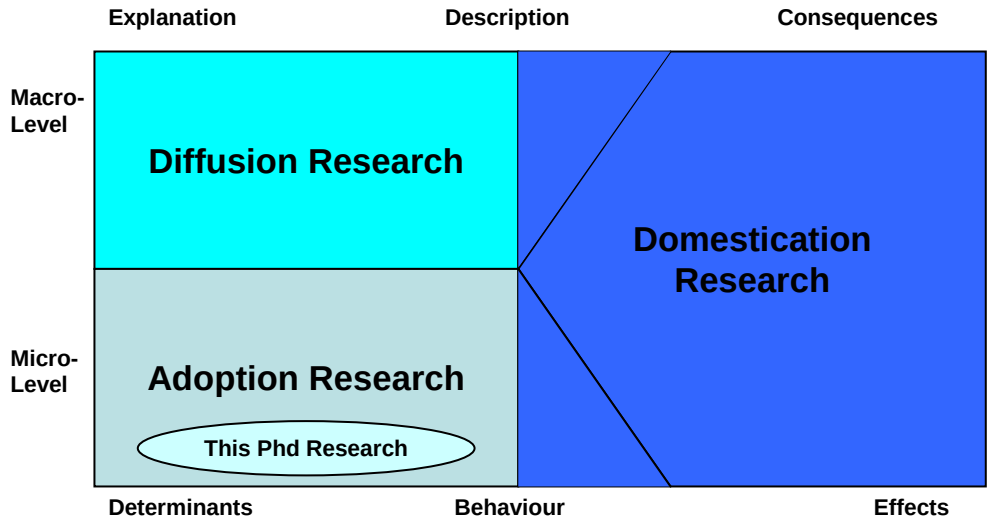

Figure 6：Position of the PhD research in terms of the typology of perspectives in end-user service adoption studies (Pedersen and Ling, 2003,p2)

This study concerns the adoption and use of mobile data services within different places conducting a micro-level study of individual end-users, trying to highlight how they experience place before deciding Service A. It should also be clear that in this study I focus on the decision to use, referred in this thesis also as usage process and not the final adoption and acceptance of the mobile data services. As the study of the secondary data of the chosen case study revealed as well as the data that came out from the "phase 1" research (Section 4.2), showed that most of the users adopt the "service A" when they purchase specific phone devices which are compatible with the service A application. But most of the users that adopt the service A handsets and thus have the intention to use the service A do not become frequent users of the service A. This could be explained by the hypothesis that the users do not know how to put the mobile data services into use or they do not have the motivation to try to learn how to use this service or tried few times to use the service and did not like the experience. So in the case of mobile data services I distinguish the adoption of the Service A handset from the actual use of the service A service. Since my study concerns mobile data services adoption and use I focus my research not on the adoption process but on the usage process of mobile data services. Similar problems with taking services into use have been reported by (Kasesniemi, Ahonen, Kymäläinen, & Virtanen, 2003).

But studying the use of mobile data services within different places is a complex process since the relationship between the place and the events occurring within it is much more complex and rich phenomenon. According to our everyday experience, we actively re-arrange and modify the places we inhabit and their elements, we organise our activities around them and we interact with other people in them. We also become attached to particular places such as our home, since they evoke feelings and emotions. Thus it seems that place is not a simple geographical "container" for our experiences but something more than that.

2.3.3. Space and Place

Space refers to the three dimensional geometry location of reality as it is presented to us. Spaces are classified using the term privacy into: private, semi-private, and public spaces. Altman (1975) and Harrison and Dourish (1996), consider space as the physical world and argue that there is a need to differentiate between space as physical location and place as social world. Moving beyond "geometrical" space I outline some philosophical views that surround place. Lainer and Wagner (1998), suggest that particular individual and social activities and behaviours can be trigged through the features of spatial design and Crabtree (2000), supports that a sociological perspective should be applied to understand the relationship between space, place and human behaviour.

The first discipline to express a concern that space is not limited to its physical variables but it is related and influenced by human activities, is Environmental Psychology (Canter & Singer, 1975). Environmental Psychology was mainly concerned with the establishing a functional relationship between environmental stimuli and behavior of humans. Interesting findings of the environmental psychology show that the environment can been seen as an open, dynamic system where importance should not be focused only on the spatial structure and features, but rather on the connection between the space and its inhabitants and on the social practices shared by the users of a space which could contribute to its shaping (Proshansky et al., 1969). Canter (1977), sharing the vision of the environment as a dynamic process pointed out the necessity to recognise the properties of the lab space in social studies in influencing human behaviour questioning the validity of such studies. He supported this argument upon the complexity of the connections between the space, people's interaction with it and with social interaction in that environment. In summary, the attention of Environmental Psychology relies on an assumed direct relationship between space and human behavior, over-simplifying thus the problem of understanding humans' behavior within a space. Within Environmental Psychology important factors such as cultural influences and personal characteristics and attitudes are not considered in depth. Therefore, I believe that although Environmental Psychology shed some light on the relationship between behaviour and space, it cannot provide a rich conceptual tool for me to study the complex behavior of mobile data services usage within everyday settings.

The most serious limits that the environmental psychology presents, when applied to the research questions I am investigating, are:

- The lack of a detailed articulation of the dimensions that constitute the experience of a space.
- The lack of practical ways to study people in places since this thesis is concerned with issues of how we study users of mobile data services within everyday settings.

I therefore highlight the discipline of humanistic geography which is concerned with these issues and has strong methodological and practical orientation. Humanistic Geography, which for the purposes of this study was adopted as the perspective which provided me with the concepts to investigate the individual, social and cultural level of human activities within a space, concentrates on people as much as it concentrates on space and place.

The move towards a more holistic view of the relationship between humans and space finally takes place within the "humanistic" school of Geography which focuses on individuals and their experience in the world. Within this perspective the vision of the world is constructed around the notion of place itself (Peet, 1998). This is because "place" as a construct implies the dynamic relationship between space and human actors. Within this discipline culture shapes place, as do social relationships and issues such as the gender which is being brought into enquiry (Entrikin, 1991; Massey, 1994).

Humanistic Geography looks at spaces and sees places, which are more than just locations and landscapes, they are entities in which people live, have experiences, understand and find meaning. "People do not simply locate themselves; they define themselves through sense of place" (Crang, 1998: 102). Even animals have a sense of a place which they defend and which gives them a sense of belonging or a sense of identity or place within a group. Places are therefore spaces which have meanings, and as Harrison and Dourish (1996), argue we are located in 'space', but we act in 'place', like when we are located in a 'house' but we live in a 'home'. They propose that place itself should be considered to understand individuals' behaviour since this includes meaning associated cultural and social practices. Erickson (1993), suggests that "place", rather than space, should be used to describe physical environments since people invest these environments with memories, understandings, meanings and actions.

According to Crang (1998), the main philosophical influences on Humanistic Geography are:

- *Intentionality* through which humans assign meanings to objects. Places are not just locales and objects, but are shaped by the way humans approach and assigns meaning to them.
- *Essences* through which humans can feel an attachment to a place or the unique spirit of a place. Thus the meanings people attach to a place extend beyond the visible and include emotion and memory.
- *Situatedness through which humans* knowledge of the world is always starting from and based around places meaning that their realization of a place is a product of how they interact with it.

Humanistic Geography treats humans as individuals constantly interacting with the environment linking individual sensory and emotional perspectives to cultural understandings of place as for example religion and ethnicity and seeks to understand this interaction by studying it as it is represented by the individual (Johnston, 1991). These approaches imply the adoption by humanistic geographers of qualitative methods of investigation and data collection rather than on the quantitative methods of the spatial science, in order to conduct experiential field work (Rowles, 1978). The goal is to avoid generalisations and, most of all, "measurements". In this respect, humanistic geographers critique quantitative approaches (Ley and Samuels, 1978).

After outlining the theoretical approach of Humanistic Geography, I am going to describe the different elements constituting the concept of place following this perspective. According to this perspective, the concept of place refers to more than just a location. Place is inextricably linked to humans and the situations that happen in

that location and that are meaningful to them. Relph (1976), defined what he called the ‘raw materials’, the three components that make up the identity of the place: the physical setting, the activities offered by the place such as the social activities and the routines as well as the meanings deriving from past events and present situations, attributed to the place. According to him, the understanding of the identity of place is dynamically created by the interconnections between them. This analysis of the components of place is not, however complete in Relph's view since an important aspect of identity termed as 'spirit of place' which refer to character or personality of the place serves to link the other components.

A component such as the "spirit of place" is hard to identify since places may hold meanings unique to individuals or groups related to aspects such as cultural heritage or social practices. Buttimer (1980), tried to attribute the overall spirit of a place to more observable elements such as symbolic, emotional, cultural, political, and biological. She does not, however, discuss the Relphs’ raw materials of place.

Sack (1997), tried also to provide another framework for understanding the constituents of place. He focuses on the definition of place as constituted by dynamic configurations of space in a geometrical sense, *meaning* and *social relations*. Moreover, he suggested that the connection between place and action is also based on social and cultural rules. When actions occur, the particular places in which they occur make a difference, as places both constrain and enable us. Sack's framework is somewhat limited since it lacks the attention towards experiences, feelings and individual values coming from the individuals’ background assuming that meanings and social relations are always shaped by cultural or social rules.

Furthermore, Agre (2001), suggested that place is a space filled with architecture, practices (routine actions people do in particular places) and institutions (social roles and rules that characterize these practices). In a more recent example Kostakos et al. (2004), claimed that place is inextricably linked to people and how they perceive this location in terms of social connections and the presence of others, protocols of behaviour, values and cultural meanings attached to it.

The richest and most complete investigation of what place is, has been conducted by Yi-Fu Tuan, one of the most important voices in Humanistic Geography. Tuan refined the conceptual distinction between space and place and defined places as entities that describe our experience of being in the world, *"incarnate the experience and aspirations of people"* (Tuan, 1971,p.281), and endow a physical location or setting with meaning, memories and feelings (Tuan, 1977).

Tuan (1974), initially developed the concept of place as a whole from an experiential perspective neglecting the emotional attachment. In his book "Space and Place" Tuan, (1977), developed a more completely concept of place narrowing down the theme of human experience of the environment to the concepts of space and place. He focused on the relationships between space and place, and what differentiates space from place. He critiqued approaches that focus on measuring features of the space to generate laws and theories since these data need to be complemented by experiential data.

According to Tuan, space is organised by people to conform to their biological needs and social relationships. Ofcourse as he argued the feelings of spaciousness can be altered due to machines and systems that can change humans' sense of space and spaciousness. All the human senses (sight, taste, smell, hearing and skin sensitivity) together with movement construct together in the humans' mind the experience of a physical external world inhabited by objects. It is this human spatial ability to construct knowledge which in association with personal reflections, feelings, cultural values and meanings starts changing this primary idea of space to a place. Therefore, there is a direct relationship between space and feeling.

Furthermore, the presence of other humans physically sharing a space and culturally sharing values and meanings also contribute to changing the idea of space to a place. This happens because the humans' sense of place has some communal elements that go beyond bodily sensations and cultural influences such as sharing experiences within a space.

Tuan among the others discusses architectural design as an example of the many elements that create the sense of a place since it creates a tangible, perceivable world that articulates experiences and clarifies cultural identity and social roles and relations. Moreover, Tuan discusses the relationship between time and the experience of place, since place exists as it is experienced by people at a certain time and we become more attached and emotionally tied to a place, the more time we spend within it.

2.4. Modeling Place

Concluding from the above I argue that the mobile networked technologies introduce the importance of place in the studies of adoption and use of mobile data services. Thus there is a need for a new approach to study the relation of mobile data services' users with place. Following the above I propose the following approach.

2.4.1. Theory of place

This study regards the exploration of the role of space and place in influencing the interaction between users and ubiquitous technologies (expressed here by mobile data services). My interest in further studying the notions of space and place is motivated by the particular kind of services I am concerned with, known as mobile data services, since these services are used within different places beyond the workplace environment. Thus, in Section 2.3.3, I tried to explore the notions of space and place as these emerged within different perspectives. To proceed with this thesis objective I adopted a Humanistic geographical perspective on place influenced by Yi-Fu Tuan's theory, using the terms "place" when referring to the "lived", "experienced" qualities of an environment, and "space" when pointing out to its geometrical and physical extension.

Tuan's theory is developed from an experiential perspective since place exists only as it is *made* by people's experience (Tuan, 1977). So since the primary feature of humans experience is coming from their senses, place can only be grounded in the physical reality of the world. So the first material of place according to Tuan is the physical one which we can physically sense, explore and inhabit within it.
In Tuan's view the other three materials of place are the personal, the social and the cultural.

Adopting Yi-Fu Tuan's analysis of the "materials or layers of place", I define place as a complex experiential notion that takes form from the following dimensions:

- the **physical** features of the space, as place is an experienced space
- the **personal** features of the user, related to the feelings and emotions the user associates to a place, to the memories related to it, to the personal knowledge and background we invest the place while we make sense of it.
- Each particular experience of place is influenced by the **social** interaction and the presence of others physically sharing a space and culturally sharing values and meanings, the communication within the place, the social co-ordination and ethics.
- and finally the **cultural** influences related to the rules, conventions and cultural identity of a place and of its inhabitants.

As mentioned in Section 2.3.3, many qualities of place are identified and discussed by scholars such as Relph, Sack and Tuan (Tuan, 1971; Relph, 1976; Tuan, 1977; Sack, 1997). Elements of placemaking are: actions, meanings and interpretations, physical features, experiences by individuals or social groups and cultural elements. Tuan argues that the mobility of user via the bodily movement, through the space and all

the human senses, sight, taste, smell, hearing and skin sensitivity, construct together in the mind the experience of a space. The association of many factors as the built environment, the architectural design, the social roles and relations the personal and cultural values and meanings change this primary idea of space into a place.

These materials of place are presented in more detail below:

Table 3 : Materials of Place

Physical materials of place	Following environmental psychology which assumed an influence of the physical variables of the space over the human behaviour, Tuan introduced the physical layer of place. The physical factors needed to define place are: • Time. • Location of the space. • Environmental conditions (e.g. temperature, light, sound, wind speed, raining etc.)
Personal materials of place	The personal layer of the place consists of the user's experience, memories, beliefs and previous knowledge of the place, feelings, emotions and attitudes associated to the place.
Social materials of place	The social layer of the place concerns social roles and interaction, communication and collaboration between individuals within the place. The perspectives of private and public can also be used as a social attribute to categorize place. For example, Fortunati (1998), has investigated how the use of the mobile phone has transferred communicative space from the public sphere to the private one.
Cultural materials of place	The cultural layer of the place concerns the culturally influenced qualities of the environment as for example the rules, conventions and cultural identity of the place.

These materials or layers do not exist a priori, but exist in connection with the others leading to and emerge through people's actions and activities within a physical space. Each material or layer of place is present at any moment of one's experience of a place, and the experience is shaped by the dynamic interconnections among these dimensions. To understand a place and its inhabitants, all four dimensions and their connection with each other have to be taken into account. Through their actions, humans leave traces of their presence and actions in a space which "shape" place as it will be experienced by themselves or others in the future. Tuan also discusses the relationship between time and the experience of place arguing that place exists as it is experienced by people at a certain time, as for example a central square in the morning and in the new years eve are different places, and that the more time we spend within a place we become more attached and emotionally tied to it. A four layer pictorial representation of Tuan's "materials of place", within this study I refer to the "materials of place" using the term "layers of place", follows as proposed by us:

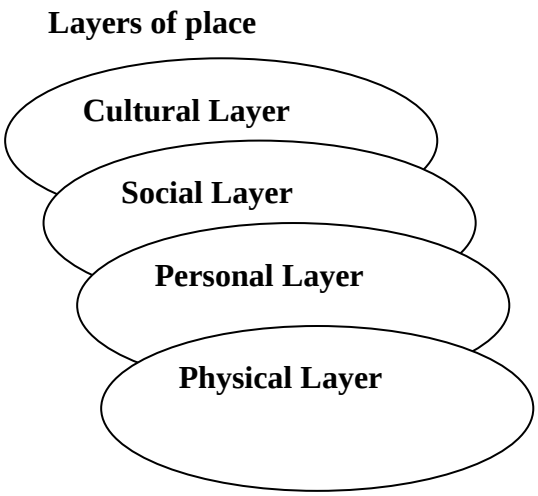

Figure 7 : Tuan's Layers of place

I believe that the roles of these dimensions of place have to be considered when studying and exploring for new moderating factors in the adoption theories. For example in different places a user has different needs (for example need for security, belonging and approval), where in some of these places the mobile data services satisfy these user needs. In that perspective in predominantly culture places as museums, the place itself may trigger actions if this is in accordance with cultural rules as for example the users take a photo with mobile phone and send it via MMS to their social group.

2.4.2. The Brahms model

I decided to model place and analyse the factors and attributes of the Tuan's layers using the Brahms modeling language. Brahms is a simulation tool to model business processes and to incorporate the social systems of work (Clancey et al., 1998; Sierhuis & Clancey, 2002) and it is considered a suitable multi-agent modeling and simulation environment for designing complex interactions in human–machine systems (Sierhuis, Clancey, Seah, Trimble, & Sims, 2003). I adopted this language to model the place layers and to analyse the factors and attributes that consist these layers. But although the Brahms model is suitable for studying kinds of social and work practice phenomena it is believed (Lisetti et al., 2005; Sierhuis et al., 2007), that larger social phenomena can also be modeled. Also Brahms takes into account the belief that we cannot ignore the influence of location upon people's decision to use technologies and thus models the activities of agents and groups in different locations and the physical environment consisting of objects and documents, including especially computer systems (Clancey et al., 1998).

The Brahms model differs from other multi-agent systems since it uses chronological activities of multiple agents, communication activities between agents as well as information representation and transformation within various physical modalities such as fax, databases and others (Sierhuis & Clancey, 1997; Clancey, Sierhuis, Damer, & Brodsky, 2005). The Brahms modeling language compared to other agent-based

models (ABM), such as Swarm[73], allows for a more 'natural' representation of human behaviour at the level of activities, reasoning, communication, interaction with objects and movement in the world (Carley & Prietula, 1994). For example, Swarm, an often-used language for modeling and simulating social and economic behaviour of large agent societies, is not based on any particular theory of human behaviour (Minar, Burkhart, Langton, & Askenazi, 1996; Luna & Perrone, 2002).

I briefly present the main modeling concepts of the Brahms language (van Hoof & Sierhuis, 2000; Sierhuis, 2001), which I modified to generate the model of place.

Following Sierhuis et al. (2007), the Brahms language is structured around the following concepts:

- Agents and Groups
- Objects
- Beliefs and Facts
- Workframes
- Activities
- Thoughtframes
- Geography
- Communication

Agents and Groups: Agents and Groups represent individuals and group of individuals.

Objects: Objects are representations of artifacts in the world

Beliefs and Facts: Brahms agents and objects represent the world state internally, what the agents believe, as propositions called beliefs (Hintikka, 1962; Konolige, 1986). Facts are actual world states.

Activities: Activity theory goes back to the 1920s and the developmental psychology work done in the former Soviet Union. The main developers of activity theory are (Leont'ev, 1978; Vygotsky, 1978). In the context of this theory the unit of analysis is an activity. Agents or objects behavior is represented as an activity (Clancey, 2002). Activities are socially constructed engagements situated in the real world, which take time, effort and application of knowledge. Conceptually we can represent activities as the "what we are doing at each moment in time".

Workframes: Workframes are situation-action rules derived from production rules, but because they execute activities, they take time.

Geography: A broad range of work in psychology and anthropology as stated by Sierhuis et al. (2007), has shown that to understand fully how people work we need to study context which includes geography, in order to understand the relation between individuals, artifacts and social groups. The geography model in Brahms represents where activities occur; hence we speak of located behaviors. Agents and objects are located in areas and can move from area to area by performing a move activity.

[73] http://www.swarm.org/index.php/Swarm_main_page

Agents and objects can also carry other agents and objects using the get and put activities. Time to move to another area is but one of the factors that influences how things get done. Other location-dependent factors include people and artifacts being in the same or different locations, and use of communication tools.

Communications: Communication is the activity of directional transfer of beliefs, held by one individual called the sender, to one or more individuals called the receiver(s). The Brahms model attributes particular interest in what triggers an activity; it often is a communication.

On the basis of the research of Clancey et al. (1998), a number of epistemological concepts is defined within the frame of the Brahms model:

- Behavior is defined by the socially constructed activities in which an individual is engaged in each day.
- Collaboration is the collective activities of two or more individuals from a community of practice (Wenger, 1998), communicating together within a work process in order to satisfy the individual goals.
- A community is a group of individuals, each with individual skills and knowledge, performing activities that collectively can be seen as a unity within the work process (Wenger, 1998).
- An artifact is a physical object in the world. When an artifact is being used in an activity, it becomes a tool for the activity.
- Knowledge is socially constructed, culturally defined, and fundamentally conceptual. Knowledge is used to act in the present (Clancey, 1997).

In summary, within this section I described the Brahms agent-oriented model which tries to simulate human behavior. Currently, the Brahms environment is being used to model and simulate work practices of human organizations. However, in this research I adopted concepts from the Brahms model in order to model human activities within real situations. Furthermore, the Brahms model helped me understand how activities and information actually flow between people and machines and how objects and tools hinder or help this process.

2.4.3. Model of Place

To answer the main research question "How does place influence the usage of mobile data services" I had to analyse users' behaviour when using mobile data services within different places. To proceed with that I had to identify and present clearly the main factors and attributes that describe the layers of the place as defined by Tuan. For that reason I decided to model place, keeping the main factors that characterize it, by adopting mainly the Brahms modeling language (Clancey et al., 2005).

A model is not the real world but merely a human construct to help us better understand real world systems (Kuhne, 2006). According to Kuhne (2006), a model needs to possess among the others the reduction feature meaning that a model only needs to describe a relevant selection of the original systems' properties. Since place itself is a complex concept I created a simple "model of place" for highlighting some

important features and aspects of the original system. This model can be used as a first step in the development of more complex model to represent place including more features in the future.

The Brahms modeling language, as has been mentioned before, is the most suitable for modeling human behavior at an individual user level in order to analyze or predict social behavior at the macro system level. The Brahms language is suitable for studying kinds of social phenomena of interest to the social simulation community (Sierhuis et al., 2007). Researchers in the field of behavioral economics at the UC Berkeley School of Information Management Science have started to use Brahms and are beginning to apply Brahms to economics of information systems (Acquisti, 2003).

My modeling approach is based on a method that divides the system to be modeled into a number of more or less independent sub-models. These sub-models come from the Tuan theory and are the layers of Place.

The model is subdivided into four sub-models (layers of Place):

- Space layer
- Personal layer
- Social layer
- Cultural layers

Based mainly on Brahms language I analysed each layer into its determinants which I referred to them as factors. I further proceeded and analysed these factors, based again in the Brahms language, into their determinants which I referred to them as attributes. It can be argued that I tried to provide a first approach of ontology of place. In information science, an ontology provides a vocabulary (type of objects and/or concepts that exist, and their properties and relations), which can be used to model a domain (Arvidsson and Flycht-Eriksson 2009). The ontology I provided describes thus the factors and attributes of place which are the specifications that define the properties of the layers of place.

The analysis of the layers into factors and attributes is and is presented below:

Space Layer

A broad range of work in computer science provided by psychology (Leont'ev, 1978; MacLean et al., 1990; Norman, 1991; Salomon, 1993) and anthropology (Suchman, 1987; Gantt & Nardi, 1992; Chaiklin & Lave, 1993) and has shown that in order to understand how people act we need to study the surrounding context. Thus the environment in which people perform activities is an important aspect in the study of mobile data services usage process. The model of the physical environment used in this study includes the user's current location as well as temporal relations and hosts the artifacts (psychological or physical), objects and tools. The main factors that describe space layer are the environmental conditions as well as the time and location where humans and objects can be placed. In the next section I present the attributes that characterize the time factor.

Time factor

The actual time and the temporal relations actual and perceived could influence the user's intention to use mobile data services. More specific the following attributes define the time factor:

Table 4 : Attributes of the time factor

Factors	Attributes
Time factor	Time zones and date
	Duration of stay
	Availability of time before leaving the location

In more detail:

1. Time zones and dates attribute. This attribute regards the essence of what time is and describes the time at the location of the user. Users have different behaviour characteristics and may have different attitudes regarding the usage of mobile data services in the morning, noon, afternoon or night because of the different pace of their working life.
2. Duration of being somewhere. This attribute concerns the period of time someone spends within a specific place and describes the time period the users have already been in this space. The duration of being in a specific space could be an attribute that will prompt the users decide for or against the use of mobile data services.
3. Availability of time. This factor describes the time period the users can spend in this specific space before they leave and move to another area.

Location factor

Areas: We live and act in a physical environment within which people, objects and artifacts are located when performing their activities. Humans and objects are located in various spaces, which in turn are located inside or outside building environments, where their actions take place. The representation of the physical world should be independent of the reasoning capability of humans regarding space. Humans perceive areas using conceptualizations, as for example the city, the neighborhood to mention but a few. Areas can be further divided into sub-areas. For example, a neighborhood consists of buildings that can consist of more than one floor. Areas can be represented hierarchically (Greece consists of Cities (Athens) which consists of Buildings (Mall / Restaurants) part of which are the Rooms. Areas can also include a number of relationships associated with them for example the restaurant is located in the Mall next to the cinema.

Figure 8 : Relationships of areas in the area of Athens

Move activity: Humans and objects can move to/from areas. The ability of movement among areas is an important attribute since it gives the freedom to humans to move and change their status whenever they wish for. The attributes of the move activity are analysed below.

Table 5 : The attributes of the move activity

Factors	Attributes
Location factor	**Move activity** -Connectivity and distance among areas (Path) - Indoors Versus Outdoors (near / far away)

The attributes of connectivity and distance have to be analysed in more detail in order to describe the motion activity. Connectivity between areas is an important attribute and can be represented through path relationships. A path connects two areas together and represents a route that can be taken by a user or an object such as a car to travel from one area to another. The distance represents the actual distance between areas. An important factor is the time it takes to move between areas which is based on the transportation used to travel over the path (by car, metro etc).

Another attribute that would facilitate or not the movement activity between areas is whether the users are located Indoors or Outdoors (near or far away) in relation to the specific area. In total I have:

Table 6 : Attributes of time and location factors

Factors	Attributes
Time factor	**Time zones and dates**
	Duration of stay
	Availability of time
Location factor	**Areas** - Types of areas - Relation of areas
	Move activity -Connectivity and distance between areas (Path) - Indoors Versus Outdoors (near / far away)

Objects/artifacts,

The attributes of the factor of the objects that could influence mobile data services usage behaviour are summarized below.

Table 7 : Attributes of the objects' factor

Factors	Attributes
Objects' factor	**Real physical objects**
	Concepts
	Arrangements of objects
	Availability of "objects" and alternatives for other activities

According to Brahms model, the behaviour of objects within or near the area (Sierhuis et al., 2007) can be represented by the real world artifacts and the concepts. Physical artifacts represent the physical objects (as for example the tables, chairs, computer, car, mobile phone, TV, Music, papers, books etc) while their attributes are represented by the concepts. For example, the real physical attribute of a wooden object in a cafeteria is the concept of a chair which can be used for sitting purposes. Concepts do not require a location to exist since they can exist within the minds of humans. The representation of concepts can also concern non physical entities in relation to which a human can have certain perceptions and attitudes that are related to the space and may influence user's activity (privacy of the area, data as for example incoming sms, user bank account, perception of computing environment such as network availability, public services, or the ability to have within this space communication over 3G network to mention but a few.

The arrangement of the physical objects generates different concepts as for example the sitting arrangements, the distance from tables, walls and windows and change the perception of the specific area. Since the availability of objects provides alternative activities within an area, I believe that it could represent an important attribute in the decision to use mobile data services.

Environmental conditions

The attributes of the environmental conditions' factor are the following:

Table 8 : Attributes of the environmental conditions' factor

Factors	Attributes
Environmental conditions	**Lighting – Noise – Weather conditions**

I argue that the environmental conditions within an area are attributes that can influence the human senses (sight, hearing and skin sensitivity) and thus could have a positive or negative influence upon the decision of users to use mobile data services.

According to the Brahms model, these physical conditions are the:

- weather conditions (temperature, wind speed, raining),
- sound,
- light

All the factors and attributes that are used to model the space layer are presenting below:

Table 9 : Attributes of the space layer	
1. Space layer	
Factors	**Attributes**
Time factor	Time zones and dates
	Duration of stay
	Availability of time
Location factor	Areas - *Type of areas* - *Relation of areas*
	Move activity -*Connectivity and distance between areas (Path)* - *Indoors Versus Outdoors (near / far away)*
Objects' factor	Real physical objects
	Concepts
	Arrangements of objects
	Availability of "objects" and alternatives for other activities
Environmental conditions' factor	Lighting – Noise – weather conditions

Personal layer

Humans are the inhabitants of the 'real world' that is made up of physical objects as well as constructs. The actions of people are constrained by the location in which they take place. Therefore, if we want to model the behaviours and practices concerning the usage of mobile data services there is a need to model the locations of the world and its inhabitants which are the people.

Furthermore, social interaction and human activities depend on the physical environment as well as on the personal characteristics of the users. Therefore in the personal layer I present the basic attributes that can explain the users' personal status and their relationship with their environments. These attributes concern the previous knowledge of the place, the memories and the personal experiences as well as the beliefs, feelings, emotions and values and attitudes associated to the place.

Relevant questions tried to highlight this attribute, as for example:

- have you ever been there before?
- how do you know about that place?
- what specific experience do you relate with that place? and
- how do you feel when you are there?

I simplified the personal layer model by breaking it down into four main factors: the attributes of the user, the user's emotional state, user's familiarity with the place and user's activity within the specific place. The analysis of the factors is following.

Attributes of the user

The attributes of the users are represented by their demographics data as well as by their culture with ICT technologies as shown below.

Table 10 : Users' attributes factor

Factors	**Attributes**
User's attributes	**Demographics (***Age , Sex, profession, socio economic status***)**
	ICT culture

According to the Pedersen and Ling (2003), Sun et al.(2004) and Sierhuis et al. (2007), the demographic attributes of the users are :

- Gender
- Age
- Profession
- Financial and socioeconomic status

And the ICT culture attributes are:

- The expertise and familiarity the users have with ICT technologies and systems
- How the users perceive ICT technologies
- Their intellectual capability and capacity regarding the ICT technologies

According to Haas (2007), inexperienced mobile users were insecure in relation to services that provided value to them and were more prone to quickly find a usable application mainly because they were directed to those applications which most other users had perceived as valuable. Recent studies conducted by Chang and Kannan (2006), indicate a positive impact of mobile technology use on user technology readiness and comfort with technology and highlights the importance of attitude towards IT as an influencing variable in the use of mobile services (Beurer-Zuellig & Meckel, 2008). The construct of technology readiness as an general state of mind has been defined as the attitude of people to use new technologies for accomplishing goals (Parasuraman, 2000). These constructs are included in the proposed model under the headings of the perception of ICT technologies and of the intellectual capability and capacity concerning the ICT technologies

Place attachment

This factor represents the familiarity the users have with the areas they are located. This familiarity is represented in emotional as well as in functional terms.

Table 11 : Place attachment' attributes

Factors	Attributes
Place attachment	**Emotional attachment**
	Functional attachment

The place attachment factor depends on the number of the visits the users have made in this area (frequent visits or rare visits). Since the users feel more comfortable being in places where they have been before, this could be a factor that may influence the use of mobile technologies.

User's emotional status

This factor identifies the past and present emotional conditions of the users as for example the mood, anxiety, fear, boredom, tiredness, happiness, anger, and sadness as well as the expectations the users have for the places.

Table 12 : Emotional status' attributes

Factors	**Attributes**
Emotional status	**Past experiences, beliefs, emotions, attitudes and feelings**
	Expectations
	Real facts (present emotions, attitudes, feelings, beliefs, mood**)**

Users create facts for the places either by having initial beliefs or by acting in these places. Humans have beliefs and expectations for the locations which come from previous experiences and their memories. But when they are located in these locations they experience real facts and new thoughts, emotions and feelings are being generated. Using these facts, which can meet or not the users expectations, the users can 'think' and deduce new beliefs which are able to generate new activities. For example, a user believes and expects based on his memories that meeting his friends in a cafeteria will give him moments of fun and relax. Only after experiencing the meeting with his friends the user can claim that this is a real fact. If the real facts match the preconditions and the expectations, of having fun, they can generate activities such as using mobile data services to send mms to other friends.

Other characteristics such as the personality and the culture profile could be considered of fundamental importance in understanding human activity. But I decided to omit these attributes from this study because the participants came from the same ethnic group. Other studies that will target participants from more than one geographical areas could consider these attributes.

Activity

Activities are the collection of actions performed by an individual according to the Brahms model (Clancey, 2002). Human actions are inherently social. These socially constructed engagements are situated in the real world, take time, effort and application of knowledge. The activity factor consists of the following attributes which are used to encode what people do when within an area.

Table 13 : Attributes of the activity factor

Factors	**Attributes**
Activity	**Type of Activity** (working, relaxing, socializing, attending)
	Timeframe (Duration of activity)
	Sub-activities
	Mobility status -Sitting, laying, standing, waiting, walking, running. -Users' life entropy

Type of Activity: This attribute encodes what the user does (i.e. what activities he or she is engaged in). The activities have a defined beginning and end (duration). For example, a user could be in the activity "go for shopping", or having vacations. Main activities that have been identified from the collected data are: working, relaxing (either in house or having fun in entertainment venues), socializing and attending (school, class, conference).

Timeframe: This attribute is required in order to specify when an activity is performed.

Sub-activities: The main activities can be interrupted or complemented by sub-activities. Sub-activities are micro units for viewing and describing human behavior. For example, a user is in a main activity of shopping and has to drive a car (sub-activity) in order to perform the shopping activity. Sub-activities as eating or using a mobile phone can occur at any time during the activity process.

The mobility status: The mobility status of the user refers to the moving action of the user. This factor defines the types of the user's bodily movement status (sitting, laying, standing, exercising in a gym, waiting and walking or running to a specified location) or broader user's mobility status (traveling, wandering, and visiting). Based on the definitions proposed by Kristoffersen and Ljungberg (1999), traveling can be defined as "the process of going from one place to another in a vehicle" while wandering refers to a form of "extensive local mobility" where an individual may spend considerable time walking around and visiting refers to stopping by at some location and spending time there, before moving on to another location.

The mobile technologies allow users to be always online, mobile and use technology whenever and wherever they wish. But individuals have identifiable patterns in their everyday life. These patterns can be found in the daily routines of getting out bed, eating breakfast, driving to work, having lunch, driving home from work etc., to weekly patterns such as the Sunday football match, and even to yearly patterns like having summer vacations. I describe this predictable pattern in an individual's life using the entropy factor (Eagle & Pentland, 2006). A user as for example a businessman who lives a high-entropy life move around places, while a low-entropy user as for example a prisoner characterized by strong patterns across all time scales. I measure entropy by using the simple model of: home, work, and elsewhere versus the time spent within these states. I believe that a "mobile" user with high entropy life should use mobile data services frequently.

The interaction status: The interaction status refers to either communicating, collaborating with other people and systems. Because the interaction activity is mainly a social activity because it relates other people this is being included and studied in the social layer model. The total personal layer model is as follows:

Table 14 : Attributes of the Personal layer

2. Personal layer	
Factors	**Attributes**
User's attributes	**Demographics (***Age , Sex, profession, socio economic status***)**
	ICT culture (expertise, familiarity and perception of ICT technologies)
Place attachment	**Emotional attachment**
	Functional attachment
Emotional status	**Past experiences, beliefs, emotions, attitudes and feelings**
	Expectations
	Real facts (present emotions, attitudes, feelings, beliefs, mood**)**
Activity	**Type of Activity** (working, relaxing, socializing, attending)
	Timeframe (Duration of activity)
	Sub-activities (The main activities are interrupted or complemented by sub-activities)
	Mobility status -Sitting, laying, standing, waiting, walking, running. -Users' life entropy

Social layer

The mobile phone has brought about new social norms and behaviours as for example the emerging phenomena in young adults and socializing patterns. A mobile phone is not only a highly personal tool, but a tool with respective implications for fashion and lifestyle. Mobile services as the text messaging on the other hand have become an integral part of mobile communication, with a significant impact on cultural and social norms in many countries (Farnham & Keyani, 2006). Furthermore, many aspects of being with and being apart from others evolve around the mobile phone. Attributes relating to social interaction can influence the usage of mobile technologies. These attributes concern the social roles of the users (employee, friend, member of family etc), the number of the people that are present within an area, the values, meanings and ethics that are culturally shared among the people within the same area, the type of interaction (communication or collaboration) the users have within a place and the type of the place in terms of privacy.

Roles of the user

The user within the same day adopts different roles for example in work at home and in leisure context. We are always present in a particular place because of a set of roles which we are performing within that environment. So any consideration of the user's interactions with their environment leads to the consideration of the activities in which they are involved and their role within those activities. For example, O'Hara et

al. (2001), categorized the type of mobile workers studying the adoption of services among knowledge workers. The factor of the social roles of the users concerns the tasks and roles the users have in a specific situation. Both formal structures (life partner, employee) and informal, emergent interactions (as friendship, sports fun member) are part of the activity model since these could influence behaviour.

Interaction status

The factor of the interaction status refers to either communicating or cooperating with other people and systems. Cooperation is an attribute that describes the common activities of two or more individuals from a group of individuals when they have to execute a task, either for work purposes or for fun as for example playing a game in their mobile in which more than one player participate. But to cooperate, people need to communicate. The communication attribute, (talk – discuss, command, promise, state - ask, listen, reply, report), refers to the exchange of information between people (either phase to phase or via telephone) or between humans and systems (exchange of data between a user and his mobile phone). I believe that the attribute of communication either between people, systems, or between people and systems, is of major importance in the analysis of the usage behaviour of mobile technologies because it consumes a considerable part from the users' time and as an outcome changes the user's beliefs and moods. Of course the impact of a communication on the users' behaviour and emotional state is different after a short incoming sms compared to a two hours face to face talk.

Communication is carried out with different modes using different tools. There is the synchronous communication which concerns the "same-time" communication between sender and receiver. This type of communication can be:

- same-place communication: same-time communication where the sender and receiver are in the same location having Face-to-face communication,
- communication over distance: "same-time" communication where the sender and receiver are in different locations. Phone-call, sms, mms.

There is also the asynchronous communication which concerns "different-time" communication with a delay between sending and receiving. This type of communication can be:

- the Same-Place Communication: different-time communication where the sender and receiver are in the same location using artifacts as Documents or electronic documents via electronic forums.
- communication over distance: different-time communication where the sender and receiver are in different locations using artifacts – fax, mailed documents or email.

Communities

I define the community factor as a group of individuals or subgroups that exist within an area and exist around the user (in both physical and virtual environments) that may have an influence on the users' activity and emotional state. This factor describes the properties and behaviors of the group of people that the users belong each specific time. The types of groups could be:

- social (friends, peers),
- organizational (professionals, family) and
- functional (group of strikers or member of a football team, cultural clubs, political clubs and others).

Humans can be members of multiple groups as well as groups can be members of other multiple groups. When humans are members of a group they usually 'inherit' attributes, relations, beliefs, activities from the group as members of it.

Table 15 : Attributes of the social layer

3. Social layer	
Factors	**Attributes**
Roles of the user	**Formal Roles**
	Informal Roles
Interaction status	**Communication** - Synchronous versus asynchronous communication - Formal versus informal interactions
	Cooperating - Working activities versus social activities
Communities	**Functional/Organizational / Social**

Cultural layer

There are concepts such as the architectural design, beliefs such as the cultural identity of the places and rules and conventions e.g. certain school rules, a more relaxed environment being in a cafeteria, and the strict conventions of the church, that govern and regulate human behaviour within places. For the needs of this study to answer how does place relate with the decision to use mobile data services, I decided to use cultural norms and rules as the attributes that characterize this layer because I believe that these seem to be the main influencers in the decision of users to access mobile data services.

Table 16 : Attributes of the Cultural layer	
4. Cultural layer	
Factors	**Attributes**
Norms and rules	Banned versus non banned public places

The attributes of the cultural layer are the rules and norms

Cultural rules and norm

Cultural rules and norms are explicit or implicit regulations and conventions that could constrain action or interaction and highlight which behavior is acceptable. Cultural rules and norms, referred to as "the way we do things around here", are behavior patterns that are typical of specific groups and they are not always related to social and legitimally standards of appropriate behavior. For example, based on the author's experience, in the territory of Greece it is a common norm to drive above the speed limit. Cultural rules and norms guide humans' perceptions and attitudes towards the locations which include how they as well as other people should relate to activities and procedures within these locations.

Summarizing the above, the description of the whole model of place is presented below. I use this model as a guideline to analyse the data.

Table 17 : Model of Place

1. Space layer	
Factors	**Attributes**
Time factor	Time zones and dates
	Duration of stay
	Availability of time
Location factor	Areas - *Type of areas* - *Relation of areas*
	Move activity -*Connectivity and distance between areas (Path)* - *Indoors Versus Outdoors (near / far away)*
Objects' factor	Real physical objects
	Concepts
	Arrangements of objects
	Availability of "objects" and alternatives for other activities
Environmental conditions' factor	Lighting – Noise – weather conditions
2. Personal layer	
Factors	**Attributes**
User's attributes	**Demographics (***Age , Sex, profession, socio economic status***)**

	ICT culture
Place attachment	**Emotional attachment**
	Functional attachment
Emotional status	**Past experiences, beliefs, emotions, attitudes and feelings**
	Expectations
	Real facts (present emotions, attitudes, feelings, beliefs, mood**)**
Activity	**Type of Activity** (working, relaxing, socializing, attending)
	Timeframe (Duration of activity)
	Sub-activities
	Mobility status -Sitting, laying, standing, waiting, walking, running. -Users' life entropy
3. Social layer	
Factors	**Attributes**
Roles of the user	**Formal Roles**
	Informal Roles
Interaction status	**Communication** - Synchronous versus asynchronous communication - Formal versus informal interactions
	Cooperating - Working activities versus social activities
Communities	**Functional/Organizational / Social**
4. Cultural layer	
Factors	**Attributes**
Norms and rules	**Banned versus non banned public places**

Summarizing the above I am presenting the approach to analyse and model the concept of place. The model is subdivided into four sub-models (layers of Place):

- Space layer
- Personal layer
- Social layer
- Cultural layer

Each layer is characterised by its factors and each factor is analysed into its attributes.

- Space attributes : geography, objects, time frame, environmental conditions
- Personal attributes : attributes, place attachment, emotional state, activities
- Social attributes : roles, communities, interaction
- Cultural attributes : facts and beliefs accepted by all

The graphical representation of the above analysis is shown below.

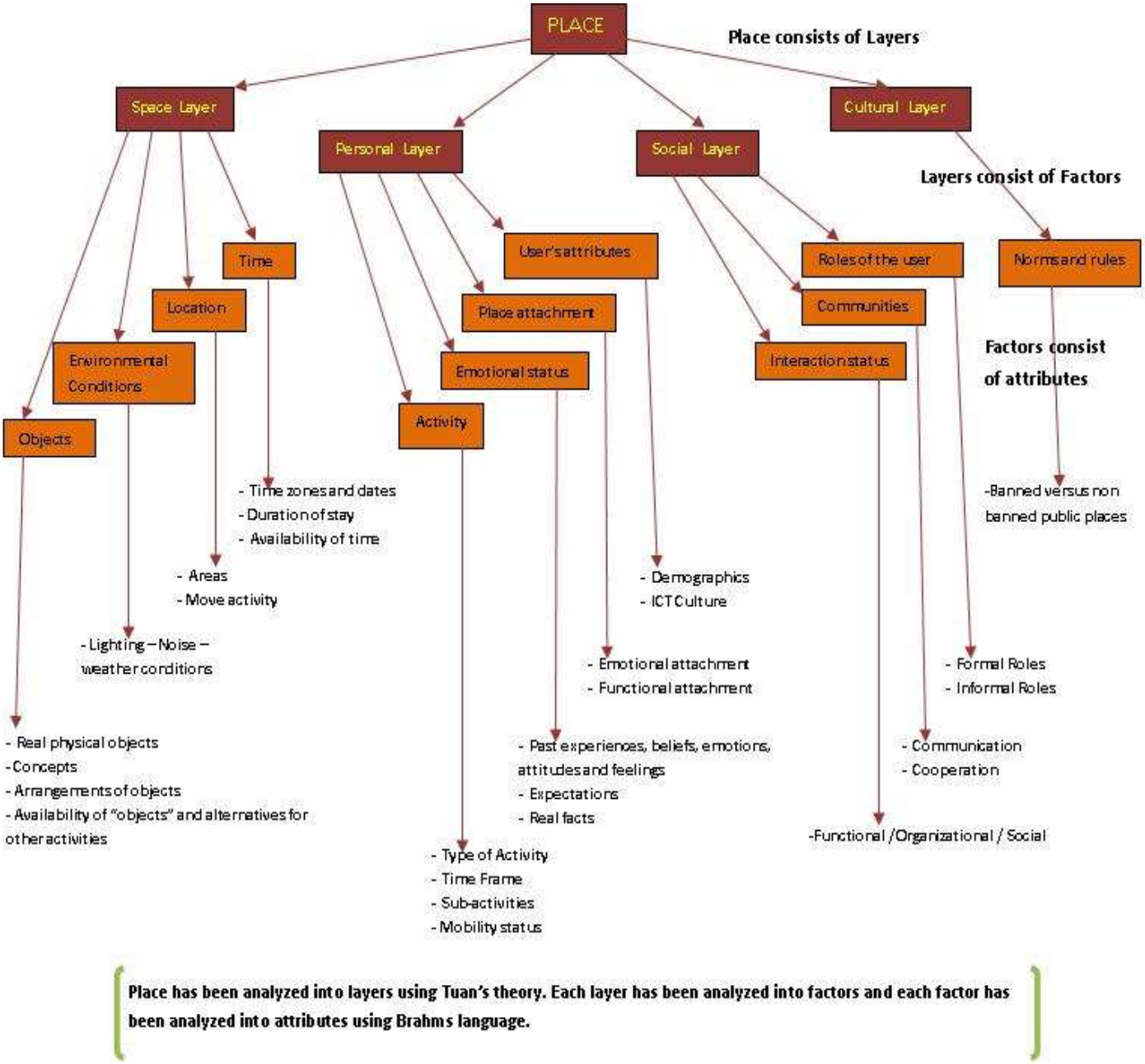

Figure 9 : Graphical representation of the place model

2.5. Research Questions

Following the emerging research fields in the areas and topics of mobile computing within ubiquitous environments as proposed by Watson (2000), Lyytinen and Yoo (2002) and Urbaczewski et al. (2002), I try to highlight the relevance of Tuan's "materials of place" with mobile data services usage, asking the following principal research question:

- **How does place influence the usage of mobile data services?**

According to Tuan's theory, the place triggers spatial, personal emotional responses through experiences and memories, social and cultural influences. Thus there are four sub-questions that have to be addressed and answered along with the principal research question.

With the first sub-question I try to identify which of the spatial factors and attributes influence user's decision to use mobile data services. So the first sub question asks:

1. Which spatial factors and attributes mainly affect the user's decision to use mobile data services?

To answer the first sub-question I have to identify key locations, if any, with high rates of mobile data services usage by asking users to recall environments that they usually access mobile data services.

According to Tuan, the user's condition, and personal layer, may affect the decision to access mobile data services. So within the identified locations I have to identify the user's condition (psychological and physiological status as for example the mobility status). Thus the second sub-question that has to be addressed and answered is the:

2. How does the personal layer as defined by Tuan affect the user's decision to use mobile data services?

The social roles of users as well as the other people present in the identified locations and the social norms that rule the places transform the way users understand a place and influence user's actions as Tuan argue. For that I have to identify the role of the social layer upon the mobile data services usage process. So the third sub-question asks:

3. How do the social activities and norms within a place affect user's decision to use mobile data services?

Finally, the fourth sub-question is trying to identify the key attributes of the cultural layer that exist within a place and explore how these attributes relate with usage process. For that the fourth sub-question asks:

4. Which cultural identities of a place mainly affect the user's decision to use mobile data services?

To answer the above questions I have to collect:

- data about the locations users prefer to use service A.
- data about the condition of the users within these locations
- data that reveal how the social environment at the identified locations inluence usage
- data that relate usage with cultural norms within the identified locations.

The methods to collect these data are:

- The first sub-question requires versatile and rich data which came from focus groups sessions.
- The second sub-question which asks for more personal data, which came mainly from the personal in depth interviews accompanied by the media elicitation method and the "synchronous feedback" method and have been cross checked through the observation method.
- The third and fourth sub-questions will have been answered by using mainly data from the media elicitation methods and the in-depth interviews.

I believe that the combination of this data revealed the role of place upon the decision to use mobile data services. The study took place in the specific context of Athens, Greece.

2.6. Chapter Summary

I started this chapter by introducing information systems, ubiquitous and mobile networked environments as well as mobile handsets and mobile data services. These mobile networked environments generate new forms of interaction, new concerns and new services since they allow "mobile" users to be always online having access to data anywhere anytime. The perspective of mobile wireless technologies introduces the use of information systems (smart phones and mobile data services) within different places, transforming the way humans experience and understand place. Furthermore, place may influence the use of mobile technologies and services since "*place constrains and enables our actions* " (Sack, 1997,p.13).

The literature review highlighted also scholars' attempts to apply traditional adoption theories and models to study the usage of mobile data services and thus to explain the low adoption and usage rates. Recently, scholars question the capacity for generalisation and the explanatory power of these theories within everyday settings since they lack a detailed and in-depth study of contextual dimensions such as the place.

Following the above concerns, I decided to set as the research objective of this thesis, the way users experience the place they are in when they decide to use mobile data services. This research objective led me to focus more on the places that users experience in their daily lives, increasing our interest for places where interaction occurs. Thus in this chapter, I have analysed some theoretical approaches concerning the relationship between humans and the physical space. I have shown that Environmental Psychology had been focused on understanding the relationship between human behaviour and space presenting some constraints such as the lack of the cultural dimension.

I have argued that Humanistic Geography, and particularly Yi-Fu Tuan's perspective, is the one I adopt in this research. According to Tuan's perspective, space describes a pure geometrical structure while place is an experiential concept which can be understood only by focusing on people. In other words, place can only exist as an experience of physical space by humans, influenced by personal features (including memories and emotions), social interaction and the presence of cultural influences. As this perspective is "human-centered" it calls for an interpretative stance by the researchers since their goal is to understand people and their making of place.

As the goal of this thesis is to study how people experience their everyday places when they decide to make use of mobile data services I share Tuan's vision of place as an appropriate notion for studying the relationship between people and their physical environment.

After adopting Tuans' perspective I analysed the concept of place into its dimensions "materials or layers of place" according to which place sees space as experienced and practiced, integrated with social, personal and cultural meanings. In other words, a four layer pictorial representation of Tuan's "materials of place" was generated by me. Based upon the Brahms language I further analysed the meanings of these layers identifying and registering the factors and attributes that the materials of place are

made of, “ontology of layers”, and I constructed the model of place. This model assisted me to justify and present the research questions. To answer these questions, I constructed the semi-structured questionnaires (Appendix C) which constitute the core of this research.

3. The Research Approach

3.1. Introduction

In this chapter the ontological and epistemological perspective of the research is outlined and I elaborate on the methodological choices and research plans I have adopted. Initially, a set of clearly defined research objectives outline the main intent of the study and provide an "essential road-map for the reader" (Cresswell, 1998). In Section 3.2 the specific objectives of this research are presented. These are briefly outlined in Chapter 1, but they can now be specified in greater detail taking also into consideration the information that was deducted from the literature review. A number of philosophical and epistemological assumptions should be made for every research that is being conducted. This study was conducted in the field and regarded by the researcher to be an interpretive, qualitative, and exploratory one. Following Klein and Myers (1999), who recommend that the researcher should present the intellectual basis of the research to the reader, the philosophical and epistemological debates underlying this research are discussed (Section 3.3).

The main debate considered here are positivism versus interpretivism, quantitative versus qualitative research, exploratory versus explanatory research and voluntarism versus determinism. Particular attention is placed on the quantitative versus qualitative dichotomy, given the fact that both qualitative and quantitative social science methodologies have been applied in studies of mobile data services.

The research design, (Section 3.4), based on the philosophical and epistemological assumptions that have been adopted, is modeled in the figure below. The research plan involves the review of the relevant literature, development of the theoretical concepts that were used as means for the application of the study, development of the research questions, collection and analysis of the data and presentation of the findings.

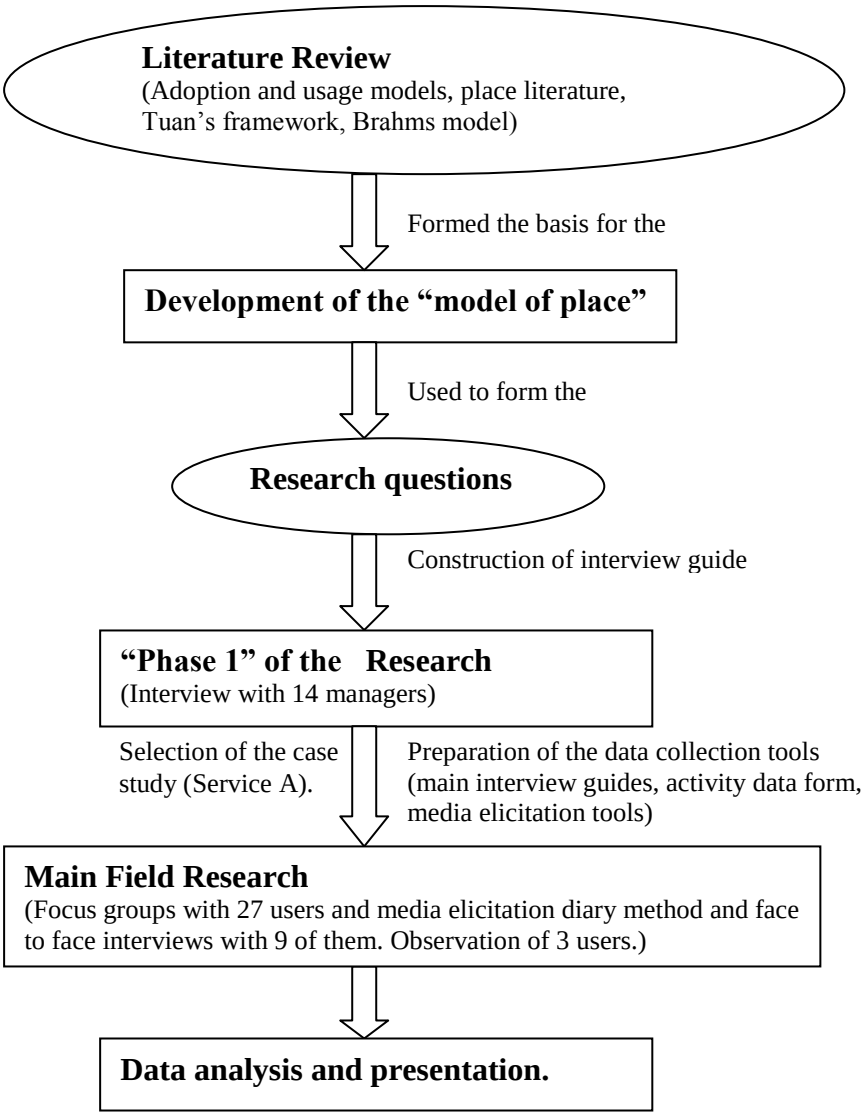

Figure 10 : Overview of the Research Design

Following the research objectives, the model of place was constructed (Chapter 2), and then used both as a sensitizing device that led the analysis process and as a means to explore and identify the influence of place on the mobile data services usage behaviour (Chapter 5).

The first empirical component of the research was "phase 1", involving 14 interviews with experts from the Greek mobile service market. An open interview guide was devised to conduct the interviews. Such a "phase 1" of the research, together with the analysis of secondary data (given to me by the interviewees and selected from the press), was deemed as the most appropriate method to conduct a wide variety of experts and identify the critical aspects of the mobile data services market in Greece. This data allowed me to choose the mobile platform which I used to conduct the research and to decide to adopt the case study method for the study of the phenomenon and the presentation of the findings. A pseudonym (Service A platform provided in the Greek territory by Company A) is used to refer to the platform and the organization in question since a confidentially agreement prevented the use of the

original name. The case study which was selected, allowed me to have a broader view of the phenomenon and to filter external influences focusing thus on place-users interactions. An overview of the case study and its suitability with this study is discussed in Section 3.4.1. The details of the chosen mobile data services platform as well as the whole overview of how the case was conducted are presented in chapter 4.

Having identified 30 participants for the main research phase (heavy and medium users of Service A) that were qualified as selectable and willing to participate in the study, I conducted the main research phase. It was carried out following the "phase 1" of the research, with the objective to identify the role of the materials of place in the usage of mobile data services.

In Section 3.5, a discussion of the research approaches is provided.It is used to study mobile technologies focusing particularly on one to one in depth interviews, focus groups, media elicitation methods and observation methods that is the data collection methods adopted in this study. In Section 3.5.2 the data collection methods are analysed and the research pipeline used in this study is presented. The exploratory nature of the study and the fact that I moved beyond the organizational context lead me to drew on research methods from various disciplines. In the frame of the study I tried to collect information related to the way users interact with the place in real usage situations. In order to access different types of information regarding users' experience I adopted the "combination" method that combines qualitative methods (interviews, focus groups and observation) with mediated data collection methods (Cheverst, Davies, Mitchell, Friday, & Efstratiou, 2000; Carroll, Howard, Vetere, Peck, & Murphy, 2002; Curtis, Luchini, Bobrowsky, Quintana, & Soloway, 2002; Brodie, 2003; Goodman, Brewster, & Gray, 2004). To achieve the objectives I approached the data collection method using qualitative in nature approaches, such as elements of the Contextual Inquiry method (Holtzblatt and Jones, 1993), in conjunction with more novel methods such as mobile Probes (Gaver, Dunne, & Pacenti, 1999; Hulkko, Mattelmäki, Virtanen, & Keinonen, 2004). Combinations of conventional and established qualitative research methods such as in depth-interviews and focus groups, a piece of ethnographic research, namely direct observation as well as media elicitation methods were employed to collect data. I also applied a technique which augments the feedback method allowing the user and the researcher to be always in contact having synchronous textual communication. The type of interviews is positioned by Nandhakumar and Jones (1997) in the middle of the spectrum analyzing distance and engagement of data-gathering methods as shown in the next figure.

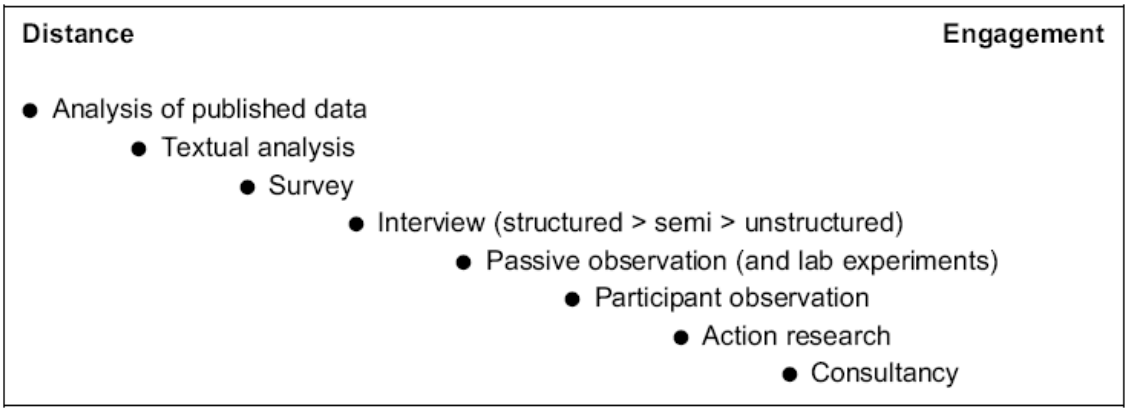

Figure 11 : Data collection methods placed between "distance between researcher and subject" and "maximum engagement" (Nandhakumar and Jones, 1997).

Finally, in Sections 3.7, 3.8 and 3.9 the various techniques used to code, analyse and present the data collected are outlined. Coding structures and content analysis were the techniques used to examine and draw findings from the data collected from the focus groups, interviews, observation notes and photographs collected.Similar structures were then used to analyse the case study in conjunction with document analysis techniques.

3.2. Research Objectives

Mobile technologies and services lead to the contexts that users experience in their daily lives, increasing thus their interest for places where interaction occurs. For example, in different places a user has different needs (e.g. need for security, belonging, approval etc.) and in some of these places the mobile data services satisfy these needs. Understanding what factors influence the use of mobile data services within different places will also assist professionals to develop better applications and services. To understand that I followed Tuan's model (1973) to determine the roles that the spatial, personal, social and cultural layers play in encouraging usres to start using mobile data services.

This study aims to achieve a number of objectives. Firstly, as stated in the introductory chapter of this thesis, one aim of this study is to successfully conduct an exploratory in nature research in order to study the behaviour of users when they decide to use mobile data services in real time conditions and everyday settings. A second objective of this study is to stress the moderating role of the materials of place in the decision to use mobile data services and contribute towards acquiring an understanding of the influence these materials have upon the usage behaviour of mobile data services.

In order to examine the role of place in relation to the decison of humans to use mobile data services I set up an innovative data collection method by mixing traditional as well as media elicitation methods within the scope of the case study of service A in the Greek market. Thus the third objective is to address the field study challenges by successfully applying the proposed combination of conventional and innovative research methodologies. I believe that these research objectives allow me to stress the influence of some of the attributes of the places and thus identify how these lead to the increase of mobile data services usage rates.

3.3. Ontological and Epistemological position

Easterby-Smith et al. (2002), argue that it is important for the researchers to establish their ontological position, because this will finally lead them to the research design. There are two competing ontological positions, the realist and the nominalist approach, through which the world is to be viewed and interpreted (Galliers, 1992; Easterby-Smith et al., 2002).

- The realist approach as proposed by Burrell and Morgan (1979), suggests that the social world is external to the individual, made up of tangible, 'real' structures, which exist prior to the existence or knowledge of any individual person, even if we have no names or concepts to articulate them.

- On the other hand, Ciborra (1998), suggests that nominalism views the world as a social construction which is merely represented by names and concepts which are used as tools for sense making and describing the world.

IS researchers also have to define their assumptions regarding knowledge and how to obtain it (Hirschheim, 1992), in other words they have to clarify their epistemological position that define the research design, and the methods employed to gather data. The study of information systems constitutes a considerable challenge for the researcher, since the nature of the subject, information, is intangible and often difficult to quantify. In IS research an epistemology between the two extremes, the interpretivist and positivist approaches is adopted. In this research I decided to study place adopting the humanistic geographical perspective as represented by Yi-Fu Tuan's theory, (Section 2.4.1), where places are spaces which have meanings coming from humans' interpretations and values.

On account of the research objectives in the frame of this study place should be considered by focusing on the description, interpretations and understanding of users themselves. Following Orlikowski and Barley (2001), as well as Walsham (1995), according to whom the scientific truth involves facts and values (epistemological stance) and the reality is dependent on human constructions (ontological stance) I believe that there are good reasons for adopting a nominalist ontology, and adopting an interpretivist epistemology position, figure 12.

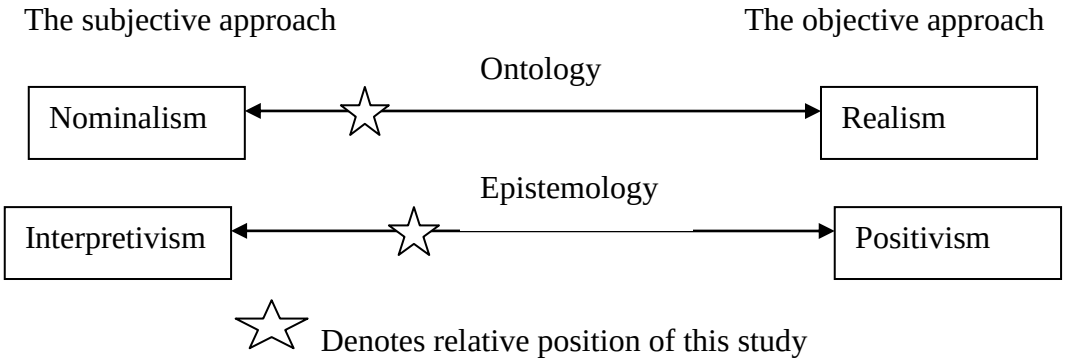

Figure 12 : Philosophy and methodology (Burrell & Morgan (1979)

3.3.1. Positivism v. Interpretivism

Positivism proposes that the social world can be viewed as an objective reality, and understood through measurement and the discovery of facts, which lead to laws of causality (Burrell et al., 1979; Galliers, 1992; Walsham, 1993; Ciborra, 1998; Easterby-Smith et al., 2002). Interpretivist approach on the other hand considers the methods of natural science to be inappropriate where human beings are involved, because as Braa and Sorgaard (1997) claim, different people will interpret a situation in different ways. Recently, IS scholars criticised the broadly positivist approach to IS calling for a more interpretivist one (Ciborra, 1998).

3.3.2. Quantitative v. Qualitative

Within this chapter a number of appropriate research methods in the mobile technologies field are reviewed. Research methods which are strategies for data collection can be classified in various ways. However one of the most common distinctions is between qualitative and quantitative research methods.

Quantitative techniques have their roots in the positivist tradition. Examples of quantitative methods are now well accepted in the social sciences and include survey methods, laboratory experiments, formal methods (e.g. econometrics) and numerical methods such as mathematical modeling.

Qualitative research methods were developed in the context of social sciences so as to enable researchers to study social and cultural phenomena, explore human behaviour and motivations and place emphasis on understanding, explanation and interpretation (Myers, 1997; Neuman, 2003). They draw not only on what is said by people, but also on what is not said, that is non verbal communication (body language) and they distinguish between casual expressions and opinions and those which are prompted by the use of research stimuli.

Both qualitative and quantitative social science methodologies have been applied in studies of mobile data services. Regarding both adoption and diffusion research and acceptance behaviour, the traditional methods have been closer to quantitative methodologies and usually from a positivist perspective as the traditional survey methodology (Marcussen, 2001). Legris et al. (2003), consider these measurements based on self-reported use rather than observing actual usage as a significant limit in technology acceptance models research. However, there are studies that have developed pure qualitative methodologies by adopting a holistic approach – using concepts rather than numbers, like scenario analysis and roadmaps (Wagner et al., 2002), analysis of future consequences of mobile data services adoption (Dorsch & Fiebig, 2001; Casaal et al., 2004), focus group interviews investigating the adoption behaviour and its consequences, (Ling, 2001; Grinter & Eldridge, 2001; Oksman & Rautiainen, 2003; Barnes & Huff, 2003; Pagani, 2004), and combination of diary and log-based methodologies with different interview techniques (Palen et al., 2001).

It should be noticed that the nature of user technology acceptance calls for studies that are periodic, qualitative in nature in order to determine factors and attributes that may

influence the interaction between the user and technology as for example trust, that may influence the users' intentions to use mobile commerce (Siau, Sheng, & Nah, 2003b). In qualitative methodology, a variety of specialised generating techniques are used, such as participant-observation, in-depth interviews, group discussions, documents, texts, to name but a few, in order to provide an in-depth understanding of the users and their subconscious motivations. Qualitative research is, thus, best used for problems the results of which will clarify issues, expand knowledge and explore the behaviour and motivations of humans.

With the rapid pace of change in the IS field, many new topics emerge each year for which valuable insights can be gained (Benbasat, Goldstein, & Mead, 1987). Different uses of technologies within everyday settings are an example of such an emergent topic of research. A qualitative study is an appropriate way to research an area where few previous studies have been carried out and where the focus is on contemporary events (Lee, 1989b; Yin, 2002) .

Furthermore, the adoption of the notion of place following Tuan's perspective has strong methodological implications. The main concern for the humanistic geographer perspective is the study of space as it is made place by its inhabitants. Place is a "user-centered" notion in itself, focused on humans and their relationship with the space they experience. To understand humans' experiences of places qualitative methods of research should be adopted in order to study individuals' activities within a space and to highlight in them the emergence of the four layers of place. Due to the complexity of collected data, the four layers of place provide a flexible and broad framework for analysis of the data.
Considering all of these arguments and since I had to work with humans and understand their behaviour within context variables that are difficult to understand and hard to define or quantify, I considered a qualitative approach to be most appropriate for this study.
The qualitative techniques that were used for the data collection phase were:

- Document analysis
- Interviews
- Focus groups
- Participant observation
- I also tried to enhance the traditional recall techniques applying the media elicitation methods

3.3.3. Explanatory v. Exploratory Research

The goal of explanatory research is to develop "statements which make something intelligible, about why things are the way they are" (Blaxter, Hughes, & Tight, 2001). A focus is usually placed on testing hypotheses, and a scientific, positivist stance is usually adopted (Silverman, 2001; Yin, 2002). Exploratory research, on the other hand, promotes understanding and is suitable for "new fields of study where little work has been done, few definitive hypotheses exist, and little is known about the nature of the phenomenon" (Patton, 1990). Researchers have been calling for more exploratory research in the IS field for a long period of time, given the evolving

nature and lack of maturity inherent in the IS field (Mumford, Hirschheim, Fitzerald, & Wood-Harper, 1985).

The study is an attempt to explore the role of place in the decision to use mobile data services. Little is known about the nature of the phenomenon in terms of the influence of place in the usage process. Thus it can be argued that this study is exploratory in nature as it attempts to explore and understand the role of place in the usage process of mobile data services. Yin (2002), quite cleverly used the exploration adventure of Columbus as an analogy for an exploratory study stating that "rationale and direction should underlie" such studies. The model of place that was developed based upon Tuan's theory of place and Brahms' model can provide a direction to this exploratory investigation.

3.3.4. View of Human Nature

The different philosophical approaches related to the understanding of how we know the world leads to a view of human nature and behaviour which can be regarded as a continuum at the ends of which are determinism and voluntarism (Burrell et al., 1979; Cohen & Manion, 1989; Easterby-Smith et al., 2002).

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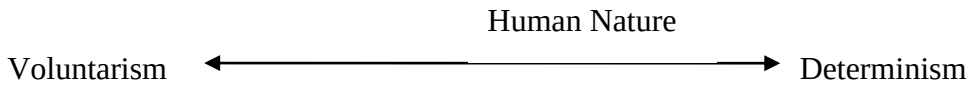

Figure 13 : Philosophical approaches related to the understanding of humans know the world

The deterministic approach argues that the decisions of people are products of their environment while the voluntaristic approach (Powers, 1998), argues that humans are autonomous, exercise free will, and are the creators of their environment. Among the theories that try to approach human activity and decision making are the subjective expected utility theory and the bounded rationality theory. According to Simons (1983), in the subjective expected utility theory it is assumed that human activity is rational while the decision maker, trying to maximise the expected value of the choice, chooses from a defined set of alternatives and perceives an accurate prediction of outcomes for all alternative scenarios. According to the bounded rationality theory, individuals are serial information processors since they cannot process more than one thing at a time, are not capable to focus on all of the options that are needed to take a decision at once and make a choice based on a perception of which decision opportunity is of the highest priority at that time (Simon, 1983). Pedersen et al. (2002), who explored the relationship between mobile data services business models and end-user's adoption, claimed that when anticipating future value for a networked service as MMS, end-users process information under the assumptions of bounded rationality. On the other hand, Fransman (2002), claimed that the Bounded Rationality theory does not appear to be sufficient in explaining the Telecoms Boom and Bust in 1996 - 2002.

The stance of my research is that it is assumed that the human nature of the individual is both volunatristic and deterministic and the human world is both constructed by humans and at the same time determined to a degree from the environment.

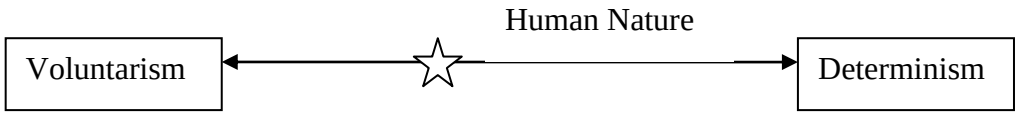

Figure 14 : The stance of the research in terms of voluntarism and determinism

The last assumption is fundamental for this research, since there would be no reason for conducting this research had it been assumed that only human nature is responsible for the decision regarding the adoption and use of mobile data services and the environment expressed by context has nothing to do with it.

3.4. Research Design

The design of an appropriate research approach is an important decision. Trauth (2001), lists five factors influencing the choice of qualitative research methods in IS research: (i) the research problem, (ii) the degree of uncertainty surrounding the phenomena, (iii) the researcher's theoretical lens, (iv) the researcher's skills, and (v) the academic politics. In her paper Trauth argues that the research problem should influence the choice of a research methodology. The following main research question was posed in this study:

How does place influence the usage of mobile data services?

The degree of uncertainty surrounding the phenomena that are to be studied is another important factor regarding the choice of the research method (Trauth, 2001). According to the literature review, the phenomenon I study, that is the usage of mobile data services within everyday settings, is new with very few in situ studies (Lawence & Er, 2007). The phenomenon of the behaviour of mobile data services' users within different places has an increased uncertainty since a lot of parameters and variables are required if we want to describe it. According to Trauth (2001), the next important influence factor regarding the choice of the research method is the theoretical lens, in terms of epistemological and ontological assumptions, that is used to frame the investigation. This research question seeks to understand phenomena. According to Myers (1997), interpretive studies generally attempt to understand phenomena through the meanings that people assign to them. Thus without the need for a hypothesis to be verified or validated, and in trying to understand the factors that affect mobile data services adoption and use, the interpretive paradigm underpins this study best.

According to Trauth (2001), the researcher's knowledge and experience in using qualitative research methods has also a significant influence on deciding whether or not to employ them in the research. Before starting the research I had limited prior knowledge of qualitative research and so only the research problem, the epistemological and ontological stance, and the degree of uncertainty of the research phenomena influenced the research choice.

Finally, the academic institution and the supervisors I worked with did not impose any methodological preferences although they believed that the decided approach better fit the research problem.

The study does not focus on frequencies, incidence, or correlation so the survey would not suffice to answer the research questions. Surveys try to deal with both the phenomenon and the context, but their capacity to deal with context is limited, and the researcher constantly struggles to limit the number of variables to be analyzed (Yin, 2002). I believe that there is a big problem with survey research on emerging technologies. The general problem is the "self-reporting" problem mobile subscribers give false answers because no one can check to see if they are telling the truth.

In particular the following problems arise when dealing with quantitative methods:

1. How can subscribers predict if they will like or want an emerging service/technology that they have never used?

2. Subscribers like to appear more sophisticated than they really are, so they will respond very positively to surveys related to emerging technologies and then, when the technology or service reaches the market, no one will buy it or use it.

3. The survey writer has to know in advance what kinds of answers the subscribers are likely to choose. If there is an answer out there that the survey writer does not even imagine, it will not appear on the survey and the survey itself will flaw.

Therefore, in the frame of a survey research it is often concluded that emerging services like Mobile TV will be wildly popular but the problem is that for a new service like mobile TV, there are no current users. The only users are trial users, most of whom are employees of the companies that develop the services. Those users do not have any incentive to spend their time to talk to a researcher for hours about their usage, or to allow the researcher to watch them while using the service.

For emerging services, the researcher cannot perform a true "random sample" survey because the vast majority of people do not know what the survey is about. Most research companies organize a "panel" of survey participants, recruiting them through e-mail or working with trade magazines to contact subscribers. The members of the "panel" are often given some incentive to agree to answer the survey, like the chance to be part of a lottery for prizes. Most research companies do not reveal how they recruit panel members, and certainly do not provide much information about those members with the exception of general data of demographic nature (age, gender, etc.).

In most cases a researcher sets up a "usability" laboratory, often in a university, where users can be observed as they try out a new service (Venkatesh et al., 2003). Research subjects are either company employees who are told to participate, or they are given some incentive to participate (for example the opportunity to use a new technology that no one else has seen before). This study is not experimental in nature and could not be conducted in a laboratory since the purpose of the investigation is how the mobile data services' users behave in the frame of their daily activities. Thus this study has to be connected with field trials with real users, actual usage situations and individuals using mobile data services as part of their everyday life. The study is exploratory in nature, since it tries to explore the role of place in the decision to use information and communication mobile technologies. This exploratory in nature study aiming to understand the phenomenon of mobile data services usage within its context will require a qualitative methodology approach (Miles & Huberman, 1994).

Researchers from many different traditions and areas of research have been involved in behavioural end-user adoption and usage studies. Studies in mobile informatics (Dahlbom & Ljungberg, 1999) and anthropological studies of user behaviour on the social consequences of the mobile services (Blinkhoff & Blinkhoff, 2000), both apply ethnographic methodologies. I believe that instead of asking a random sample of users close-end questions, it is better to adopt a qualitative research methodology where I can do things like participant-observation (look at how people use mobile services in

their daily lives), in-depth interviews and media elicitation methods. Qualitative research as for example ethnography, case study, focus groups, to mention but a few, is a natural choice for interpretive researchers. Within this study a hybrid approach that includes parts or wholes of multiple study types was adopted. More specifically, the research types that were adopted are participant's observation, focus groups, face to face interviews and media elicitation methods.

Such research methods provided me with the possibility to study individuals' activities in everyday settings, from an interpretive perspective, via which unforeseen issues could be identified and gave me rich data and new insights regarding usage (Lee et al., 2003). The whole research was conducted within the scope of a case study, allowing me thus to have the whole picture of the influences the users take into consideration when deciding to start using mobile data services.

The research design that was opted for is the following.

- Literature review that assisted me to define the research problem (low diffusion of mobile data services in European countries and the need of refinement of the adoption and usage models) and to decide on the theoretical constructs and models as well as on the research methodology.
- Theoretical constructs of Tuan's framework and Brahms language were used as flexible and broad frameworks for the development of the research questions and guided the data collection, as well as the analysis and interpretation of the data.
- Development of the research questions,
- "Phase 1" of the research in the Greek mobile data services market, in order to select the case study.
- The main research phase with a mix of qualitative research methods to collect data and analyse the role of the materials of place in the use of mobile data services.
- Data analysis and findings presentation in a form of a case study so as to present better the whole phenomenon.

3.4.1. Selection of the Case Study

In chapter 2, the review of the relevant literature highlighted the gap in the knowledge of the relation between place and usage behaviour of mobile data services and enabled me to form the research questions. I adopted an interpretive approach aiming to generate valid knowledge, by examining the mobile data services' end users, within their social settings (Orlikowski & Baroudi, 1991). The case that was collected concerned usage behaviour of humans of a specific mobile data services platform (Service A - a pseudonym) in Greece. This specific case study (Greeks' usage behaviour of Service A within the greater Athens area) is the unit of analysis of this study (Yin, 2002). Thus initially, before starting the main data collection phase I had to select the mobile data services platform to work with.

Thus I conducted a "phase 1" of the research in the territory of Greece collecting first hand empirical data from 14 experts from relevant companies and organizations,

representing the value chain of mobile data services market, directly applying interviews with them. Open questions (Appendix B) had been developed for the purposes of this "phase 1" data collection phase of the research and semi-structured interviews were conducted. I distinguished between first hand and secondary sources of data. The secondary sources of data which I tried also to collect refer to other materials, such as company reports, memos, letters, reports, newspaper articles and so forth which have been previously published. The pilot interviews and reviews began in the winter of 2004 and ended in the spring of 2005. Details of the "phase 1" of the research, its objectives and details of the case study selected for are presented in chapter 4.

I applied the "phase 1" of the research to select the case study because I believe that a non random selection of case studies is necessary in order to sharpen external validity. The case study chosen (Service A in the Greek territory) is considered an investigative object that would assist me approach the main research question. According to (Yin, 2002), in the process of selecting information-rich cases, sampling for a specific criterion may be useful. The choice of the Company's A case study reflects purposeful sampling that provided me the opportunity to learn a substantial amount central to the research topic of the mobile data services in the Greek market.

The case study approach gives the broad picture of the context within which the commercial mobile data service is used as for example the pricing methods, the users' emotions and perceptions of the service and the marketing policies. The case study explained the behaviour of the end users concerning the implementation of the marketing policies of Service A in Greece. This permitted me to filter these behaviours and focus on the main research question which is the role of place in the behaviour of the users.

Having concluded the case selection phase I proceeded to the main phase of the research in order to capture the role of the materials of place in the usage behaviour of Service A. But before starting this main research phase I had to opt for the most suitable data collection methods for these mobile technologies. Thus a review of the research approaches for these kinds of technologies was first conducted to select the most appropriate of them. The overview of the research approaches is presented in the following sections.

3.5. Research approaches for mobile technologies

3.5.1. Challenges for mobile technologies research methods

When IS research moved from desktop applications towards mobile devices and services, the practical problems related to the evaluation of mobile environments became rapidly known. Traditionally, user-centred research has relied largely on data collection methods such as direct observation in the workplace. The ubiquitous nature of mobile devices means that they are not bound to the workplace since we carry them with us, and use them in a number of ways and situations both for professional and personal purposes. Thus in order to build an understanding of the use of mobile technologies, the information systems (IS) researcher needs to move beyond organizational contexts. This fact increases the research challenge because the conditions regarding technology use are dynamic, varied, and difficult for investigators to directly observe (Palen et al., 2002), hence novel research methods have to be designed for that. Many of the complexities related to gathering data about mobile technology use, stem from the fact that we need to account for the physical movement and changing of the geographical location of users and the need to negotiate access to private and public spaces that are not defined by the rules of the workplace. For example, researching people's shopping habits in order to design improved mobile shopping assistants (Newcomb et al., 2003), following people into the bedrooms of teenagers Grinter et al. (2001) and understanding how groups of friends might use an SMS chat application to rendezvous at a particular location (Axup, 2005). Mobile technologies research methods must handle the challenges that mobile technologies are bringing.

These challenges can be categorized as follows:

- Scale deployments to more sites.

Mobile technologies research methods typically must handle issues of scale not faced by desktop systems, functioning across multiple places, or over long periods of time or across multiple users. Gray and Salzman (1998), highlighted the importance of using larger sample sizes, to better support statistical conclusions and appropriate participant randomization.

- Increase the amount of data collected per site.

It is difficult to collect data in mobile technologies research studies because evaluations of events of ambiguous importance may go undetected, and critical events are often casual and sparse since small bursts of usage are often extended throughout the entire day, and in many different places (Holmquist et al., 2002).

- Apply the research into such situations that data can be collected unobtrusively.

Since mobile technologies are typically integrated into everyday life, evaluation techniques have to appropriately handle this integration into daily lives. It is often difficult to obtain the feedback necessary to evaluate an application while maintaining that application's unobtrusiveness. The research community tries to overcome both the physical and privacy/ethical issues of accessing data for mobile research by

helping reconstruct the user's experiences. Thus the data collection methods rely on combinations of existing methods and concepts, for example complement established IS data collection methods such as interviews with those derived from marketing, such as focus groups, role playing, and diary studies combined with valuable new opportunities created by mobile technologies themselves such as the ESM method.

3.5.2. Data collection methods

The nature of the data collected is extremely important since there is much prejudice regarding the validity, as well as reliability and level of generalisability one can achieve with them, Table 18. There is the assumption in modern science that quantitative data is more valid, reliable and can be generalised. However, the origin of the numbers is not quite transparent and there are many typologies and tools that they are derived from. At the same time numbers do not necessarily reveal causality-only frequency. In brief, different kinds of data generate different kinds of questions in the choice and evaluation of methods.

Table 18 : Questions of reliability, validity and generalisability in data collection (Easterby-Smith et al., 2002 , p.53).

	Positivistic	Interpretivistic
Validity	Does the research instrument measure, what it is supposed to measure?	Has the researcher gained full access to the knowledge and meanings of information?
Reliability	Will the measure yield the same results in other situations?	Will similar observations be made by different researchers on different occasions?
Generalisability	What is the probability that patterns observed in a sample will also be present in the wider population from which the sample is drawn?	How likely is it that ideas and theories generated in one setting will also apply in other settings?

There are several data collection methods available to IS researchers which can be broadly categorized, on the range of interaction between the researcher and the research phenomena as shown in the following figure:

3.5.3. Review and categorization of data collection methods

The categorization of the data gathering methods I present here is based in an extensive literature review of papers that reported on existing and new methodological approaches that are emerging in response to the complexities of mobile technology research (Eldridge, Lamming, & Flynn, 1992; Cheverst et al., 2000; Curtis et al., 2002; Palen et al., 2002; Berg, Taylor, & Harper, 2003; Brodie, 2003; Beale & Lonsdale, 2004; Goodman et al., 2004; Hulkko et al., 2004; Isomursu, Kuutti, & Vainamo, 2004; Hagen, Robertson, Kan, & Sadler, 2005; Scott Carter. & Jennifer Mankoff, 2005; Viljamaa, Anttila, & Rob van der Haar, 2005; Sun & Zhang, 2006).

Starting from Kjeldskov and Graham (2003), who reviewed Mobile Human computer Interaction research methods, I can conclude that the possibilities for research to understand mobile technology acceptance and use in real settings are richer than expected. My contribution to the study of the data collection methods is that I classified the methods proposing a new categorization scheme. This categorization is based on autonomous research methods that can be combined and produce more complicated methods. I focus and analyze mainly the methods that I applied in my study. The categorization of the mobile technologies' data collection methods is the following.

Table 19 : Categories of the mobile technologies' data collection methods

<table>
<tr><td colspan="8">Basic Research methods</td></tr>
<tr><td>Observations
The researcher follows the individual and takes notes or photographs or record video</td><td>Interviews
Face to face or using technology as mediator (interview by audio or video - conference). Structured vs semi-structured interviews.</td><td>Focus groups
Face to face or using technology as mediator (interview by audio or video - conference).</td><td colspan="4">Self – reporting methods</td><td>Walkthroughs, surveys , Simulations and enactments (tools that are used to make available experiential information sensitised to real contexts of use), sketching and drawing, role playing</td></tr>
<tr><td></td><td></td><td></td><td colspan="3">Diary methods
(participants record events as they happen or triggered by the researcher another time)</td><td>Cultural probes
(keep materials from an event)</td><td></td></tr>
<tr><td></td><td></td><td></td><td>The user keeps written notes in a diary</td><td colspan="2">Use technology to keep diaries: Mediated Data Collection methods. The captured data sent to the researcher either automatically (synchronous transfer) or at another time (asynchronous transfer)</td><td>When employ mobile technologies as data collection tools we have Mobile Probes, SMS Probes and Experience Clips techniques</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>do their normal routines, carrying or wearing mobile recording devices</td><td>use the technology, and data is logged automatically</td><td>Do the data collection by self-reporting, or keeping diaries, using their mobile devices.</td><td></td><td></td></tr>
</table>

An analysis of the basic research techniques I adopted for my research follows.

Interviews

According to Judd et al. (1991), the method of in depth interview is a common one for data collection in the IS field. In depth interviews contribute to a more detailed and sensitive analysis of possible issues relevant to personal reasons for and against usage of mobile data services which might not be easily expressed in the context of a group discussion. The structure and logic of the questionnaires that were used in qualitative research were consisted mainly of open-ended questions. The work of Pagani (2004), Barnes & Huff (2003) and TNS (2003) was used to design the discussion guide for the interview (Appendix C).

Focus groups

Group discussions were the core part of my qualitative methodology, as they are characterised by a relaxed, informal atmosphere which allows participants to exchange their views and ideas freely. The advantages of Group Discussions are the fact that they encourage teamwork and team spirit. Furthermore, the dynamics of a Group Discussion encourage creativity in developing ideas and, through the interaction and "sparking off" that occur among participants, allow differing viewpoints to become apparent and more deeply-held perceptions to surface. Focus groups, bringing together small groups of people to talk to each other, draw out different types of information than when participants speak directly to researchers, such as in interviews. Focus groups allow interaction on a small number of issues determined by the researcher and more rapid data collection than interviews. Participants were recruited on the basis of access to a mobile phone with a built in camera, regular Service A use, a personal email address and willingness to participate in the research by providing the information and taking the actions asked by the researcher. Issues discussed in the focus groups included the use of mobile data services in relation of place, mobility and always online status and their attitudes to, and perceptions of, these technologies. However the social settings of the focus groups are unnatural in contrast to participant observation that allows in depth observation of natural settings over time. Carroll et al. (2002), consider the success of their research to come from the combination of focus groups which provide concentrated interaction with the subjects of the research and direct observation which provides naturalness of setting and reliability of findings.

Observations

My work is supplemented by ethnographically inspired observations of mobile users in action that allow real world iterative evaluation of the use of mobile communication technology. Direct observation that could include notes, photography and video recording is a method that places the researcher in the context in which technology use occurs since the researcher is present during the everyday practices and activities of people. But environments of use of mobile technologies are not always helpful to these methods because this can be disruptive for the users (Isomursu et al. 2004), and impractical in some other cases (Palen et al., 2002). The participants of course could belong to the social network of the researcher and in that case the researcher could more easily join them, observe or take photos or audio recording in the frame of an informal, free-form interview in order to clarify the actions and motives of the participants. Observation provides an understanding of what the participants do with technology rather than what they say they do (as in interviews and focus groups). Also, by recruiting participants from my social environment for the observation phase, I had the opportunity to exploit the natural human behaviour of sharing experiences with friends.

Self reporting methods

Self reporting methods allow access to data that cannot be acquired by direct observation due to reasons such as privacy. Self-reporting methods are useful for field-based evaluation because they are participant-driven and thus easy to scale and resistant to changes in context. The most popular types of self-reported methods which have been used extensively to study user behaviour in field settings are the diaries and cultural probes (Gaver et al., 1999), where users take on the role and responsibilities of data collection by recording their experiences and activities. Cultural Probes are packages of materials (including postcards, maps, diaries and more) for the gathering of information related to an event. Cultural probes have been improved recently through the use of mobile technologies themselves as reporting tools. Mobile Probes (Hulkko et al., 2004), and Experience Clips, (Isomursu et al., 2004) are all self-reporting methods that employ mobile technologies as data collection tools.

Diary studies are designed to capture activities that occur in real environments. Participants are given diaries to document their feelings or particular activities as they occur during a certain period of time, such as the number of incoming phone calls over the course of a work day. Since diaries document several events they give a more credible and solid description of the person (De Longis, Hemphill, & Lehman, 1992). Diaries allow me to understand needs and motivations related to the use of technology in different contexts, since they gather more contextual data in comparison to interviews, where situations are mostly memorized. Diary design is highly research-specific and the implementations of diary studies often requires

participants to discuss frequently, even on a daily basis, their diary entries with the researcher (Rieman, 1993). The richness of the data can be seen as an advantage of the diary method and the challenge of the method lies in motivating the users the analysis of the open and subjective entries (Palen et al., 2002).

Diaries lately have improved due the use of mobile technologies. After the work of Hagen et al. (2005), the emerging diary research methodologies referred as mediated Data Collection methods where participants:

- Collect data by self-reporting, or keeping diaries, using their mobile devices
- or use the technology, and data about use, content and metadata is logged automatically
- or finally they perform their normal routines, carrying or wearing mobile recording devices (e.g sensors or cameras) which perform the video observation and keep the data logs

Focus groups and interviews could not provide us with enough detail. While a videotaped usage session can provide an excellent overall picture of the session under evaluation, but videotaping in a public, mobile environment will render the usage situation somewhat unnatural, hence potentially affecting the user experience. This is true because having a video camera in a public space such as the pedestrian area restricts the mobility of the user, as the person with a video camera cannot move very freely. Also, passers-by will frequently stop to stare at the strange-looking pair moving oddly.

For that I believe that with Mediated Data Collection methods we can get richer emotional material and more versatile usage situations as compare to the traditional observation methods, and additionally there is clearly a yet unexplored potential to develop a more systematic design method regarding participation. The limitations and constraints of self-reported, mediated data collection methods in the course of which it is the users that make the recording with their mobile phone include the implications of recording in inappropriate places such as shops where photos or videos are prohibited (Newcomb et al., 2003; Hulkko et al., 2004) and the consequences of recording an individual action without permission. Of course in order for this method to be successful, the users need to be instructed on what they are expected to capture, and how they should do it. Also, the users need to be motivated and willing to participate. Mobile phones are very common in a modern city environment and their usage in public areas has become ubiquitous. Many new mobile phones have the capacity of video and audio recording. These features are very easy to use without extensive training or practice. Therefore, they can be used to collect data related to the user experience without disturbing the usage situation for evaluating applications outside the office environment.

Finally, Penny Hagen. et al. (2005), introduced the Simulations and Enactment tools that are used to make available experiential information sensitised to real contexts of use.

Field studies which research complicated phenomena and are resource intensive, use a combination of these basic research methods as shown in the following matrix. For example, summative studies need to collect field data, since these can elucidate how the systems operate in context. The methods that could be used to collect field data include direct observation, walkthroughs and self-reporting methods or combination of them.

Table 20 : Research studies that combine basic data collection methods.

<table>
<tr><td rowspan="2">formative research studies - stage before actual systems are built,</td><td colspan="2">summative studies - evaluate already working systems - Service A</td><td rowspan="2">Feedback studies (ESM) Combination of diary study and questionnaire. The researcher asks participants to collect data and answer predefined questions whenever the researcher decides so.</td><td rowspan="2">Elicitation studies – media elicitation studies Combination of diary study and interview. Participants capture events, usually by taking a photo or a video clip that are then used as prompts for discussion in interviews</td><td rowspan="2">Combination studies. Combinations of Mediated Data Collection methods, Simulations and Enactment tools, as well as combinations of the established methods of interviews, focus groups and questionnaires.</td><td rowspan="2">Contextual Inquiry is an ethnographically based approach to the study of users in their context of interaction. Techniques used for conducting CI include informal observations (documented through note-taking), video observation sessions, sketching and drawing, semi-structured interviews.</td></tr>
<tr><td>students in a university environment, the so called laboratory studies</td><td>Real working environments and contexts, the so called field studies. Techniques used are observation or self-report studies or walkthrough or questionnaires or combination</td></tr>
</table>

The analysis of these combination studies follows.

I distinguish formative research studies from summative studies. Formative studies used when data has to be collected at the stage before actual systems are built, while summative techniques evaluate already working systems studying acceptance and usage issues. Since my study concerns the use of Service A platform which is a system that is already in operation I focused on summative methods.

Summative methods applied to evaluate user technology acceptance can be divided into those that are conducted with students in a university environment, the so called laboratory studies and those that involve individuals in real working environments and contexts by utilizing questionnaires, the so called field studies.

But as mobile technologies and self-reporting techniques become more sophisticated, it is easier to observe, evaluate and record usage directly in unconstrained settings rather than using self-reporting surveys. It should be noted that mobile technologies are particularly hard to test in the laboratory because their use is often highly contextualized within multi-person, multi-task settings. Field studies that entail the unconstrained use of a system may provide more realistic information on the problems and advantages that users enjoy although the relatively uncontrolled environment of the field setting calls for the inclusion of additional factors and attributes that reflect the real world settings and conditions. Unconstrained studies are those that value realism over controlled settings and can be used to gain qualitative feedback about context-specific use of an application as for example Crabtree (2003), who conducted an evaluation of a mixed reality mobile phone game via analysis of logged data combined with extensive participant observation.

In any case, developing more technologically sophisticated and contextually appropriate ways for participants to provide their own field data is an emerging area in mobile research methods. In addition, novel ways in which complex data related to use can be automatically extracted through mediated data collection methods are also a significant research direction. The use of mobile technologies to record data, including images and video in public and private spaces, raises interesting and challenging issues regarding research design and research ethics. The use of video to record use situations to be analyzed later, has already become a popular research method (Buur, Binder, & Brandt, 2000). Of course these data collection methods and the types of practical and ethical questions they pose, represent a significant area for current and future research.

The introduction of mobile technologies has improved self reporting methods introducing feedback studies, where participants can answer predefined questions about events and media elicitation studies where participants can capture media that are then used as prompts for discussion in interviews. Feedback studies may also require participants to capture media to serve as prompts, but the principle difference between elicitation and feedback studies is that elicitation studies involve synchronous communication between researcher and participant (e.g., interviews) while feedback studies involve asynchronous communication between researcher and participant (e.g., questionnaires). The methods can be combined, with results from feedback serving as prompts for discussion during the elicitation study.

Another difference between feedback studies and elicitation studies is that in feedback studies participants should provide information about an event immediately after it occurs, whereas in elicitation studies participants only capture some aspect of an event when it occurs and provide information about it later during interviews where the event serves as a memory cue. Feedback studies are scalable but the act of answering questions is a significant distraction from the

user's main task and the lack of an objective observer does not assure to what extent logged information matches actual events. Feedback studies have the drawback of potentially overburdening participants with questions, especially when the number of events reported is high (Cheverst et al., 2000), but since questions are asked at the time of the event, feedback studies are more likely to provide accurate responses to questions that depend on the recall of the event. Thus, the experience sampling method (ESM) sometimes referred to as "beeper studies', is a popular feedback study where users are given electronic paging devices or use their mobile phones (Larson & Csikszentmihalyi, 1983). These devices randomly ask users, 7-10 times throughout the day (by design, but arbitrarily from the subjects' point of view), to write down quickly what they are doing or how they feel based on given questions

In a media elicitation study on the other hand users are given cameras and asked to take photographs either with or without specific assignments. Participants capture events, usually by taking a photograph or a video clip, and are asked about the event during an interview at a significantly later point in time. The advantage of this method is that it allows quick capture, data collection in the course the action, and is easy and less laborious than writing notes in diaries. Because participants can rapidly capture prompts, such as a photograph, elicitation studies tend to be much less burdensome than feedback studies. Although the captured media represents a subjective point-of-view, it has some empirical value because understanding begins just with the view through the eyes of the users. On the other hand, memory can be improved when a person is presented with cues about an event such as who was involved, where it occurred or what was being done just before and after the event (Maglio & Campbell, 2000). This work has also shown the importance of peripheral information in photographs as well as identifying the need for participant review of photos prior to conducting the interview.

Diary studies using media-elicitation is quite a novel method. Palen and Salzman (2002) experimented with cell phones as a feedback medium and Brown et al. (2000) and O'Hara et al. (2001), used the same method to understand transaction decisions. It is not evident yet to what extent the media facilitate participant reconstruction of events and how different media types evoke different reconstructions and attitudes towards an event. Media-elicitation is a promising method of gaining more details related to everyday events of the participant, enhance the focus of the participant on the interview itself and encourage participants to make new associations.

I can conclude that the two methods represent a tradeoff between accurate recall but burdensome logging (feedback) versus potentially inaccurate recall but unobtrusive logging (elicitation).

3.6. Data Collection techniques used in the Main Research Phase

After selecting the Service A and the case study of Company A in Greece, I conducted the main phase of the research to capture the role of place in the use of mobile data services. For that I gathered data based on the articulation of the place in terms of Tuan's four materials (Tuan, 1977). For each of these dimensions I collected data combining different methods. Basic data collection techniques (interviews, group discussions, observations, mobile elicitation self reporting method) adopted for the field study. The study was designed to explore the usage of mobile data services in an unobtrusiveness mode involving visual as well as verbal information from participants. The fieldwork of focus groups, was carried out in the course of two weeks in Athens, (26th March-8th April 2007), the media elicitation method (16th April-27st April 2007), and, finally, the observation during the first (7-8/04/07) and the last (28-29/04/07) weekends in April and the first weekend in May. I interviewed the individuals that participated in the media elicitation method during May.

Due to the exploratory nature of the study there are few established research approaches in IS research that can be used. Moving beyond the organizational context is unusual in IS research and so I drew on research methods from various other disciplines. Combinations of conventional and established methods such as in depth-interviews and focus groups, a piece of ethnographic research, namely direct observation as well as media elicitation methods, have been employed to collect data. The utilization of these methods enables the triangulation of information by depending on the specific advantages of each instrument. More specific a combination of classic qualitative research in the form of in depth interviews and group discussions have been employed to extract the information needed on usage of mobile data services.

However, given the inherent limitations frequently faced in qualitative research regarding the respondents' ability to properly recall and deconstruct their usage behaviour I deemed imperative to complement my qualitative study with self-report methods and a piece of ethnographic research, namely observation, aiming at establishing a richer understanding of observed behaviour as well as enriching my findings. Furthermore, in order to achieve my objectives I approached the data collection method using qualitative in nature approaches, as elements of Contextual Inquiry method, (Holtzblatt & Jones, 1993), in conjunction with more novel methods such as mobile Probes (Gaver et al., 1999; Hulkko et al., 2004).

In this phase I collected information related to the way users interact with the place in real usage situations. Thus in order to have access to different types of information regarding users' experience I adopted the "combination" method

followed by Brodie (2003), Carroll et al., (2002), Cheverst at al., (2000), Curtis et al. (2002), Goodman et al. (2004), who combined qualitative methods (interviews, focus groups and observation) with mediated data collection methods.

Additionally I modified and extended self-report evaluation methods taking advantage of the large infrastructure of the increasingly powerful mobile devices and messaging services. For that I propose an innovative technique which enhances the feedback method allowing the user and the researcher to be always in contact having synchronous textual communication.

I believe that the above methods combined with the mobile experience clip technique (Isomursu et al., 2004), decreased the burden on participants and researchers increased the quality of data gathered and provided rich data related to the emotions, feelings and experiences generated by a mobile application.

The main research phase started by recruiting users of Service A to participate in the study. The recruiting process was conducted by using the data base of a research company in Greece and by identifying participants by advertising in the press and the internet[74]. All of the participants came from the ethnic group of Greeks who according to Hall (1966) and Gesterland (2002) are mostly expressive based on their culture profile and are characterized as largely polychronic people. Studies have shown that culture influence behaviour characteristics (Hall, 1959). Hall notes that in some cultures it is the norm that individuals attend to different events simultaneously, while in other cultures events are handled sequentially (Edward 1959) and thus in order to better understand and analyse the findings I had to identify the culture profile of the participants. Hall (1966), used the term polychronic to describe cultures where different events are handled simultaneously as well as Davis (1999), used the same term to describe situations in which one attends to several events simultaneously, while each event unfolds at a different speed. According to this characteristic, order is not of importance to Greeks, for that they change plans often, to keep several activities going at once, they are easily highly distractible, and are subject to interruptions when consider an objective to be achieved. They have a strong tendency to build lifetime relationships and are committed to people and human relationships and are more concerned with those who are closely related (family, friends, close business associates) than with privacy. Since mobile technologies allow users to be connected all the time with their family members and friends this characteristic could advocate the high usage rate of phone calls and sms between Greeks (Marcussen, 2002).

During the recruiting process I found very difficult to identify frequent users of Service A. This was due to the fact that less than 1/3 of the population who are users of mobile data services in Greece spend on average 1-10 minutes / week according to WMDSS[75] (worldwide Mobile data services Survey).

[74] www.myphone.gr/forum/archive/index.php/t-159631.html
[75] http://wmdss.mobiforum.org/2006

Based on the assistance of the recruiting department of a leading research company in Greece I finally managed to recruit 27 participants, based on specific criteria. A total of thirty individuals (16 women and 14 men) participated in the data collection phase. Initially I recruited twenty seven individuals to participate in the group discussions. Nine of them participated in the media elicitation method. Finally, I recruited three individuals from my social network to participate in the observation phase of the study. All participants were Greek and the majority young users with an average age of 24. I did not aim to recruit persons over 45, because the rate of frequent users of mobile data services in this age group is too low. It seems that older people do not attach great importance to gather information and expand their horizons by, for example, learning how to use new technologies as service A. This could be supported by the argument that the subjective sense of remaining time/ future time has profound effects on basic human processes, including motivation (Carstensen, 2006). Thus older people, since they perceive time as finite more than younger people do, have lower motivation to get involved with newer technologies and try to find emotional meaning and satisfaction from social interactions.

The recruitment of the participants was based on specific criteria. Behaviouristic characteristics, age, profession, location of residence as well as demographic characteristics were also considered for the sample selection. The participants owned a 3rd generation mobile phone with a built-in camera and were frequent users of the Internet and of the Service A platform with at least two usage occasions of the platform per week. They were users with fixed or prepaid contract, permanent residents in the area of Athens and had minimum spending for Service A 10 Euros/month for the last 3 months

A drawback of the conventional demographic segmentation (age, sex, heavy/light users) is that it would not suffice to fully ‘describe’ the differentiation that actually exists in the mobile data services market. This is especially true, since the way for example entertainment or leisure are perceived, differs considerably from person to person, based on strictly personal priorities and tastes as well as distinct peer-influenced sub-cultures. Furthermore, this segmentation does not describe the effect of the mobile data services ‘learning curve’ on usage between recent versus older subscribers in mobile data services.

3.6.1. Focus groups

Initially I identified the main locations (physical dimension) where individuals use mobile data services. For that I needed versatile rich data, which came from the focus groups. Focus groups provide versatile data through creative dialogues, while different personalities interact with each other.

Three focus groups, (nine users per group), Table 21, were conducted and lasted for 180 minutes each. These group discussions provided more direct data collection and versatile rich data (Carroll et al., 2002), revealed key themes in the usage of mobile data service and identified and categorised the main locations (physical dimension) where individuals use mobile data services.

The focus groups were structured according to the following stages:

1. Welcome and purpose of the meeting
2. Round-robin introduction of participants
3. The participants were encouraged to talk about the Service A usage.

- Questioning on current usage and satisfaction (What are the imperfections or disadvantages of Service A? How do you currently use Service A? What do you like about it? What do you hate about it? Has the Service A changed your life? If so, how?)

4. The participants asked to recall and discuss locations and situations where they usually use Service A.

- Questioning and discussion according to the discussion guides. Based on the research questions I developed an interview guide aiming for an instrument to obtain unobservable information from individuals, where the aim is not a quantitative study, but a broader approach that encompasses as many variables as possible. The interview guide for these discussion groups for the main phase of the research is following in Appendix C.

5. Participants asked to mention which services and applications they wish for the future.

- What would you like to be able to do with service A that you currently cannot? To stimulate participants' imagination, I directed their attention to imaginary services that would be available in the future discussing situating scenarios for using such services. For example, I discussed with them an m-learning service describing the service as a supplement to regular language courses that would help participants maintain and improve their language skills. More specifically, the service would offer lessons in audio-visual format that cover parts of weekly lectures unattended or simply provide extra practice in the language studied. Another service that was discussed concerned the disaster management service which would alert people of a disaster along with instructions what to do, which places to avoid, or where medical assistance would be available. The announcements would be initiated by agencies or the government and would only be sent to people that are in the vicinity of the disaster site. The participants were very positive in such kind of services considering the fact that earthquakes are a frequent phenomenon in Greece.

6. Summary and conclusion.

- Having discussed Service A applications and prior to bringing the sessions to a close, I asked participants to rank the applications Service A provides

on the basis of which the most is interesting to them, they find the most useful and would not hesitate to pay to use them.

The analysis of the participants per focus group is shown below.

Table 21 : Research sample of the focus groups

No. Focus Group	Number of participants / age group	Sex	Age	Use of Service A
1	9	Boys/Girls	14-18 students / youngsters	Low spenders (10-30 euros) / Medium/heavy (30+ euros)
2	9	Men/ Women	19-24 university students / younger adults	Medium/heavy (30+ euros)
3	9	Men/ Women	25-38 young working people/older adults	Medium/heavy (30+ euros)
-	-	-	39-55 mature target users / budget conscious – family conscious	The number of frequent users of mobile data services within these age groups is too low

Table 22 : Sample of participants (youngsters , 14-18 year old)

14 – 18 Youngsters				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
1.	**Girl**	**14**	**High School student**	**Low spender**
2.	**Girl**	**15**	**High School student**	**Low spender**
3.	**Boy**	**16**	**High School student**	**Medium Spender**
4.	**Boy**	**16**	**High School student**	**High spender / interview**
5.	**Girl**	**16**	**High School student**	**High spender / interview**
6.	**Boy**	**17**	**High School student**	**High spender / interview**
7.	**Girl**	**17**	**High School student**	**Medium spender**
8.	**Girl**	**17**	**High School student**	**Medium spender**
9.	**Boy**	**18**	**High School student**	**High spender**

Table 23 : Sample of participants (Younger Adults, 19-24 year old)

19 – 24 Younger Adults				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
1	Man	19	University student	High spender
2	Woman	19	University student	High spender
3	Man	20	University student	Medium Spender
4	Woman	20	University student	High spender / Interview
5	Man	21	University student	High spender / Interview
6	Woman	21	Sales	Medium spender
7	Woman	23	Post graduate student	High spender
8	Woman	24	Owner of a touristic shop	High spender / Interview
9	Man	24	Army service	High spender

Table 24 : Sample of participants (Older adults, 25-38 year old)

25-38 Older Adults				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
1	Woman	25	Secretary	Medium spender
2	Man	27	Member of a music Band	High spender
3	Woman	30	Owner of a company – haircut	Medium Spender
4	Man	30	Sales manager	High spender / Interview
5	Woman	32	Consultant	High spender
6	Man	32	IT Administrator	High spender
7	Man	34	Taxi driver	Medium spender
8	Woman	35	HR Manager	High spender / Interview
9	Man	38	Owner of an SME advertising company	High spender / Interview

Group discussions were a core part of my qualitative methodology, as they were characterised by a relaxed, informal atmosphere which allowed participants to exchange their views and ideas freely. Group discussions encouraged teamwork and team spirit as well as creativity in developing ideas and, through the interaction and "sparking off" that occur among participants, allowed differing viewpoints and more deeply-held perceptions to surface. Focus groups allowed interaction on the issues determined by the interview guide that had been prepared. Issues discussed in the focus groups included the use of mobile data services within different places, the user's attitudes towards them, and perceptions of these technologies.

During the focus groups I asked users to demonstrate the usage process of Service A in order to deeply understand how their experiences and perceptions are being formed by the specific services. I spend some time to discuss the beliefs and perceptions of the participants against mobile data services.

The services that were discussed are the following:

- **Entertainment services** (ringtones & images, BEAT Box-Calling Tunes, Fun & games, sign, diet and beauty, Music Zone - Full tracks/ Realtones/ Voice tones/ ringtones/ Wallpapers, music news)
- **News** (news and weather, sports, financial news)
- **Communication services** (e-mail, Chat, Find a date)
- **3G services** (wireless internet, Mobile TV, Video call, 3D Games)

Some of the services that were discussed during the focus group sessions are presented below:

- **Entertainment services**

The radio service was underlined by participants as one of their favorites asking for a more enhanced service where they would be able to follow popular radio shows at opportune times other than at the original on-air time and for the ability to forward tracks to friends.

- **News**

The news and weather applications were described by the participants explaining that the weather service would be aware of the users' location and therefore it could provide regionalized information. Participants were asked if they would expect a choice of different news sources and if they would like to be able to access this content while visiting other countries.

- **Communication services**

The participants were not very positive with this service in its present mode and thus I tried to discuss further issues that could enhance this service. For example, I tried to find out if the reception of profiles of other potentially compatible users or

the video clips of people introducing themselves could make such services more desirable. It should be mentioned that participants would find this service difficult to discuss openly due to its sensitive and personal nature.

- **3G services**

One of the services that were discussed in this category was the mobile TV asking participants to imagine them waiting at the metro station unable to watch their favorite sports team. The service was discussed as a means of following live events when the participants are not able to watch the event.

To understand better the mobile data services usage pattern I based my study upon two basic parameters:

- Usage pattern (frequent/light users)
- The benefits gained buy the mobile data services usage

All group meetings were conducted in 'face-to-face' meetings in Greek, recorded on a cassette recorder and later transcribed. The recording of the groups' content gave me the advantage of concentrating my full attention on the conversation and extending the scope of interest where necessary.

3.6.2. Media elicitation method

Because the way participants use mobile technologies is irregular and often occurred at times when observation was not feasible (such as beyond working hours), I adopted the self reporting method that reduces the burden on the researcher by having the participants' record events as they happen. I decided to avoid asking users to take notes because this would be a physical and practical constraint since it would disturb the normal mobile activities of the users, and would require them to sit down and start writing. Also, some people may find writing about their emotions and feelings a difficult task. Voice-mail diaries on the other hand are a low-cost way to collect data regarding activities as they occur at any time. When paired with mobile telephony, the opportunities for creative experimental design would only increase, and make the technique especially suitable for studying the activity in a natural manner and with minimal intrusion under mobile conditions. In general, for studies in which detail is important, a hybrid photo/audio capture medium is most appropriate. Thus because mobile telephony has created opportunities for capturing everyday activity in new ways I decided to use a media elicitation method following Hulkko et al. (2004) who developed Mobile Probes as a way for participants to document their shopping experiences using the built-in camera and SMS functions of their mobile phones. So in order to capture how the participants experience a place, to capture their feelings and memories associated to that place while they use Service A, I applied media elicitation study using mobile prompts accompanied by in depth interviews.

I also applied my innovative technique which is an extension of feedback methods. This method allowed me to get insights on how space is shared by groups of people and how social interaction and cultural elements influence the usage process. Thus after the focus group sessions I started the media elicitation method accompanied by the "synchronous feedback" method working with participants coming from the focus groups in order to represent a set of demographic and behaviouristic characteristics similar to that of the focus groups. This part of the study was conducted and data was collected in a 2 weeks period so that parameters such as exposure of users to Service A advertising or changes in usage patterns would not come in effect. The users' motivation to participate, complete the tasks and document relevant issues is the key to successful self reporting studies. In that sense the users' motivation should be one of the driving forces when developing such kind of research pipelines. Thus I created incentives to encourage participation. These incentives were 50 € for participating in the media elicitation study and 20 Euros for participating in the focus groups. Because I introduced monetary incentives to encourage subject participation in the media elicitation method I decided to work with only three users per group for this data collection phase as shown in the following Table.

Table 25 : Research sample of the 'media elicitation phase' groups

Media elicitation study with in depth interviews	Number of participants / age group	Sex	Age	Use of Service A
1	3	Boys/Girls	14-18 students / youngsters	Low spenders (10-30 euros) / Medium/heavy (30+ euros)
2	3	Men/ Women	19-24 university students / younger adults	Medium/heavy (30+ euros)
3	3	Men/ Women	25-38 young working people/older adults	Medium/heavy (30+ euros)
-	-	-	39-55 mature target users / budget conscious – family conscious	The number of frequent users of mobile data services within these age groups is too low

Table 26 : Sample of participants (youngsters, 14-18 year old)

14 – 18 Youngsters				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
1	**Boy**	**16**	**High School student**	**High spender**
2	**Girl**	**16**	**High School student**	**High spender**
3	**Boy**	**17**	**High School student**	**High spender**

Table 27 : Sample of participants (younger adults, 19-24 year old)

19 – 24 Younger Adults				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
4	**Woman**	**20**	**University student**	**High spender**
5	**Man**	**21**	**University student**	**High spender**
8	**Woman**	**24**	**Owner of a touristic shop**	**High spender**

Table 28 : Sample of participants (Older adults, 25-38 year old)

25-38 Older Adults				
Number of Participants	**Sex**	**Age**	**Profession**	**Use of Service A**
4	**Man**	**30**	**Sales manager**	**High spender**
8	**Woman**	**35**	**HR Manager**	**High spender**
9	**Man**	**38**	**Owner of an SME advertising company**	**High spender**

I chose these nine participants based mainly on the following characteristics:

- Regular access to a Service A mobile phone with built-in camera and a personal email address. Any usage of the Service A platform, at least two to three times per week. This was necessary to collect at least four photographs for a period of two weeks.
- Permanent residents of the greater Athens area, since the study was conducted in Athens. As residents of Athens it was easier for me to understand better the users' levels of place attachment with specific places.

So it was easier for me to have a better insight working, cultural as well as leisure places as the Mall, Central cafes, metro, Kolonaki Square, etc.

- Low entropy users, (Eagle & Pentland, 2006), who usually execute routine daily activities within "familiar" places having a strong place attachment (Williams, Patterson, Roggenbuck, & Watson, 1992), with these places. This behaviour characteristic enabled me to identify the in depth feelings and emotions users had with these places.

The participants were asked to keep a "diary" of their Service A use habits for a period of two weeks before the interview, including details of the service and context of use. As one of the recruitment criteria is the ownership of phones with a built-in camera I asked these nine participants to take pictures of the places and things whenever they used Service A and keep notes and video/audio recording of the environment they used Service A if possible.

Figure 15 : Sample of the photographs that the participants emailed to the researcher.

I gave each participant some basic instructions how to take a photo with a mobile phone, what to observe and what is most important for the research each time they notice that they are using Service A to read news, surf the web, access emails, watch mobile-TV or listening to the mobile-radio. Participants were given a list of issues to report on, such as the places they were, their mobility status, their emotional status and other people near them. The participants were asked to email the captured photos to a predefined email account. I asked them to annotate the e-mails with notes or audio recordings.

Looking outside my office | Boring. Nothing special to watch | Waiting for my children.

Figure 16 : Sample of photographs with annotations

If the users were not available at the time of capture they kept the annotations and e-mailed the photos later when available. Because I was concerned that requesting from the participants to use the method would erode participation in the two-week long study, I made participation in the voice-mail diary or written annotations optional. I reviewed the data collected at my e-mail account. Participants took an average of four photographs during the two weeks period.

Also, within 2006 Microsoft[76] and Company A launched the MSNMessenger[77] on platform A devices, allowing users to stay in touch when they are on the move. MSN Messenger on Service A extends the features of MSN Messenger available via PC, which includes access to the MSN Messenger contact list, allowing users to seamlessly connect with those who are online. Instant messaging between PCs and mobile phones enables immediacy, gives the ability to chat with the users online when they are on the move and allow me to see the text of whole conversations. Users had been provided with the MSN service on their mobile devices and every time I received a picture from a user and decided that there were issues of interest then via the MSN service I had a short chat with the user. This method combines the ESM technique with a synchronous communication between user and researcher at the time the event is taking place and for that I termed it the "synchronous feedback" method. This "synchronous feedback" method allowed me to identify on the spot, the emotions and experiences of the user. If this was not possible then via email I would ask for clarifications.

The technology used in this study included mobile phones equipped with digital cameras and with Service A service capabilities. Most new generation mobile phones have a reasonably large color display and a built-in camera. These devices are capable of recording different media types like audio, images and videos. Current camera resolutions are equipped with better optics and better image quality reaching the 5 Mpixells as the LG KG920[78]. With these devices it is possible to take pictures or videos and save them on a MMC memory card. Some mobile phones have a built-in limitation for the clip length, 30 seconds, allowing the user to start recording a new clip soon after finishing the previous one. In that case downloadable applications can be used to remove the clip length limitation. The images, videos and sound recordings were transmitted over the GPRS or 3G network.

[76] www.microsoft.com
[77] www.msn.com
[78] http://us.lge.com/products

The research pipeline as described in Papadopoulos (2008b), borrows from both feedback and elicitation methods to maximize participant recall and interview preparation while minimizing situated logging. The proposed pipeline is following:

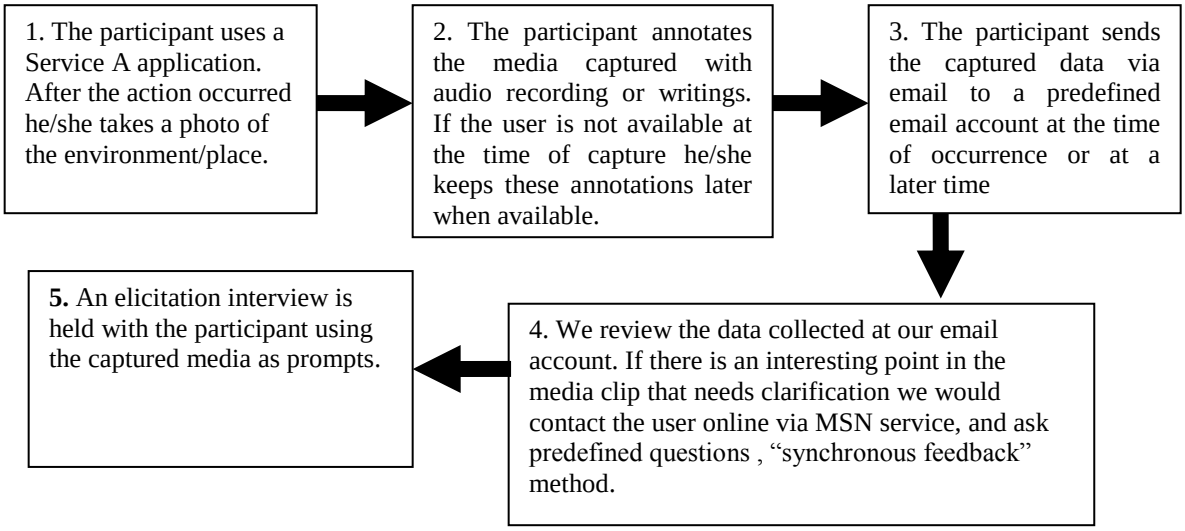

Figure 17 : Proposed media elicitation pipeline.

This data collection method minimized the extent to which participants were distracted from their primary tasks since they were able to send the data at a later time, while I had the opportunity to prepare the interviews based on the captured pictures and the annotations sent. After the two weeks period, I had audio recorded in depth interviews that lasted for approximately one – one and a half hour each with the nine participants. The participants in the media elicitation study were interviewed individually. The mobile probes, along with the data from the chatting on the MSN were used as inputs to trigger discussion. As every photograph contains details not found through written or verbal means, it becomes an important source for information unattainable otherwise. These in-depth face-to-face interviews were audio recorded.

The aim of the interviews was to get a better understanding of the behaviours recorded through the media elicitation method, helping to discern meanings and motivations. I tried to elicit verifiable facts and "reality out there" (through questions regarding issues such as frequency of interactions, with whom, for what type of tasks, etc.) from the interviews. The interviews were directed towards discovering interviewees' perceptions, experiences and feelings about using Service A within natural environments trying to get "honest and open information" that is valid and reliable. The mobile data services use in public places and relevant etiquette were investigated and questions were also asked about SMS and phone calls. During the interviews I collected data that provided insights on how the participants experience the place where they used mobile applications (personal dimension), how social interaction is shaped by the space (social dimension) and

how cultural elements influence the place (cultural dimension). I also tried to highlight the participants' perceptions regarding Service A and reflections about the experience of using it. This consisted of a mix of facts with personal non-replicable experiences and emotional reactions in response to the questions (as for example why did you decide to use the service A rather than the radio or the TV in this particular situation).

To conduct the interviews and collect the data interactively, on an individual basis from the subjects, I used an interview guide. I tried to listen more than to speak, to ask questions in a straightforward, clear and non-threatening way, not to appear bored and to eliminate cues which could lead the interviewee to respond in a particular way. The discussion topics covered during the focus groups and in depth interviews are listed in Appendix C. The photographs assisted the participants to remember details and reconstruct the whole event. After completing the data collection phase, I coded, compared and analyzed the captured pictures, the filed notes and the transcripts that came out from the focus groups and the interviews

3.6.3. Observation method

My work was supplemented by ethnographically inspired observations of mobile users in action that allow real world iterative evaluation of the use of mobile communication technology. Direct observation, which included note taking and photography, put us in the context in which technology use occurred during the participant's everyday practices and activities. These everyday environments of use of mobile technologies are not always helpful to these methods because this can be disruptive for the users (Isomursu et al., 2004) and impractical in some other cases (Palen et al., 2002).

Having recruited three individuals from my own social environment it was easier for me to join them, observe or take photos or audio recordings of an informal, free-form interview in order to clarify the participants' actions and motives. I also exploited the natural human behaviour related to sharing experiences with friends. The participants were too busy professionals (a female/27/consultant and a male/35/IT PM) and a university student (female/21).

Table 29 : Research sample of the "observation phase" group

Observation method	number of participants	Sex	Age	Use of Service A
1	1	Woman	27 / consultant	Heavy (30+ euros)
2	1	Man	35 / IT Project Manager	Heavy (30+ euros)
3	1	Woman	21/ university student	Heavy (30+ euros)

Observation provided understanding of what the participants did with technology rather than what they said they did (as in interviews and focus groups). I evaluated the service A usage in natural setting by direct observation gaining thus insight into people's daily life to manage data, plan meetings, and control their availability while mobile. Each observation was unique. The observation phase was conducted during weekends and holidays excluding rush hours during working periods. I spent two days with each individual, who was aware of the research. Observations were recorded in notes describing the users' behaviour on public transport, in bars, cafés and shopping centers as well as in streets and squares. It was noted how people behave while talking and texting, their body language, the direction of their gaze, and also the display of the handset and where it was carried. To record the observation phase I used a pre-defined form as an instrument to guide information capture (activity data form). Activity sequence data forms during time were constructed based on these notes as shown below. These activity data forms assisted me with the analysis of the data.

Table 30 : Sample of an activity sequence data form

Participant (35/male/ IT project manager)	**Place**	**Time (Saturday)**	**Event**
	Home	10 am	Have breakfast
		10.30	Having calls, arranging meetings
		10.40	Check e-mails – Laptop
		11.05	Taking care of the pet
		11.15	Get prepared to go out
	Car	11.45	Driving to the shopping center (Mall, familiar place)
		12.10	Exchange SMS
	Shopping center	12.30	Buying newspaper
	Café	12.40	Waiting for friends
		12.45	Checking service A
		12.48	Stop surfing service A since someone called
		13.00	Friends start to arrive / Having coffee
		13.30	Having a look with friends at the new Smart/auto – service A
		13.34	Keep conversation
	Square	14.00	Walking around two of the friends to have a look at the stores
	Supermarket	15.00	Going alone supermarket
	Home	16.10	Having lunch at home
		17.00	Relaxing/ watch TV

I took notes for the observations not on the spot but soon after the event. At the end of the observation session I went through the observation field notes to clarify and fill in details where necessary. I prepared detailed notes within a day after the observation session. I proceeded to the second observation after having completed the first one. My main motivation was to capture unconscious behaviour activities and find out what was going on (exploratory) rather than to confirm hypotheses. For that I used the method with one participant per session, in order to become able to observe his/her behaviour. The usage of mobile data service was a relatively short process, but the events during a day weren't occurred frequently. This led me to extend the observation session per participant to two days. The emphasis was on the importance of understanding the actual experience and reflecting on the meanings associated with the everyday life use of mobile data services. A difficulty I encountered was that I acquired only a restricted and partial understanding of the actions observed. Partial because I could not observe all the actions and behaviours, in this case all the existent mobile data services uses, and also because all ways of seeing are partial and incomplete.

Furthermore, unavoidably I was part of the social environment of the observed participant and this allowed me to observe the activities of the subjects, first-hand. But although I tried not to make the participants feel any discomfort, this onsite observation was subject to a number of concerns such as the discomfort of the subjects, the disturbance of the leisure time of the participants and the extraction of biased conclusions since the observation took place within specific contexts with low anxiety levels. I tried to cope with these concerns sometimes by being too friendly and some other times adopting an inactive, fly-on-the-wall, participation attitude.

Finally, have to be mentioned that before conducting the focus groups and the interview sessions I tested the interview guide to ensure understandability, with peers and preliminary focus groups. I explained clearly to the interviewees the confidentiality policy, the purpose and any other issues related to this research and the importance of them in this research. In any case I tried to omit irrelevant and redundant questions.

3.7. Coding process

Coding is often used in qualitative research to provide a structured and coherent analysis of qualitative data (Miles and Huberman, 1994). Codes are 'tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Coding allowed me to interpret the data and identify what is relevant to the research project's goal. Various coding techniques were used to support the analysis such as note taking, memos, summarising and data reduction. Furthermore, repeatedly and in parallel with the data collection process I was coding and grouping the data and were constantly comparing the findings. The model of place, that was constructed in chapter 2, provided me with a structuring mechanism or 'map of the territory' for the research effort, within which empirical data was collected and analysed (Fisher, 2004). This model allowed me to filter the relevant data in the analysis phase and provided what Miles and Huberman (1994), call "the best defense against overload". Thus since my study does not aim at constructing a theory from concepts emerging in the data I used the model as a filter to reduce the data.

Although my approach is closer to that of Miles and Huberman (1994), since I initially defined the structure of the model of place before the review of the data, I developed the structure of the coding system following a more integrated approach. Thus I employed both inductive developments of codes, using conceptual codes, as well as a deductive organizing framework for code types (model of place). The process of analysis, interpretation and constant comparison of the data and findings is shown in the following graph.

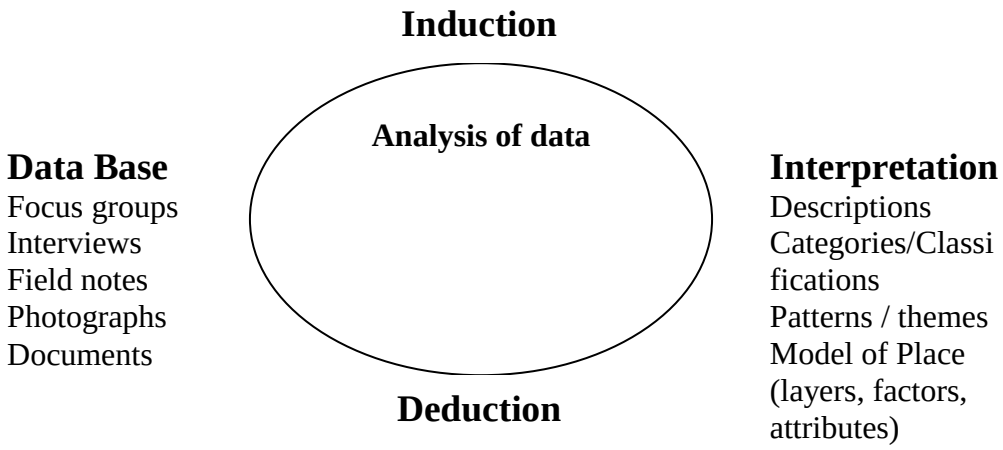

Figure 18 : Process applied for analysis, interpretation and constant comparison of the data and findings.

Various code types have been proposed by Miles and Huberman (1994) and Strauss and Corbin (1998), however the coding structure adopted for this research consisted of four distinct types:

• Profile (Socio-demographic) Coding: Since participant anonymity was guaranteed to all those who took part in the study a profile code were attached to each piece of text extracted from a transcript. For example, for a 16 year old boy, a student in the high school (secondary education) who was classified as high spender the profile code was (m:16:high school: high spender) while for a 14 year old girl, student in the high school who was classified as low spender the profile code was (f:14:high school: low spender). According to Miles and Huberman (1994), this type can be characterized as a descriptive code since it involves little interpretation.

• Classification Coding: Classification codes were used to analyse the data coming from the focus groups and the interviews, based on the proposed model of place as recommended by Miles and Huberman (1994) and Yin (2002). This type acted as a filter allowing me to remove any irrelevant data collected throughout the data collection phase. Each one of the four layers of place (as for example personal layer, social layer etc) was assigned a code, and with sub-codes assigned to the factors of place (as for example roles of the users, interaction status etc). Where appropriate, a further set of sub-codes were then used to assign the attributes of place (as for example communication, co-operation etc).

So for example, one coding string would have read as: **[Social_layer/interaction_status/communication].** This type of code can be characterized also as a descriptive code (Miles and Huberman, 1994).

• Conceptual coding: These codes are used to label discrete happenings, events, and other critical issues (Strauss & Corbin, 1998), as for instance the concepts "escape" or "alone". Wherever in the data set for instance, the participant was arguing that he/she was bored without any interest for activities I marked this data segment by an adequate code label like "alone" or "familiar environment" etc. According to Miles and Huberman (1994), this code can be characterized as an interpretative code since it can highlights hidden motives, actions etc.

• Pattern Coding: The third coding mechanism was pattern coding, where codes "identify an emergent theme, configuration or explanation" (Miles et al., 1994). Pattern codes are labels for systematic sequential co-occurrences of other codes, signifying complex clusters of meaning. Thus, they do not relate to one particular data segment only, but to a determined sequence. This approach aims to aggregate and summarise the previous codes, identifying themes and inferences across them all. The importance of the "feeling of security" or the "Individuality and Emancipation" themes is example of emerging themes across the interviews. Some examples of how these coding mechanisms were applied are contained in Appendix D.

3.8. Data Analysis

There does not exist a single appropriate way to conduct qualitative data analysis (Cresswell, 1998), although there is general agreement that analysis is an ongoing process that begins in the early stages of data collection and continues throughout the study. This section provides an overview of the study's data analysis approach which generated themes and findings. The overall approach to data analysis was guided by the qualitative data analysis techniques described mainly by Miles and Huberman (1994). Various techniques were used to support the analysis. More specifically, I used note taking, sketching ideas, summarising and data reduction, coding, relating to analytic model in literature, noting relations among variables and building a logical chain of evidence, summarising field notes, identifying data patterns, comparing data and counting frequency of codes identifying codes where little information resides.

During the analysis part I focused on how individuals describe their experiences with time, space, objects, artifacts, feelings and behaviour when they use mobile data services. My goal was to provide interpretive descriptions of the poorly understood phenomenon of everyday use of mobile data services.

All conversations (interviews same as the focus groups) were conducted in 'face-to-face' meetings in Greek, taped and later transcribed. The recording of the interview content on a cassette let me concentrating my full attention on the conversation and thus extend the scope of interest where necessary. The interview and focus groups transcripts as well as the field notes (diaries, ethnographic data) were:

- coded
- organized and structured (grouped thematically),
- and finally analysed.

Initially, data analysis was carried out through an extensive reading of the transcripts to gain an overall understanding of the content. Reviewing the data to comprehend its meaning in its entirety is an important first step in the analysis because it helps to identify emergent themes (Crabtree & Miller, 1999). This initial activity allowed me to reduce the volume of data which according to Miles and Huberman (1994), is a process for selecting, simplifying, abstracting and transforming the raw case data.

In the next phase, I coupled my model of place with the data selected from the data collection activity. The model framework served as a sensitizing device for looking at, interpreting, and analyzing the data (Van den Hoonaard, 1997). I systematically coded every paragraph in which issues of the attributes of place were discussed. For each of these paragraphs, the main themes which were viewed as the essence of the discussion were coded and notes were taken.

Finally, I organised the codes and notes and assembled the information. Themes and patterns evolved from the assembly of the conceptual codes which link concepts to each other. This enabled me to draw conclusions and meaning from data and to build a logical chain of evidence. The assembly of the information enabled me also to see repeated patterns within the collected data and reveal the hidden motivations and behaviours behind the use of mobile data services. For example, as in the study of space, the feeling of security as an important in the usage process of mobile data services was a repeated pattern in the data that was related to the location, objects and environmental conditions factors. Throughout the process I frequently compared all emerging themes and concepts to ensure analytical consistency. During the analysis process if I realised that a piece of information about a concept contradicts previous understandings or if I was not certain of the importance or validity of an emerging pattern code I would try to collect more data relating with this code during the ongoing data collection phase. This use of the codes to guide data collection is known as theoretical sampling and is central to conducting qualitative research.

The mix of the research methods enabled me to view the emerging themes through different angles and to identify complementary concepts. For example, the focus group sessions provided me with rich in context data and allowed me to identify how users perceive service A and which are the most common locations they prefer to use Service A. The media elicitation method, the interviews and the observation provided me with rich data to understand the individuals' emotions and feelings, the cultural characteristics of the places and the social influence when the place trigger usage of Service A.

Also, the detailed analysis of the transcripts provided me not only a comprehensive background understanding of mobile device users, but ensured that the demanding nature of mobile communication is fully documented, salient themes were identified where possible and the physical, social and technological constraints were recorded.

The aim of reliable research is to enable replication of the findings if conducted at a later date by a later investigator (Yin, 2002). For that a case study database was used to record all interview material and store all primary documents received during data collection. Furthermore, the documentation that was used, the contradictory evidences produced by the different number of the research methods that were applied, the quantity and the variety of the evidences that came out, do support the validity of the results that this study generated.

3.9. Data Presentation

The data that was collected through the group sessions, the interviews and the media elicitation methods concerned Service A platform owners' usage behaviour, within the greater Athens area. In order to establish the interpretative generalizations (Walsham, 1995), from the case study "Service A in Greece" I draw upon the Tuan's theory and Brahms' model that locate the specific case study and its ramifications within the broader context of the behaviour of humans within different places. Qualitative methods of collecting data such as those employed in this research raise the question of how to present results. Following the above research choices I adopted the case study of a mobile data services platform (Service A) in Greece as a way to present the results. According to the researcher's interpretative stance, the final outcome of the interpretation of this specific case study is a "contribution of rich insight" and a "drawing of specific implications" (Walsham, 1995).

Service A, which is presented in more detail in chapter 4, is already a commercial product and not a tool that I have developed to research the phenomenon of usage or a probe of a future product which is unknown to the end users. Thus Service A is part of user's lives that are being influenced by parameters as the marketing activities of Company A, by their social network, by the image of the Service A brand and the price policies the specific period I carried out the research and their past experiences with the product. Although I tried to study the relationship between places and Service A usage within its real life settings, I did not manage to avoid the influence of the above parameters since adoption and usage of mobile data services is a complicated phenomenon.

According to Yin (2002) and Eisenhardt (1989), a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the subject area is context rich, there are more variables of interest than those the data points and the boundaries between phenomenon and context are not clearly evident. For that I believe that choosing the Service A platform as a case to present the data, I present the whole phenomenon of mobile data services usage within its real context and bring to light unfolding events over time and context. Furthermore, I expect that the case study "explained" what lessons can be learned from the implementation of Service A in Greece in terms of service adoption and use within the end users.

3.10. Chapter Summary

This research is drawn from the need to understand deeply how users experience place before starting using mobile data services. The results of this exploratory research are both academic and practical and aim to provide understanding of the elements that lead to usage increase. Since I adopted the humanistic geographical perspective as represented by Yi-Fu Tuan's theory, chapter 2, where places are spaces which have meanings coming from humans' interpretations and values, within this chapter I discussed and presented the contrasting philosophies and research methods that surround my position, as well as the rationale and justification behind these decisions. More specifically, I presented and justified my interpretivistic stance and my decision to use qualitative research methods to collect data in the field by using conventional data collection methods like interviews, observation and focus groups as well as media elicitation methods and a new form of feedback methods.

The phenomenon I study is how users experience place before deciding to use mobile data services. The tool I used to conduct the research is the Service A platform. The units of analysis are the owners of Service A mobile data services platform in the Greek territory. I also present the data collected in the form of the case study. The summary of the research approach follows:

Table 31 : Summary of the research approach

Phenomenon ==========>	**Mobile data services use**
Research problem ==========>	**Experience of place before deciding to use mobile technologies and services.**
Point to study ==========>	**Analysis of data related to the experience of place before using Service A**
Ontology , epistemology ========>	**Nominalist, interpretative**
Data collection ==========>	**Interviews, focus groups, media elicitation methods, observation**
Unit of analysis ==========>	**Service A owners' usage behaviour in the Greek territory**
Data presentation ==========>	**Case study of "Service A mobile data services platform" in Greece**
Data analysis ==========>	**Descriptive , interpretative and pattern coding**
Theoretical constructs to guide analysis and interpretation of the data. ====>	**Tuan's theory, Brahms model, place model**

Computer-Supported Cooperative Work literature (Baecker, Grudin, Buxton, & Greenberg, 1995), categorize the applications by using the distributed versus collocated and synchronous versus asynchronous distinctions. Following this categorization, Service A is an application asynchronous and distributed in nature

since users tend to be mobile and to change often context, making of course data collection more difficult, and thus its study should be situated within real settings. Thus my decision to apply the chosen field studies are widely accepted as the methodologies that provide the most experimental realism (McGrath, 1995) and can be used to gather context-dependent data.

Also, within chapter 3 I faced the challenges, (scalability, data scarcity and unobtrusiveness) the researchers have to address before deciding which research methods they will apply to conduct the field studies. My proposed research method addresses the field study challenges of scalability, data scarcity and unobtrusiveness, as following:

- When scaling an evaluation, the time needed for researchers to conduct the study tends to scale as well. The solution I propose minimizes infrastructure deployment because it is based on known technologies as e-mail, video clips, MSN, mobile phones etc. lower per-participant researcher-hours introducing self-reporting, and encourage uptake via the motives it introduces. Also through the focus groups the study intends to gather versatile and rich data. Finally, the situated annotations of the experience clips as well as the possibility to review the captured data and annotations before the elicitation interview takes place minimize the researcher's burden facilitating their getting the most data out of limited interview time.

- Critical events in mobile data services use are casual and sparse, so it is important to capture and gather feedback on as many as possible. To aid data collection in a field evaluation process, my solution captures easily via mobile phone and encourages due to motives and the ability to have feedback from critical events at the time of occurrence via MSN.

- In order for the field evaluation to be unobtrusive, devices and interfaces were used with which participants were already comfortable, such as mobile phones, Service A service, e-mail and MSN leading thus to rapid uptake.

Within chapter 3 I also described the research pipeline I applied for the field studies. This proposed pipeline provides "lightweight situated annotation", the researchers are able to review captured events and have online feedback communication when necessary with users. The combination of the different research methods provided me also with the opportunity to understand the researched phenomenon of usage of information data services within natural environments as a whole. In particular these research methods provide access to group (focus groups) and individual (self-reporting and observation) views as well as participants' post hoc recollections of actions (focus groups, interviews) and researchers' interpretations of the participants' actions in their everyday contexts (participant observation).

4. The context of the research

4.1. Introduction

In this chapter the "phase 1" of the research that was applied in the Greek market before deciding which mobile data service platform would be used in the scope of this study is described. Also, an overview of the geographical context of the research is given, as well as data from the empirical field study phase related to the needs of the users and their perceptions of Service A are presented.

In the next section of this chapter a description of the "phase 1" of the research that was conducted to identify the mobile data services platform that was adopted in the research is provided. The interviews that were conducted with managers from the three major mobile data service providers in Greece, the larger content providers in this market and the Telecom National authority in Greece are also presented. Section 4.3 contains the analysis of the background of the case study that was used to present the findings. The background of the case study concerned various aspects of company A as well as various characteristics and details of the provided applications of the Service A. I decided to use "Service A" (pseudonym) as the platform to provide the mobile data services. This service is provided in Greece by company A and as stated in the introductory chapter, a pseudonym (company A) has been used to respect the assurance of confidentiality requested by the organisation in question. The decision to use Service A was based on the positioning of the service in the Greek market as a leading product, a fact that made it easier for me to identify a sufficient number of heavy users able to participate in the study.

Finally, in Section 4.4, there is the conclusion with a discussion of the findings of the "phase 1" of the research. In Section 4.5, the geographical context where the field study was conducted, is presented. The characteristics, the public behavior and the beliefs of the residents of this area are also described. This section also presents the lifestyle characteristics of the participants, who were interviewed as part of this study, as well as the way they perceive Service A. The focus groups showed a functional and strong emotional connection between the participants and the mobile data services provided by their mobile phones because these services fulfill certain needs. Thus in Section 4.6, the users' needs are analysed and these needs are correlated with specific applications that the Service A provides.

The objective of this section is to describe the context, the social and cultural etiquette concerning mobile phone use in the greater Athens area. The study revealed that the places where users mainly use service A are at home, in the metro, cafés, taverns, cars and resting areas within shopping areas in city centers. This section presents some features of people's behaviour in these urban areas in Athens. The way of living as well as the lifestyle of the participants follows.

4.2. Description of the "phase 1" of the research

The rationale behind the survey of the Greek mobile data services market (content providers, competitors, national authorities) was to:

- Determine the perception of the key actors for the specific service,
- Identify the methods that are used to promote the service,
- Identify the problems that exist in this market
- Identify the factors that are concerned as crucial for the success of this service,
- Identify the culture of the key actors that are promoting this service and its influence on the adoption process.
- Determine the target groups to work with in the research
- Determine the applications to study their usage rates within different places

And finally select the platform (Service A) I used in order to study the role of place in the usage process. The success of Service A worldwide turns this service into a preferred testing ground for the mobile data services usage process.

Based on the findings I identified the characteristics of the Service A users (age groups, heavy users versus light users and others) and thus defined the groups of responders that I would involve in my study. These interviews assisted me also to clarify certain issues regarding mobile data services as for example the pricing strategies.

The "phase 1" of the research was carried out by collecting published data such as documents, and articles and conducting 16 interviews, following the method of in-person with managers representing the mobile data services market in Greece. The interview as a common method of data collection in a case study, Yin (2002), provided me with useful insight and allowed subjects to describe events and tell their story. Thus I attained a clear picture of mobile data services market in Greece, I depicted the market environment and I positioned Service A.

The data base content of the "phase 1" of the interviews is following:

Table 32 : Content used from "phase 1" research

Company	Interviewees	Interviews	Press research pages	Annual report
Company A	2	2	52	1
Mother company of Service A (abroad)	1	2	15	1
Competitor 1	1	1	3	
Competitor 2	2	2	12	
Content provider 1	1	1	1	
Music content provider 2	1	1	1	
Content provider 3	1	2	31	
Content provider 4	1	1	11	
Content provider 5	2	2	1	
Research company in Greece – Company 6	1	1	1	
National Regulatory Authority for Telecoms	1	1	5	2

A table of the open questions (Appendix B) was developed for the "phase 1" data collection phase of the research. Semi-structured interviews were used to assist me clarify and gain the whole picture of the context and the market (mobile data services market, competitor products, pricing etc) of mobile data services in Greece and thus decide which platform to use for the research. The pilot interviews and reviews began in the winter of 2004 and ended in spring 2005. The subjects of the interviews were middle and top managers coming from the whole value chain of the mobile market in Greece. The subjects were chosen from various sectors, ISP, content providers, technical providers etc. In all interviews, that lasted between 1 and 2 hours, a semi-structured interview guide was followed, which facilitated comparison and gave respondents enough flexibility to elaborate on the specific areas.

4.3. Background to the Case study

Following the "phase 1" of the research I adopted a case study as a way to collect data and present the findings. The adopted case study was the mobile data services platform of Service A which was launched in the Greek Market by the mobile service provider of Company A. This was a well known service in Greece as well as worldwide according to secondary data, which as I believed it could assist me with my research. The case study provided me with a broader perspective of the mobile data services market as for example the characteristics of the heavy users' target group. This perspective allowed me also to understand and filter the external factors that might influence the decision to use Service A and thus understand better the influence of place in the usage process. For example, special events and promotional campaigns that were organised in the summer periods could give me false data according to which these time periods increase usage rates. The case study of Service A in Greece gave me a better knowledge of the broader environment and market and thus assists me to avoid such misunderstandings.

4.3.1. Company background

Company A is a Greek telecommunication provider, (965 of the 1000 most successful companies worldwide, business week 2004), which offers in Greece service A as a mobile data services platform. Currently it has more than 4.6 million customers in Greece being thus in the leading market position and it also operates in 4 other Balkan countries. Total consolidated revenues for 2005 reached EUR 1,797.6 million, representing an increase of 13% as compared to 2004. Since 2001, Company A has installed a nationwide GPRS network which allows data transmission with enhanced functionality and speed. In 2004, Company A launched commercially its 3G services. In 2004, the company began offering exclusively to the Greek mobile market, Service A, the world's most popular mobile Internet service. In June 2005, the company launched 3G services in Service A providing services such as mobile music, 3D Games, JAVA applications, and exclusive content. Service A offers access to more than 82,000 Internet sites (as of July 2004); it has attracted more than 41 million subscribers worldwide since its introduction in February 1999. Company A provided multimedia messaging and data transfer to over 170,000 subscribers of Service A, in March 2005 in Greece. According to the press, the director of the service A in Japan, during 2005 argued that he considers Company A as a worldwide successful case study.

The context of this research which is the mobile market in Greece is characterized by high rates of growth.

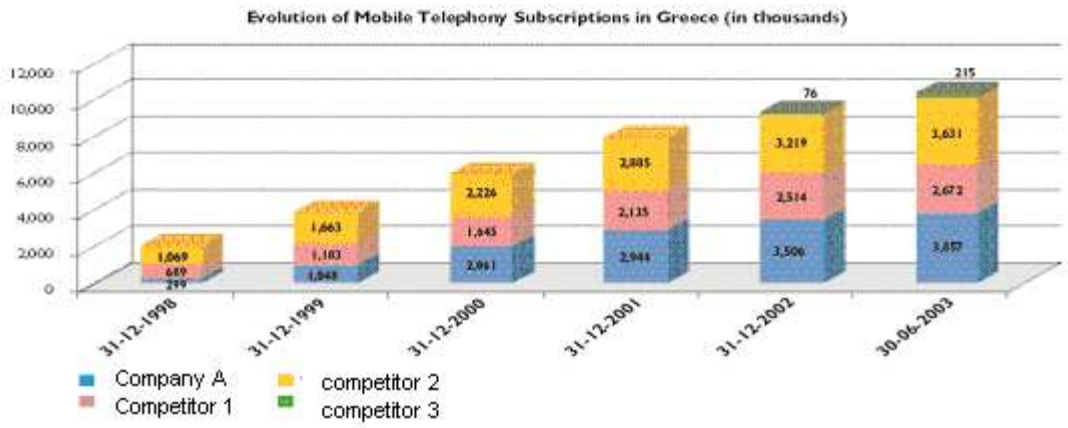

Figure 19 : Greek mobile market growth[79]

Service A allows data transmission, giving thus the possibility to the users to have an "always on" connection and faster transmission of data, which resulted in speedier downloading of pages. Thus Company A offers value to its subscribers by allowing them to be permanently connected. Company A also created value to content providers allowing them to use a standard that was compatible with Hyper Text Markup Language (HTML) and thus made it easier for them to modify their existing web pages to the Service A compatible wireless phones. The revenue base for the services was also differentiated from the traditional way of charging for wireless services. Instead of charging by time the company decided to charge a flat monthly fee plus a small fee per 128-bit packet. This revenue model also called for creative billing alternatives.

4.3.2. Service A background

Service A has been considered by the press as an innovative service compared to the competition. Previous similar attempts failed and abandoned (according to the secondary data I collected from Company A) since the market of mobile data services in Greece had not reached a sufficiently mature stage for these services.

Service A, was chosen for this research because it could help it through a number of mechanisms:

- Service A as a mobile data services brand has extent awareness within the Greek population, and offers a pool of different success applications for the research.
- The awareness of Service A allowed me to establish samples across diverse groups of users and situations of usage.

[79] http://www.eett.gr/eng_pages/index2.htm

- The pool of different applications allowed me to uncover how different categories of applications might affect usage within different places.
- Service A provided extended features that assisted me to apply the "synchronous feedback" research method using the MSN Messenger. It should be mentioned that during the research design phase I tested few other tools such as Context Watcher[80] and Context Logger[81] used by the Reality Mining project at MIT Media Lab. These tools have been built to support field studies, but they could not support this research since they were based only on Nokia's Series 60 operating platform which was not compatible with the mobile phones that supported Service A as well as the other two competitor platforms.

To conduct the research, I initially identified the elements and features of the most successful mobile data applications of Service A. Service A provides a portal that allows users to have WAP services as well as to surf internet and have e-mail, Mobile Banking, maps, On-line shopping, travel/booking, MSN Messenger, and other applications in their mobile phone. These applications are provided either via the mobile provider that hosts the service or there are contracts with outsources who provide this content.

Regarding the business aspect of the Service A alliance in Greece a conclusion that resulted from the "phase 1" of the research is that the Service A consortium invest on the development of an innovative business model, figure 20, that leads in a win-win situation for all the partners. What seem to be missing up to now are the positive results in terms of revenues, something that leads to negative and pessimistic attitude.

[80] http://www.lab.telin.nl/~koolwaaij/showcase/crf/cw.html
[81] http://reality.media.mit.edu/download.php

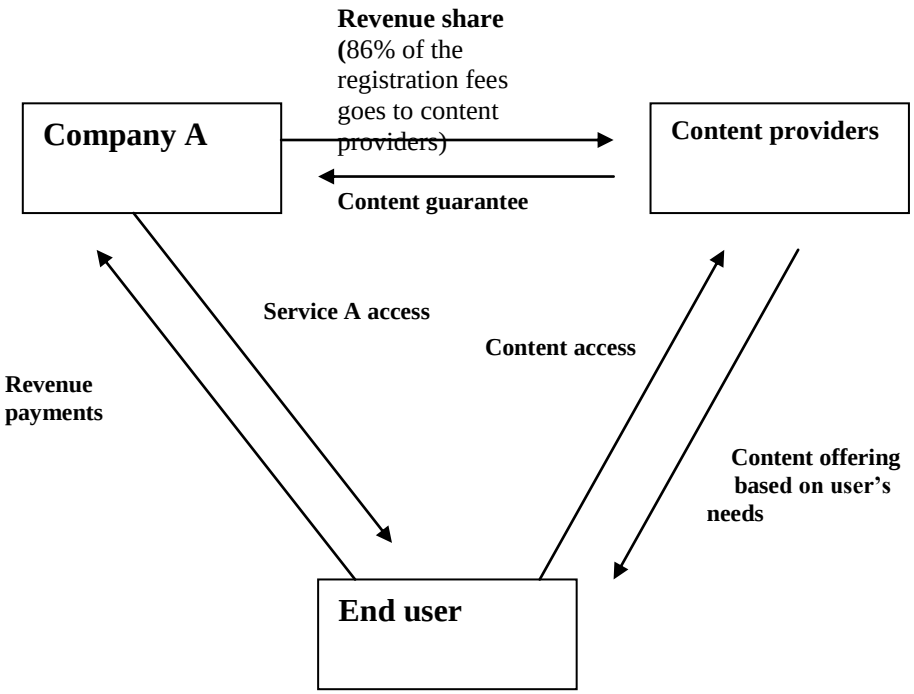

Figure 20 : Service A business model

Service A menu in Greece offers more than 100 sites at the time of launch, 2004, which were available in the following languages: Greek and/or English. Three major categories of applications consist Service A menu, as follows:

Table 33 : Categories of Service A menu

Information services	News / Weather
	Sports
	Stock
	Maps & Info
	Lifestyle / Showbiz
	Travel & Reservations
	Traffic
Entertainment services	Ringtones (Full tracks/ Realtones/ Voice tones/ Betat Box-Calling Tunes /)
	Wallpapers / Pictures & Cartoons
	Fun / Humour
	Astrology
	Entertainment guides
	Beauty and diet
	Games
	Music Zone
Communication services	Chat & Date
	SMS transmission compatibility
	MMS transmission compatibility
	Email transmission compatibility
	Instant messaging transmission compatibility

Service A, offers 3G transmission compatibility. 3G technology improves further Service A in terms of even greater speeds, increased capacity for data transfer and longer duration videos, improved quality and upgraded graphics.
Company A also offers through Service A the following 3G applications:

- **Music:** Through a large music list of the top Greek and international songs and in co-operation with the largest record companies, Company A customers can select entire songs, download them to their handsets and replay them.
- **3D Games:** The best 3D games offer Company A customers a three dimensional experience with impressive graphics and sound that bring mobile gaming to life.
- **Video call:** 3G technology offers the most exciting form of communication, with real time visual contact, that was available through Service A over Company A's 3G network.
- **Wireless internet and Mobile TV**

Company A's expanding, 3G networks in 2004 covered approximately 46% of the population in the areas of Athens, Thessaloniki and all the other major Greek cities while in 2005 Company A installed 250 new 3G base stations. The following applications have low usage rates although, according to the participants, they look potential for future take up.

- Mobile shopping / mobile banking
- Social Communities
- Offers – e-bay
- Advertisements
- Tip of the day / what happened that day / joke of the day

Participants argued that they consider as potential services the following applications:

- Mobile finance / mobile bill
- Mobile health
- Mobile learning
- Make your m-blog

Sun and Zhang (2004) argued that different technology characteristics could have different impacts on user acceptance. Thus I tried to characterize Service A in terms of these characteristics which are following:

Table 34 : Technology characteristics of the mobile data services, Sun and Zhang (2004)

Purpose	Work-oriented vs. entertainment-oriented technologies
Complexity	Technologies less complex – more complex.
Individual / Group	Group technology vs. individual technology

Service A has the following characteristics:

- **Purpose**

The majority of the services that Service A provides are characterized as entertainment-oriented applications. Only the following applications namely e-mail, news sites, stock news, travel & reservations and maps could be considered as work oriented applications and be used by professionals for work purposes. According to the findings of the research, the participants perceive Service A as an entertaining oriented service.

- **Complexity**

According to the "phase 1" of the research, Service A targets the mass market and thus potential users of Service A could be everyone who owns a mobile handset. Thus the intention of Service A was to provide applications that would be as simple and "easy to use" as possible. Of course this was not always possible, since the early stage of the technology did not always allow such simplicity in the usage of

some applications. What the main data revealed was that younger users are more prone to challenging applications than the older ones.

- **Individual / Group**

The initial applications Service A provided were mainly oriented towards individuals. The new technological developments permitted Service A in the last couple of year to include in the applications offered more group oriented services. Thus recently Service A, by exploiting the features of the smart phones, allows users to have "Chat & Date", "MMS", "Email", MSN (Instant messaging transmission), 3G video-call, providing to their users the ability to have group services with more advanced features. The above positioning of Service A is consistent with the following graph which shows the registered users per different groups of Service A applications. This data was provided by the companies that participated in the "phase 1" of the research:

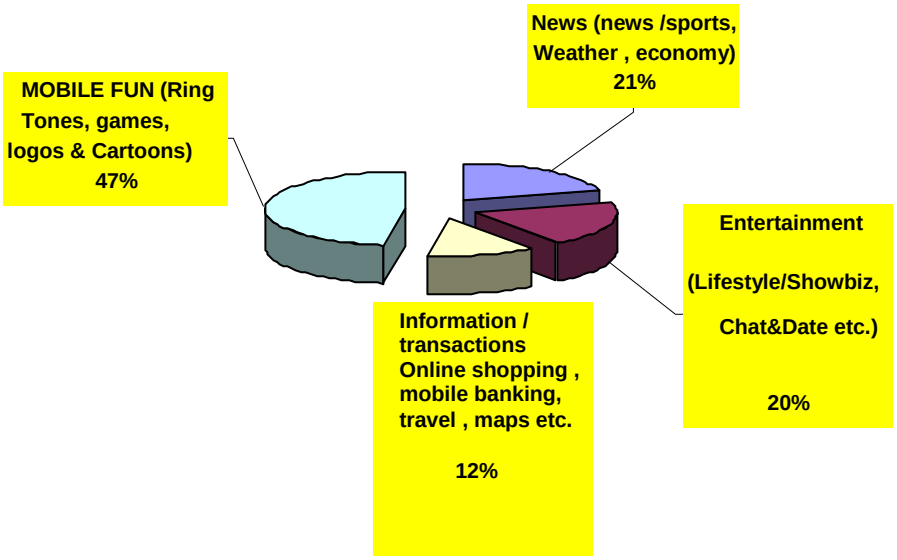

Figure 21 : Analysis of mobile data services adoption rates within Greek context in 2005

I can conclude from the above graph that 2 out of 3 of the users, that are 67%, use the Service A portal for fun and entertainment.

4.4. Discussion of findings

This "phase 1" of the research assisted me to depict the characteristics of the mobile market in Greece. According to the secondary resources, in an international comparison, Greece can be considered as an advanced information society especially when it comes to mobile communication. Almost 90% of Greeks in 2004 own mobile phones (EETT 2005)[82]. This means that virtually everyone has a mobile phone. There are almost 8.9 million mobile subscriptions in Greece, a country with a population of 10 million. The Greek mobile market has experienced radical changes during the last few years. Firstly, users were allowed to keep their phone number when changing their mobile operator. Prices, that had been stable for a number of years, began to fall. Secondly, new low-price mobile operators entered the market. This had a dual effect. On one hand, price competition was enhanced, on the other market players also have started to differentiate by aggressively marketing mobile services. A number of findings are evident from the analysis, and are briefly discussed below. Firstly the "phase 1" of the research assisted me to understand the competition issues, the beliefs and attitudes of the key persons of the mobile data services market in Greece and to position the Service A as shown in figure 22. According to the findings, the market positioning of the different "mobile data services" applications is as follows:

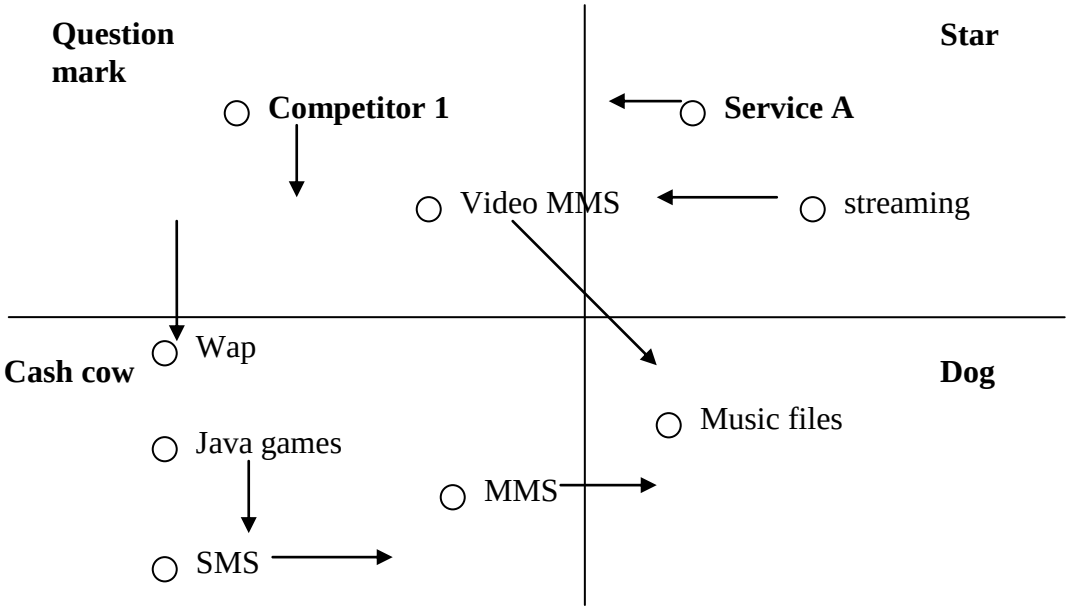

Figure 22 : Mobile data services' Greek market[83] (Service A positioning)

[82] http://www.eett.gr/eng_pages/index2.htm
[83] www.antenna.gr

Secondly the findings confirmed that the drivers that lead adoption and use of technology are usefulness, ease of use and sociability. So from the findings it is obvious that users are willing to pay for content if this is unique, allow users to personalize their mobile phones and update frequently. The characteristics regarding attractiveness are interesting content, branded product, proper presentation on the mobile phone screen, easy access and use, and value for money for the end user. Consumers do not use their phones for in-depth catalogue search or complex and time consuming transactions such as buying groceries or ordering a new PC. Rather they use their phones for simple and timely transactions such as buying travel tickets, transferring funds or buying shares. They also wish for personalized news and information that is time-sensitive, such as priority e-mails, share-price alerts or online auction updates.

Initial findings from this study suggest that the companies are focusing and thus investing heavily on the following characteristics of mobile data services:

- Simplicity and user friendliness, (easy access and proper presentation on the mobile phone screen)
- Low cost and low prices introducing flat rating
- Fast services at high speed networks (easy access)
- Rich, unique, updated frequently, interesting, branded and personalized content. (usefulness)
- More advanced and easy to use handsets equipped with the latest features (ease of use)

Concerning Service A, the effort to differentiate is apparent through its competitive advantages which are speed of access, business model and the development of new applications such as e-mail, MSN over mobile phones etc. The companies lately are trying to implement services that offer value for money to the end users and a new and better experience for them leading to a "Whow" experience. According to the head of the Consumer Trends in Mobile Telecoms of Company 6 *"what is critical for success is the 'Customer Experience' created".*

Bringing together the previous characteristics I can conclude that these join together with the terms of ease of use (user friendliness and low prices) and usefulness (rich context) and sociability (more advanced handsets). The companies do not seem to consider the role of different places in the usage behaviour of the users.

Lately the companies focus their R&D activities in streaming services (mobile TV, mobile radio). What seems to be missing from the efforts of the companies to increase usage rates is the understanding of the role of place in the usage process and thus heavy invests in R&D and deployment of new services that will exploit this role.

Another interesting point that emerged from the initial research is that Service A service is pre-installed in specific phone devices (called Service A handsets). But most of the users who buy these mobile phones do not actually use the service. This is because a fair number of users, mainly the older ones, do not know how to put the mobile data services into use or they are not aware of the availability of the service or finally they do not have the motivation to try to learn how to use this service. The interviews and the secondary data showed that among some users an unexpected drop in mobile data services usage is observed. According to the interviews, this can be explained by the high cost of the service together with the low service quality as perceived by the users. This differentiates the adoption of the Service A service from the actual usage process. This means that it is easy for any user to adopt any handset that supports Service A but it does not mean that the user will actually use the service.

These findings led me to the conclusion that the real problem with mobile data services is not the adoption process as such but the fact that the users who own such a service never or seldom use it. This is because the barriers to buy and adopt Service A are very low, since everyone can obtain Service A for free by purchasing specific handsets.

The findings also revealed that although the core task of the companies in the mobile services market is to offer innovative services, the companies had not conducted studies to relate the context of the users when use mobile data services with the different applications of mobile data services. For example, considering the music content of provider 2 it is an interesting fact that "*60-70% of the users download hit songs as ringtones*" but there is no clear answer as to "*where*" these users make use of these services. But how the place they are in influence their decision to use the service and download the songs? This can be explained, according to the interviews, by the attitude of the majority of the companies in the value chain of the mobile data services market that act as followers and imitate services rather than innovators. It should be noticed that only recently, in the second quarter of 2006, Service A launched a service that exploits the "always online" benefit, which is the MSN application over mobile networks. This application was part of my data collection pipeline providing me with valuable data.

4.5. The geographical context of the research

According to my experience, as permanent resident in the area of Athens as well as according to the discussions I had during the focus groups the following characteristics concerning the geographical context surfaced. In Athens, streets are mainly transient areas except in commercial areas where crowds use the streets not only to walk but to talk together or to have a rest or a coffee. There are outdoor areas that are used as "meeting areas" for example the squares of Kolonaki, Eksarxeia Syntagma, Omonia, the shopping centers like the Mall and Cinemaplexes and areas that are full of cafeterias and bars such as those of Psyri, Thysio, Kifisia, Glyfada and Bournazi. In these areas streets are not only the route from one place to another, but also a space to observe as well as to be observed. In resting places as cafeterias the chairs are placed round the tables and those who sit there face each other. They are supposed to be there mainly to drink and chat and see and be seen.

Pedestrians will not avoid eye contact and do not always show reserve and indifference. City dwellers that pass in front of a café are aware of being observed. People look at each other openly, without avoiding eye contact. The physical distance that people keep in public places, is not close and people find the presence of CCTV cameras on the streets intrusive [84]. For example, the participants expressed unease about the fact that services that would inform them about the traffic would require mobile networks with knowledge about their location and movements. As a 30 year old lady argued in the focus groups sessions *"I don't like the idea that the service providers of location based services will know where I am all the time"*.

4.5.1. Profile of the participants

The characteristics of the participants who were interviewed as part of this study in terms of age, sex, usage rates are depicted in tables in chapter 3 (research methodology). The majority of the participants, almost 2/3 of them had mobile phone contracts, while the remaining of the participants used prepaid cards. In order to respect assurances given to the participants regarding anonymity, opinions and quotes used and analysed throughout this chapter are not directly attributed to individuals using their names but when each of the interviewees was assigned a quote the age and the profession where necessary were used.

The basis for the selection of the participants was discussed in the previous chapter. As mentioned earlier the sample of the participants, 30 users, had to be experienced

[84] http://www.edri.org/edrigram/number3.22/CCTV

users of the Service A service. Since still Service A, is quite an expensive service, the frequent users of Service A have the financial capability to sustain such a cost. Thus the socioeconomic profile of the sample of this study represents the urban, upper class part of the population in Athens. But although this sample represents only a part of the population, it is indicative of the social etiquette and the daily activities within the area of Athens where the study took place.

According to the usage rates, the participants are separated into two categories:

- Light users

Light users prefer fast and useful services. They like internet because of the rich content, easy use and aesthetic reasons and because they believe that it provides value for money for unlimited usage. They claim that mobile internet is slow with enough problems in terms of quality of service. They are also confused with the pricing policy.

- Frequent users

Frequent users have adopted the Service A as an everyday service. They typically use it when they are on the move and they have no internet access, or between activities for news or entertainment. They appreciate the immediacy of access to the info and the entertainment it provides to them throughout the day. They prefer short and light entertainment content and simple information. They like easy access (one step process).

In the course of the focus group sessions I asked participants to describe their favourite leisure time places, In other words, the places they like to spend their time when they meet their friends, their favourite places. According to the discussions of the focus group, the leisure time of the participants exceeds, on average, 35 hours per week, with women having, statistically, slightly more leisure time than men. Both men and women, show a similar pattern in their weekly leisure time distribution. Among the most popular home based leisure time activities are watching TV, relaxing, listening to music on the radio or a CD player (an activity which is preferred by people 30+ years of age regardless of gender), reading newspapers, magazines and books.

Apart from the home-based activities, going to a gym is a major sport activity among the city residents, and particularly among females. In contrast, activities like watching and playing football and basketball, although they do not represent large percentages in total, still remain major male activities. Regarding social activities, those of visiting friends and family and dining out in a tavern, or fast food restaurants for younger people are highly preferred by all city residents, although dining out in a tavern or restaurant does not seem to be preferred by young people up to the age of 18. Going for a walk in the city shopping centres as the Mall, or enjoy a cup of coffee in one of the cafes located in the squares of the city are activities with a high level of participation by all residents and especially by

women. Women utilise the public transport network to commute to work, much more than men who prefer to use their car or motorbike to go to work.

Respondents claimed - especially younger ones - that they visit regularly the city bars and clubs. Of course this does not exclude older people from participating in such activities, although most of them seize the opportunity of a quick "escape" from the city using their car. Most sports viewers and regular cafe goers are males aged 20 to 38. The educational level of the respondents did not seem to have a great influence on the participation of leisure time activities. The participants, especially the older ones of 28-38 year old argued that the mobile phone has changed their life style since the ease of mobile communication comes at the price of leading a life in which one is dependent on mobile phones, more stressful, and lacking time for face-to-face communication.

The spatial clustering of some facilities, especially those related to social life, for instance of cafe-bars and fast-food restaurants in one of the main squares, is combined with the fact that the city centre residents are, according to their claims, the main visitors to these places. Based on the discussion guide matrix (Appendix C) I asked participants to describe their daily schedule. Then I tried to simplify and model their daily activities. This assisted me to position the photographs the participants e-mailed to me within their daily schedule. By doing that, I was able to develop a better understanding of their situation and got prepared for the interviews.

I present an example of the daily activities of the high school students (youngsters) and university students that participated in the study.

Table 35 : Daily activities of youngsters and teenagers.

7.00 – 8.00		14.00				24.00
Do homework	Take lessons and notes in School - University Activities they are involved are : learning new things, writing / listening, reading books		Do homework	Walk around, meet friends, flirt	Computer games, playstation, Xbox	Keep diary
Listen to music		Lunch		Do sports	Watch TV	Surf internet
Have breakfast				Take lessons (music, ballet, private lessons)	Cinema	
				Go shopping	Have dinner	
					Talk with friends on the telephone	

4.5.2. How participants perceive Service A.

During the focus group sessions I also tried to identify the way users perceive Service A as a service as well as their expectations from it. This data also assisted me to clarify which behaviour is acceptable or intrusive within specific social contexts. According to the data that was collected from the focus groups, the 14-18 year old participants use mainly:

- Realtones, welcome tones
- music
- Downloads photos and videos
- games

This category is pricing sensitive, interested in entertainment and fun, they like to customize their mobile phones (realtones, wallpapers) and they frequently buy video clips and content relating with their favourite performers. They also consider their mobile phone as their personal communication system and they like to use it to send e-mail since they consider their mobile phone as mini PC.

During the focus groups I asked participants to imagine what kind of mobile data services they would want from their mobile phones in the near future. This group expressed the wish for services related to entertainment as for example for a search engine for music and for a service to preview the content before download it, something like the demos for games. According to the focus groups, the 19-24 year old participants use mainly:

- Realtones, welcome tones
  - music
  - Downloads photos and videos
  - games
- entertainment guide
- news (gossip, sports, cultural)
- signs

This category is pricing sensitive and interested for entertainment and fun. This group asked for low cost services for entertainment purposes and wished for internet like services being able to access their favourite sites and portals preferring the news and cultural oriented portals. They claimed that they would not mind paying for services they find valuable as for example the e-ticketing. They also wished for free internet service through their mobile devices, for searching and sending e-mails (when on the go or during vacations time). According to the focus groups, the 25-38 year old participants use mainly:

- news (gossip, sports, cultural)
- entertainment guide
- E-mail
- Realtones, welcome tones
- games
- signs
- music

This category's usage pattern is influenced by its lifestyle pattern and the users need immediate access to the information anytime anywhere they wish for. This group looks for general but specific information (portal like) in their mobile internet. Thus this group argued that would be willing to use, if provided by their mobile service provider, services such as e-ticketing, GPS and maps and of course free internet and e-mail services. Being able to make payments with the appropriate security was a popular request for this group also. Following the above data the

most popular 'non-traditional' uses as well as the services that have special interest for the participants:

- news
- simple games to kill time
- music (real tones & welcome tones)
- sports (results and applications to bet)
- entertainment guide
- E-ticketing (on the go booking of tickets)
- Signs
- GPS/maps

This special interest gave me the opportunity to discuss with the participants the following services in more detail.

Music is a highly appreciated service by all the interviewees of age 15-34. Many participants expressed more interest in being able to listen to the radio on their phone then watching mobile TV. As a 16 year old student argued *"I am quite happy with the radio in my mobile being able to switch between my favourite stations…….for sure I prefer listening more than watching mobile TV or videos when I am on the move"* The main issue regarding this service is that there are numerous alternative methods to find, retrieve, download and listen of music. Thus users are able to download music free and easy using internet services as the limewire[85], exchange their music with their friends using bluetooth, e-mail or cd, or buy music at low cost from internet e-shops[86]. According to these findings, the users are willing to pay their mobile service provider to download music using the mobile network but they have quite a few alternatives to download the same music at a lower cost or for free. However, listening to music or the radio while on the move is highly valued and would require neither visual attention nor a significantly larger phone compared with the needs mobile TV asks for.

The interviewees expressed their interest in simple games in their mobile phone as for example tennis, packman, to mention but a few, especially to kill time and avoid stress during breaks. These games are considered as simple since they give pleasure to their users with no special effort required by them in terms of joystick and display functions. The participants claimed that they play these games when they are out of their home or in their office between tasks or when they travel. Frequent users of these games are those that they do not have access to their pc or internet at home or they are bored and unwilling to use their pc and prefer an easy and fast activity. The main competitors of mobile games are PC games since quite a few free sites allow downloads of games or games that users can play online such as the www.yahoo.com/games. According to the interviewees, the life cycle of the

[85] www.limewire.com
[86] www.mp3.com

games on the mobile phones is less than a month for the frequent users to few months for the light users.

Participants are most interested in news content. Its timeliness and short content-like character matches well with dead time usage, that is while commuting or waiting, and the desire to be up-to-date. Of course people with shorter commutes were not interested in such services and as the 25 year old secretary replied *"I don't think I would use any application of service A outside of home that would consume more than 15 minutes"*. They reported a need for personal time for news during a day preferring to have news when they are in a secure place. This is because during the day there is a need for casual information that usually ends at the end of the day at the TV at home. At anytime during breaks the users need «light» news, something like reading headlines, from different sources such as TV, magazines and internet. The drives for the news sites are the traffic news while driving, weather news, what films the cinemas play, theatres and the cultural news and less the everyday news. Sports content followed suit with football leading the field. Mobility and the small display render the mobile perfect for fast and immediate information and not long and not useful surfing. This is important since it allows the user to have up to the point access when needed. The benefit of having access to country home news while abroad was also very attractive. As the 32 year old IT project manager said *"…when you hear about a major event as for example an earthquake in your home country when you are abroad you want to know right away what's going on*".

Although very few from the participants interviewed, had the experience of using mobile TV, mobile social networking and online shopping from their mobile phone all of the users considered these three services as very promising and potential for the future. The interviewees perceived Mobile TV as an interesting service because it allows users to watch programs (sports, news and entertainment when alone in situations that there is no alternative option). As they claimed Mobile TV gives them a feeling of always being in the centre of the action and they are part of a group. The competitive advantage of this service is that they can have news anytime. Mobile TV can be used during waiting times, travels, when being in a boring situation, or to escape from reality. Users claimed that they find the service interesting in a mood to act spontaneously and when away from their permanent residence as for example on holidays. For some participants watching television constitutes a background or a social activity and thus they did not like the idea of watching alone their favourite football team playing. Their main worry again was that consumption of the content would be very expensive and as the 24 year old lady told me "I *watch my favourite show every Thursday evening ….. I hate missing it…but sometimes I spend my evening in my shop … I don't have a TV set in my shop so I think that it would be nice to have the ability to watch part of it while being there, ……but if it's too expensive then I would rather miss it*". Since they have other options that are inexpensive (paid for or free newspapers) and often available in dead time situations, they are not willing to pay current multimedia

content prices. They also expressed doubts whether the screen size would be large enough to enjoy TV content. On the other hand, they do not wish especially female participants, the size and the weight of the handset to be increased beyond their preferential limit. The participants also feared that watching video on the mobile phone might distract them and they might miss their stop. Thus they claimed that they prefer short and light content that would not require much attention.

The services that allow users to have social networking, dating or browsing for prospective partners, drew the weakest response amongst the participants. The participants claimed that they do not like to use social networking and such kind of services on their mobile phones when they are out of the house because they consider the environment as a negative factor since there is too much noise, they are on the move, the level of privacy is low, and the mobile display is small. A female participant, 30 year old hairdresser claimed that *"I am divorced for 7 months now and I am seeking a new relationship…using dating in the metro would allow everyone to see that I am looking for someone. The possibility to think what kind of person am I, since I date in public places makes me feel embarrassed…."* Of course some of the participants, especially the younger ones, claimed that they are fond of using it when on holidays and they know that other people are willing to use such services. The 17 year old boy, who participated in the media elicitation phase, lowering the tone of his voice during the interview, admitted that *"I know some of my friends who would do anything to meet girls… browsing through personal profile information, using dating services or entering in chatting forums"*.

The participants claimed that they have a feeling of insecurity to use mobile shopping through their mobile phones. They prefer instead to have detailed information regarding the products and only if there is a fast network. They prefer to buy products for which there is no need to try them on, as for example tickets and accessories and spare parts for their pc. They claimed that although they would not trust online shopping using their mobile phones they consider it a useful service in emergency cases, to buy ferry tickets for example.

As for the warning service the participants wished to have it in their mobile phones and claimed that this is an attractive service since Athens has had recent experiences of disasters and Greece in general is a country of high seismic activity with frequent occurrences of floods and fires. Also, violence and crime in the area of Athens have increased in the last decades causing the worry of parents about their children. Also, the frequent daily traffic jams led the participants to ask for warning services related to traffic problems through this system. As the 34 year old driver argued *"it would be a nice idea to have such a service in our mobile……. I don't believe that frequent* alerts would be sent through this system…. And since *I won't get messages about disasters all the time, so in the mean time traffic info would be helpful"*.

Regarding the language courses which I discussed as a potential mobile data service although all of the participants were non-native English speakers and found this service appealing they were not positive to expose themselves to demanding content while on the move. Discussions on this topic sparked ideas about having access to mobile dictionaries.

I asked participants what they like about Service A and what they regard as the imperfections of the lifestyle it provides to them. According to participants, the main advantages of service A are the easy, immediate access to any kind of information from any location (including abroad), especially during emergencies, and the ability to locate places and people when attempting to meet. These increase their self-confidence because they have an instant mode of communication and information at their fingertips at all times. In general the main disadvantages and major complaints about service A related to cost, short battery life and unsatisfactory coverage. Furthermore, the participants expressed their concern regarding the issues of security and privacy when using service A in public places and as that most of them prefer not to use it on public transport. Finally, the participants also complained of the small screen size of their handset as compared with that of their PC.

From the focus groups sessions it downed that Service A usage rates also depend on the user's experience of the features of the Service A itself. Thus although users can surf over the internet by using the service A, the low aesthetic quality of the platform leads users to prefer internet access from their PC even if this is less convenient to them. Most of the participants perceived Service A as a «good to have» service and not as a "must to have" one which they preferred to use it during idle periods of time or when their working schedules are not hectic enough.

Users claimed that the ubiquitous availability is challenged primarily by cost, insufficient coverage, and short battery life. More specifically, they argued that the most important barriers regarding use are the poor interface of their handset compared with that of their PC, the quality of service especially in places where there is no wireless broadband coverage, the confusing pricing policy of the service providers and the high cost of the service compared to that of the internet (for example they mentioned that they almost pay the same monthly fee for their home ADSL subscription having unlimited use with the subscription they have to pay for a few GB of data in their mobile phone). The 20 year old university student, a medium spender, reported looking at the application that provides emails in Service A "*at the university I use the PC's in the library for free and while at home the ADSL line I share with my brother. I do not feel like checking emails with service A which costs me money. I don't earn my own income yet you know and I have to be careful*"

In particular participants claimed the following:

- Service A is an expensive service. The pricing policy is confusing. Most of the sites are not free but they require subscription so the users have to pay monthly fees to access the specific sites.
- The "Service A" applications are considered as poor. These applications try to imitate web based applications on the mobile phone. As a participant said " *I can find such an application on the web, most of the times for free*".
- Most of the information concerns the two major cities in Greece, Athens and Thessaloniki. This is positive for this study since the users are permanent residents of Athens.
- They perceive Service A as slow and not a user friendly service. This can be considered as a failure of the marketing department since it generated high expectations through advertisements such as "I am booking tickets now".
- Mobile phone users got attached with their mobile devices, "*my mobile phone, I love it…*" as a user replied. Service A users have to buy specific mobile devices, mainly Japanese and Korean brand devices. Participants consider this as a problem since Service A has not been among the favoured brands such as Nokia and Sony Eriksson.
- Younger users predominantly favour e-mail and MSN services over the Service A platform. And they consider them as substitute services to sms and MMS. It should be mentioned that these services are closely related to the social life of the users.
- The users that prefer to access the internet from their mobile phone are highly demanding users, highly educated with enough expertise in technology and enough mobile (high entropy users).

The definition and perception of Service A by its users:

- Users perceive Service A as a one way communication service similar to TV in contrast to the sms and phone calling that are two way communication services. This means that users can be accessed by others via sms or calling but not via Service A. This is not the case with e-mail and MSN but these services still are not utilized to their full capacity. So Service A is a service that most of the time has to be initiated by the users themselves. This highlights the importance of the environment in the decision to use Service A since it provides the stimuli to initiate usage.

- Elderly users do not relate Service A with their social life and they seldom use it to stimulate social interactions.
- Users believe, based on their experiences, that Service A is too slow and time consuming and that they should have enough spare time in order to use it.

- Users claimed that they prefer areas where privacy is assured before they decide to use Service A since this would allow them to focus in this activity which they consider it as intellectually demanding.
- Users mentioned that they prefer to use it when they feel bored and they do not find other alternatives within their environment.

The participants reported that they perceive Service A appropriate for casual use and thus purchase it accordingly. Some examples include music, realtones and services for mobile phone customization as well as games, used during periods of boredom, especially when there are no alternative options to access information related to news and sports.

4.6. Analysis of user needs

In this section the emotional and functional needs of the participants are analysed. This data emerged from the discussions I had with the participants within the realm of the focus group sessions. The connection of these needs with the different applications provided by Service A, would add valuable knowledge to the study. This is because the knowledge of the users' needs gave me the possibility to connect these needs with the places and conclude if and how the matching of the needs by the place will trigger usage of mobile data services or not. Also, connecting the participants' needs with the different places allowed me to group and better interpret the collected photos, to prepare for the interviews and cross-check the validity of the interviewees.

4.6.1. Emotional and functional needs of the users

Based on Maslow's (1943) hierarchy of needs and on Sommerlatte's (2006) customer of needs, I categorised the daily needs that people have to cover into four broad categories as shown below:

Table 36 : Daily needs of people

Need for esteem	**Entertainment (fun) need**
Need to cope for the everyday problems / problem solver	**Communication need**

Concerning the fun/entertainment motive, it should be noticed that this can potentially be part any of the five original Maslow needs (Maslow, 1943). In order to relate the 'accessing mobile data services for having fun' behaviour into the Maslow's hierarchy of needs I have to understand what basic need the users fulfil when they have fun. Having fun using service A could be rooted to 'belongingness', or 'recognition', or it could come from a deeper level, from the sense of self-fulfilment. The analysis of the data showed that each user tries to satisfy a different need or achieve a different aim when trying to have 'fun' using Service A. Also, of the 27 participants interviewed, 24 mentioned that they relate the fun with the situation of experiencing something new in service A.

I tried to identify the emotional and functional needs that Service A provides to the users and to position these needs into this categorisation. The key benefit appreciated in service A could be wrapped up in the following sentence: 'a one step

tool to connectivity while on a mobility status'. The key issues in this statement are 'Connectivity' and 'Mobility' which if combined are perceived as the capacity to communicate, be reached, receive or exchange information and experiences at any time the user chooses to do so with friends, partners or communities the user might be part of. The underlying motivations triggering the use of Service A application appear to relate to either or a combination of emotional and functional needs of users. The emotional aspect of Service A usage relates to a set of needs which are listed and analyzed below. The analysis of the data that came out mainly from the focus groups assisted me to identify this set of needs:

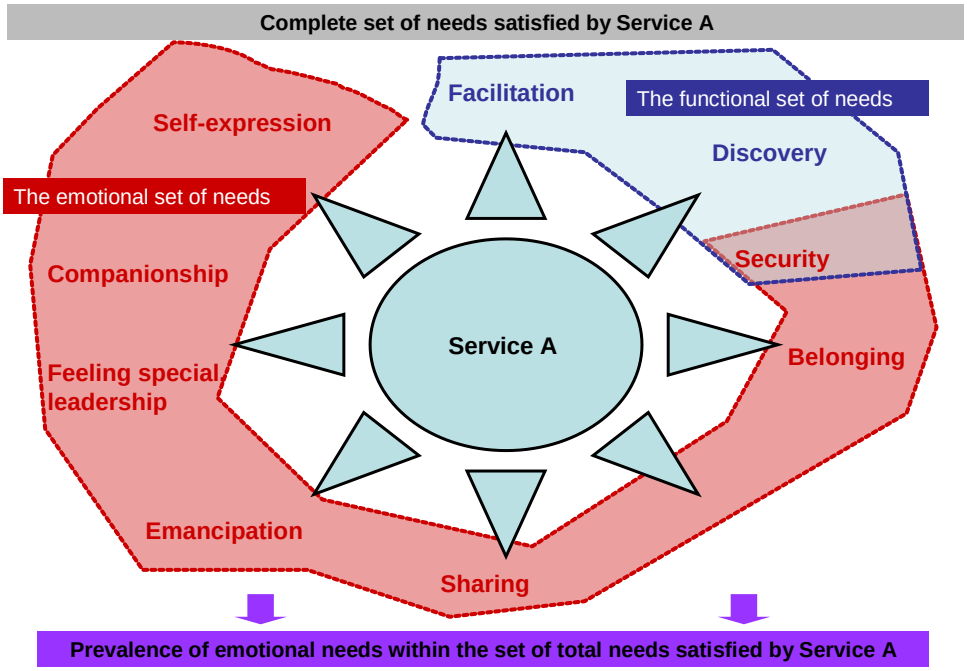

Figure 23 : Set of needs satisfied by Service A

-Self-expression: being able to demonstrate personality traits, one's taste, habits, lifestyle or even mood, seems to be satisfied by specific applications of Service A and so were used to communicate any of the above to interested parties the user interacts with such as realtones and wallpapers downloads.

-Sharing was found to relate mostly to situations when users are exchanging data or information in the form of MMS & e-mails, allowing them to be and feel that although far apart they can be in constant contact with their friends/partners/family, exchanging emotions besides than merely information.

-Feeling special, leadership: mostly relevant to teenagers, this need was found to be the initiating force for engaging into Service A, either out of pure curiosity or a

conscious need to be one step ahead than the majority of cellular phone users, making most use of what technology has to offer in the form of cell phone functions.

-Emancipation/independence was considered as a relevant need solely among teenagers. The use of Service A would serve as self-satisfying proof or else a medium of their emancipation, their growing independence from their parents since Service A offers a window to information and people that builds up the private life and personal relationships of teenagers. Applications of Service A that are relevant to this need relate to the personalization of their mobile phone (downloading realtones & wallpapers) as well as to chatting and information search regarding mostly music news.

-Companionship is closely perceived with 'Sharing', yet translates to the capacity 'not to feel alone' at situation the user might feel uneasy, embarrassed or lonely, and is satisfied by any possible mobile data services which might make the user appear 'engaged' into some activity as opposed to having to deal with an awkward situation such as being stood up or being among strangers.

-Security is a need shared between the emotional and functional layer, as it is pertinent in situations when users retrieve information essential to their physical security for example the location of the nearest pharmacy or their emotional security such as the capacity to share their feelings with their family when they are away from home. Mobile data services give users the ability to remain in constant contact with other people and to access any information anytime they wish. This gives them an additional sense of security and company (Palen, 2000).

The functional aspect of Service A appears to include besides 'Security', - which appears to be a shared territory between both emotional and functional sides - two more needs:

-Discovery: namely the need to explore and become exposed to new stimuli, novel information and experiences, in the context of engaging into new mental processes and experiences. Mobile data services that satisfy this need and purpose are mostly information sites and download.
-Facilitation is relevant to practically all mobile data services, as they all aim to offer traditionally more complex services in a 'simple one step process', be it either e-mail, downloads or internet browsing.
I positioned the above emotional and functional needs into the four categories as follows:

Table 37 : Positioning of Emotional and Functional needs

Need for esteem • Recognition by others via self-achievement, competition and use of lifestyle products, cosmetics, fast cars, fashion clothes etc. • Self-expression • Feeling special, leadership	**Entertainment (fun) need** • Cognitive needs (need for information learn, explore, experience, discover new things, create, better understanding of the world) • Need for fun (Music- games-photo video camera) • Need for Freedom, Emancipation, and independence.
Need to cope for the everyday problems / problem solver • Transportation • Security • Physiological needs.	**Communication need** • Need for belonging, for love, be in contact, have social life. • Sharing. • Companionship.

According to the respondents, the needs that could increase usage of service A are:

- Communication needs / Social interactions: As the 24 year old man doing his national service in the army responded '*I spend 5 days of the week in the army camp and its valuable for me to keep as much as I can my social life in balance….I try to join as much as possible social events when I am out of the camp….I am happy to know that I will be informed if any new event get organized even if I know that I can't join, it makes me feel that I am still part of the group*' and as the 16 old year teenager, high spender, stated when interviewed '*when something funny happened to me, I like to text friends and exchange with them funny photos via MMS….I like the feeling that I share with them this moment and thus make them laugh*'.

- Entertainment (fun) needs: The 17 year old teenager who participated in the media elicitation phase responded "*most of the times when I look for fun and the place I am in doesn't provide me with enough options to have activities or whenever I am bored and need some excitement I use service A to surf the internet or to play games on my mobile phone. You can see the photo I e-mailed to you. I was out with my parents and their friends for lunch. After having lunch they started talking. I got bored at once and started using service A* "

- Control-security needs: The owner of the advertising company (38 / male) replied that "*my daily activities rely upon the communication I have with my clients…my job requires from me to travel a lot forcing me to spend a lot of time outside my office…to access my e-mail account anytime is*

critical for me… the fact that service A provides me such an option makes me feel more secure"

The market has decided to invest heavily in applications that fulfil the communication and self-actualization needs as well as the need to cope with the everyday problems (BW Special Report, 2007). In the following scheme I positioned the applications that the ventures have decided to invest according to the needs these are trying to fulfil.

Table 38 : Promising mobile data services

Need for esteem	**Entertainment (fun) need** • TV to Go (watch TV shows) • Music to Your Ears (information and entertainment center, offering access to e-mail, Web content, and digital music, supporting the MP3, MP4, Windows Media and eAAC+ digital-music formats. And if those mean nothing to you, it even has an FM radio.) • Songs Fill the Air (music-download services.)
Need to cope with everyday problems • Google Goes Wireless (phones easy access to Google's services, including previews of their e-mail messages on Gmail, headlines from selected news sources, weather, stock quotes, and even selected RSS Web feeds.) • The Right Direction (get directions as you drive. Phones with global positioning system capabilities)	**Communication need** Social interactions : • Friend Finder (Tracking friends or making new ones) • Networking Serendipity (professional networking opportunities)

Based on the above table two of the applications that look promising for the future are the video telephony and the IP - TV over mobile networks. According to Ekling et al. (2007), the wireless networks still cannot provide acceptable quality of service for the above applications and thus there is considerable resistance and low diffusion within the population. So I decided to avoid studying these services in this research.

4.6.2. Relation of specific applications with the needs of the users

The last generation of mobile phones are not voice and text communication tools but they are convergent devices since they integrate multiple functions as for example gaming, video, mp3 players, portable media, photo cameras and PDA to mention but a few. Thus the new mobile data services can exploit all of these new functions and provide their users with advanced and rich in content services. These services can fulfil emotional as well as functional needs of their users. But the majority of participants referred mainly to their emotions rather than the rational, functional needs that made them using Service A. It is worth noticing that the participants were prone to exemplify particular situations after service A usage took place, which were pertinent to an emotional need, 'how they felt using Service A ' rather than a rational context 'how better/efficient using service A at that occasion' was. I felt this was a reasonable situation following the 32 year old female consultant argument " *whenever I take the knife to cut bread I do it because I have to eat…I don't have any special emotional attachment with the knife….when I use service A I do it most of the time because I like to do it and not because I have to do it…most of the time using service A has to do with my emotional desires to kill my time or to entertain myself…you know I can survive without having lots of the applications service A provides…maybe less happily but I can bear it believe me…*". Most popular service A applications were used on the basis of providing entertainment and as a medium for an emotional sense of satisfaction. These services were in all cases related to emotional needs for the majority of the sample and are analytically listed in the following table.

Table 39 : Service A applications associated with emotional needs

	Most recurring needs associated with service A usage	Degree of popularity of recurring needs in the sample	Most popular service A applications satisfying the particular need
EMOTIONAL NEEDS	Sharing	+++	Email, MMS
	Self-expression		downloads, music news
	Emancipation / independence		Information engines, realtones, wallpapers
FUNCTIONAL NEEDS	Security		Information sites, maps
	Discovery		Information sites, downloads
	Facilitation	+	email, downloads or internet browsing

Asking participants to describe the kind of benefits expected by each particular pattern of usage it became evident that the emotional set of needs appear to be the stronger motivations to use communication services as MMS and chatting and

services that concern self expression and independence. This was not the issue with the other applications of Service A such as the information, the business and the financial applications. The replies from the respondents revealed that they are not emotionally attached to other similar platforms that provide similar services as for example the Blackberry since they correlate them with their professional life. As the 30 year old sales manager responded "*I have my own mobile phone with service A as well as the company's mobile phone which is this Blackberry*[87] *one. I consider Blackberry as a "must to have" tool to access my e-mail accounts anytime anywhere I like……most of the applications of the service A are a "nice to have" apps for me…although I can access my e-mail accounts from service A without paying, I prefer to have blackberry because its more functional and seems to me more professional tool*". The participants also reported that they appreciate it that service A fulfils their emotional need to feel that they escape from uninteresting places.

The participants used functional terms to describe the service A applications that they perceive as alternative to Internet. They use these applications mainly to have electronic exchanges, to access information (weather, news, signs, etc) and to download files as songs, photos and video clips anywhere anytime they wish to do it. Participants argued that talking or texting provide to them more emotional value since they fulfil the desire for social connectivity, than using mobile data services. Mobile data services, except e-mail and mms, that users consider as analogous to texting, provide to users an anonymous world of bits of data. This could explain the argument that mobile data services are unable to give them high emotional and thus social value.

Service A applications mainly connect humans to data bases that fulfil the need of the user for information, knowledge and fun. But users fulfil these high level needs, according to Maslow (1943), using alternative services as for example Internet, TV, Radio and print press, since the vast majority of respondents agreed that these alternative services are more secure, easier to use with lower cost and higher quality, make the "functional" service A applications being less competitive. There are services that fall into both emotional and functional layers as shown below.

[87] www.**blackberry**.com

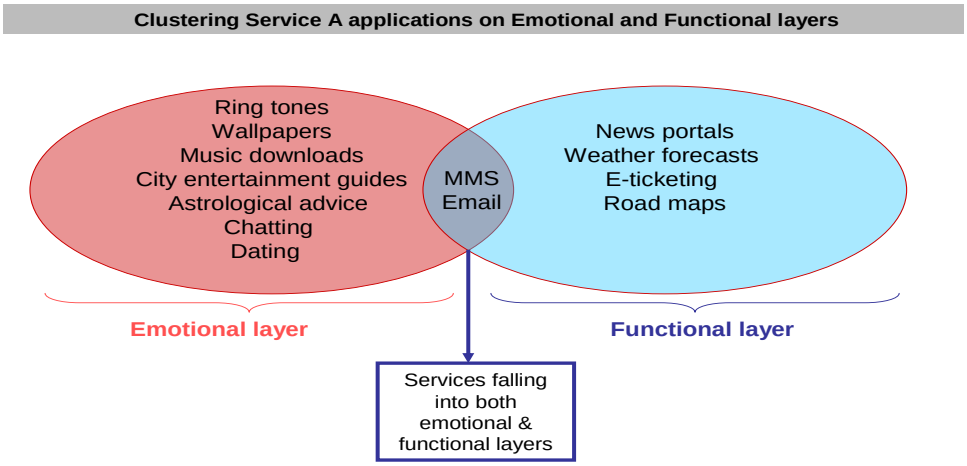

Figure 24 : Clustering Service A applications on emotional and functional layers

The focus groups confirmed that a combination of factors relating to consumer experience, including download speeds, poor menu interfaces and graphics quality, and lack of updated information, serve as barriers to an increased use of data services. More specifically, the participants agreed that the following constraints are negative factors for their functional needs:

- The high cost of the service compared with the cost of terrestrial internet
- The confused pricing policy adopted by all the mobile service providers making users unaware of the cost they have to pay each time they use service A
- The security issues related mainly with the financial transactions that some of the applications of service A provides to the users. More specific the participants argued that they don't trust to give their personal data when these asked form Service A applications.
- The applications of Service A are time consuming with slow download rates compared with their need, when outside home, for fast and easy to use services.

These factors make users perceive mobile data services as time consuming services for which they have to spend effort and time to access information. Users believe that they need at least "few minutes time" and "private space" in order to be able to concentrate, introduce effort and use the services un-interrupted. Thus during the daily life of the individuals the environments that are considered as suitable to use Service A are not as many as it is believed.

The emotional connection with service A is stronger than the functional benefits it provides to its users because it does not provide efficiency and low value for money (high pricing cost in relation to its content and its competitors as the Internet). On the other hand, users carry around with them their mobile devices all the time because of the functionality they provide, having the ability to do transactions anywhere anytime fulfilling their basic need for control.

Although this functionality can be considered as a competitive advantage for Service A still a number of concerns as the complexity of the pricing policy, the unfriendly interface, the security and low quality of the network (slow transfer data rate) and the large "Time to Use" periods, make these services undesired. But because the service A often produces disappointing experiences to the users it weakens the functional side of the relation with Service A. These experiences have a negative influence and the emotional attachment with the Service A decreases further the usage rates.

4.7. Chapter Summary

Within chapter 4 I conducted the "phase 1" of the research to depict the characteristics of the mobile market in Greece and to decide which mobile data services platform to adopt for this research. According to Section 4.4, where the main findings of this "phase 1" of the research are discussed the companies do not seem to consider the role of place as an important factor when designing new services. They are mostly focused on designing services to conform ease of use (user friendliness and low prices), usefulness (rich context) and sociability (more advanced handsets and applications). Also, the findings revealed that when considering mobile data services platforms, users easily buy and adopt these services since these can be obtained for free by purchasing specific handsets but they never or seldom use them.

Within chapter 4 the characteristics of the places where the study was conducted and the profile of the participants are also presented. The average age of the participants was 24 year old and they consider Service A as an everyday part of their lives. The participants discussed the way they like to entertain themselves, the locations they prefer to spend their free time, their daily activities and how they perceive places in terms of social and cultural norms.

It is established that cafeterias are the major places for socializing among the participants. There they feel well and relaxed and they often use Service A. As the age increases restaurants and taverns play an important role in the social life of the people but now the usage of service A is not as frequent as within cafeterias because of the cultural norms.

Based on the data I also prepared a schedule of the daily activities of the participants. The participants perceive Service A as a good daily tool and they mainly use it for information, communication and entertainment purposes. They argued that they are very much concerned about the cost, the bad reception quality and the poor options Service A provides. They are positive to the multimedia content but they prefer quick content and fast services. When outdoors, the participants argued they only use service A within short time slots either to inform themselves or to kill their time.

From the above findings I established the main places the participants spent their daily life and I got prepared as to what to expect during the next phase of the study which was the media elicitation phase. It was clear from the findings that the applications of service A cover both users' emotional and functional needs. I also identified which needs are covered by the most wanted applications. Finally, I identified how the participants relate the different places with their needs for fun, entertainment, relax, communication, need for information and need for fitness. These needs also depend on age, social origin or the educational background of the participants.

5. Analysis of the Field Interviews

5.1. Introduction

In this chapter the analysis of the data and the findings of the empirical field study phase are presented. From the literature review in chapter 2, it became apparent that the study of mobile data services adoption and use should entail place as a factor for study. Studies have shown that there is relationship between human behaviour and the physical environment (Altman, 1970; Altman, 1975; Green, 2002; AIA, 2007). Thus in this research the role of place in the usage process of mobile data services in practice is examined. To accomplish this, I analysed the role of the layers of place regarding the decision of the users to access Service A. In chapter 2, I reviewed the existing literature and decided to adopt Tuan's theory (1977) as guiding framework for the analysis of the collected data. The theories of modelling allowed me to deconstruct further the basic materials or layers of place as defined by Tuan and thus created a model of place. This model served as a sensitizing device for observing, interpreting, and analyzing the collected data.

The remainder of the chapter is then structured around Tuan's framework, with each of the framework's components discussed: the main locations (Space layer) where individuals use Service A are identified and discussed (Section 5.2), while the personal factors and attributes (Personal layer) that influence usage of Service A are discussed (Section 5.3) and the social and cultural layer are analysed (Section 5.4 and Section 5.5). Attention was focused on the attributes and factors where the data was found to be crucial as well as weak or silent regarding the influence of the usage of mobile data services.

5.2. Space layer

The replies of the respondents related to the first of the layers, as proposed by Tuan that is the layer of space, are presented and analysed in this section. Most of the data regarding the attributes and the factors of spaces as well as the characteristics of the locations where users would use heavily Service A, came from the focus group sessions. The analysis of the data was influenced by the factors and attributes of space presented in Table 9 : Attributes of the space layer.

According to the model, the factors that construct the surrounding space are those of location and time, the environmental conditions and the objects that exist within this environment. This study aimed to analyse the atmosphere of a particular space and moment when users decide to access mobile data services. Space, which according to Tuan (1977), is one of the four layers of place, was found to play a critical role in defining behaviour of users towards the mobile data services.

The findings of this study highlight the relation between the factors of space and usage of mobile data services. The analysis of the data reveals how these factors influence the decision to use mobile data services. The analysis of the data brought into light patterns that were found to influence or even shape up in most cases, the emotional state of the user, another parameter pertinent to the usage of mobile data services. Thus patterns such as familiarity with the space, feeling of security and privacy, perception of time, boredom, and the option for alternative activities seem to be dominant constructs in the decision of the user to start using mobile data services. For example, the majority of those participated in the focus groups pointed out that they would mainly use Service A within micro-environments as for example their home, their car, at school or at work and at areas associated with leisure time such as cafeterias, waiting rooms in cinemas and fast foods or restaurants. For reasons of economy of space I termed the environment that surrounds the users, as micro-environment and the broader environment like the neighbourhood as macro-environment. The analysis of the data related to the micro-environments revealed that quite a few conceptual codes as for example [feeling nice], [spend hours there], [my own space] and others generated the pattern of [familiarity] as the link between these micro-environments.

Of course this result is to be expected since the participants spend most of their daily time at home, work, friend's house, mall (shopping, café/restaurant, cinema, and bar), Supermarket / Grocery Store, School and athletic facilities. But the in depth interviews and the observations that connected this pattern with those of time perception, security and privacy provided an explanation as to why these micro and macro environments influence positively the usage of mobile data services.

The analysis of the micro-environments follows the classification shown below, with special attention to places where use of mobile data services is high.

Table 40 : Classification of spaces

Transportation	Outdoors	Indoors	Banned places
public transport, train stations and cars	streets and open spaces	houses, restaurants, bars, cafés, pubs	concert halls, theatres, cinemas and classrooms

5.2.1. The time factor

The analysis of the time factor includes the actual time when the event takes place (here the usage process of service A is defined as the event), the time the users will spend at a specific space, how the users perceive time at the time of event and the availability of time before leaving the specific space. The actual phrases or words of the participants are in italics.

In the process of the analysis it became evident that depending on the time of the day, that is the users' daily schedule/routines and the area they are in each time, the propensity and capacity to use mobile data services varies accordingly. Concerning this time of the day when users would access Service A the data revealed that there are time zones within which the use of mobile data services is increased. Noon and early afternoon were found to be the most popular times of the day most subjects engage themselves in value added services usage, either at work (working adults, 25+ year old) or after classes and at home (students). For all the participants in this study morning is associated with work and studies. Conceptual codes of [feelings of anxiety] and [feeling of pressure] were mentioned as important factors that do not allow the subjects to actively search for information through Service A within these time slots. This is a result that shows how closely Service A is perceptually connected with leisure and access to popular non-professional type of information. According to chapter 4, amongst the favourite applications are mostly those related to gossip, music downloads, city entertainment guides, dating and chatting. Taking the time to use Service A for subjects that are not directly relevant to work or studies, I presuppose that the users have the "time" and the "mood" to look for information that facilitates mainly their leisure and social life. According to the participants, the above services are being used in a context of a "*more relaxed*" and "*carefree situation*", being "*after school*" or "*after work*" or during theirs "*evening out*". According to the participants, another time span found appropriate to use mobile data services was what was described as 'idle time'. These are time slots in the subjects' daily schedule in which the users find themselves in the following circumstances:

- "*Waiting*" or "*queing*" in establishments such as banks, medical offices, public services, where they are left with "*little to do besides waiting*" to be serviced.

- Being "*bored*" and "*having nothing to do*" at that moment: being at home, at mid-day after school or university for students and during the evening after work for adult professionals, usually at their own home, friends' homes or leisure areas such as cafeterias and bars.

- Taking a quick break in the day in between activities: either during the last hours of work or before work actually starts, with the purpose of either "*killing time*" or "*decompressing*" from work related stress.

- Holiday time (Christmas, Easter, New Years Eve, and summer holidays) was also found to be a typical period for engaging in mobile data services usage. Participants argued that this is mainly part of their group activities which "*allow for entertainment*" that is often facilitated by the retrieval and use of information relevant to the place of holiday originated from the mobile data services. During holiday periods there is heavy use of sms, mms and e-mail applications which facilitate the communication between friends and family members that are far away.

5.2.2. The location factor

Varying locations stand for varying opportunities for activities and social interactions of different natures. The study of the location factor includes the identification and analysis of the different areas where users frequent make use of the service A. This analysis includes the characteristics of these areas for example indoors versus outdoors. According to the data, the type and the amount of Service A usage in each location is bound to be influenced mainly by the users' surroundings.

Macro-environment (Urban Vs rural locations)

The participants claimed that they tend to use mobile data services much more when they are away from their home, in macro-environments that provide rest and leisure, during weekends and holiday periods. This is in accordance with a consumer survey[88] according to which 42% of adult users claimed that they would not go on holiday without their cell phone. An analysis of the findings supported by the relevant literature would highlight this argument. Participants reported that

[88] http://www.adobe.com/macromedia/proom/pr/2005/mobile_survey.html

when they are in urban settings, they would use Service A on occasions of "*stress*" or "*boredom*", in which the sought benefit from mobile data services was reportedly to take a quick break out of their daily schedule, to relax and escape from their busy routine. In contrast, usage in rural locations appeared to relate with search of connectivity and accessibility. Participants claimed that when away from home for long periods they tend to use more often Service A to "*access information*" as for example news and stock prices and to "*send mms and e-mails to their friends and family*".

A strong pattern emerged from the analysis of the transcripts related to rural locations. This pattern concerned the users [need to maintain contact] with what is taking place in their urban social and political environment, with more emphasis placed on remaining in touch with friends and family they do not expect to see for a certain length of time, due to long distance.

Micro-environment (Outdoors Vs indoors)

This section considers the analysis of the experiences of users before deciding to use mobile data services when outdoors and indoors.

Outdoors:

- **On the road / in traffic:** According to the analysis of the data, usage of Service A in these locations relates to situations of "*anxiety*" or "*boredom*", whereas the user tries either to make some use of the lost time spent trapped in traffic as for instance checking e-mails or uses mobile data services to manage boredom in the sense of browsing available sites to kill time. A third occasion but more rare within this occasion is the retrieval of maps when being lost or looking for the faster way to reach a destination

It is not common to see pedestrians in Athens to use mobile data services standing or walking down the street. Although the participants of all ages and genders said that they "*make and receive calls while walking on the streets*", they "*avoid Service A while on the street*". More specifically, they argued that they "*try to avoid noise and crowded situations*" when using Service A because this activity "*takes time*" requiring from them mental effort. As the 27 year old lady, consultant, pointed out while I had a talk about Service A and I was walking on a Saturday morning in Athens, " *it is difficult to access service A and exchange information when you are in the street and at the same time you have to be aware of your surroundings, of what is happening around you. I have the feeling that I am in danger whenever I am not aware of what is happening around me*". So even though participants when interviewed consider streets as more than simply transitional spaces it seems easier to them to have a phone conversation while standing or walking on the street than using Service A. The patterns of [security] and [privacy] emerged from the

transcripts that described usage behaviour when outdoors although it has been observed that people ignore each other when using their mobile phones.

For example, although users claim that they "*would not feel comfortable*" to use Service A while on the street this is not the issue with texting. Participants argued that people "*inattention*" when walking in the streets allows them to send sms freely outdoors. It could be argued that when concentrating on texting they avoid eye contact with other pedestrians and this gives them the "*feeling of privacy*". The inconsistency of texting sms while they are avoiding at the same time to use Service A when outdoors can be explained by the perception they have for Service A as a time consuming activity.

Indoors:

Participants claimed that they "*normally use service A indoors*". The environment and etiquette in indoor places, except those where the use of mobile phone is banned, is aimed to make users initiate Service A. According to the findings, it seems that mobile phone use is becoming a routine action when "*waiting*" or "*relaxing*" in leisure venues, at home, in friends' places and in the car. Mobile telephones seem to be a way of entertaining and keeping company when one is alone in a café or in the house. Not only making calls, exchanging sms, but also playing games, downloading realtones or just surfing Service A menu are ways of doing something the waiting time. These findings are in accordance with Lasen (2002b) who argues that mobile phone use gives new meanings to dead time periods and transitional spaces allowing escape from boredom.

A more detail analysis of the indoor places where the use of Service A was found to be a routine activity is presented below:

- **Home:** The teenager participants said that in between school classes and during extracurricular activities they prefer to use their cell phone and Service A when in their home. According to the data, the time they spend at home is characterized also by "*anxiety*" and some "*feeling of 'restriction'*" coming from the school related pressure or the need to get out of the control and supervision of parents.

As such, the type of mobile data services the teenager participants argued that they use in their homes relates to emerging patterns of the [need to mentally escape] and [take a break from the actual setting] of their home by engaging themselves in some sort of entertainment such as chatting, downloading music or checking out music news. The above findings are consistent with a survey[89], according to which 68% of the Greek students, feel tired, anxiety, stress and boredom when they are in high school.

[89] www.skai.gr/master_story.php?id=77169

Young adults also admitted that they find their home a suitable place to use Service A, yet not as much as teenagers. This age groups share more or less the same nature of Service A patterns of use with the teenagers as these are described above. Of course there is a slightly different form of motivation, which revolves around the "need to use it alternatively to internet", especially in cases where there is no internet line at home, either while actively searching for information or browsing just for fun.

- **Visiting friends or family:** According to the analysis of the data, Service A appears to be used at homes of users' friends or partners, mostly when ideas for group activities are going around and users are asked by friends for information which can be retrieved instantly by using Service A. Retrieving the data a frequent pattern for usage occasions for young adults has been noticed. The pattern of making [plans for group entertainment] with friends was frequent with the texts that concerned interaction with friends. This pattern is related with activities such as "*booking a restaurant"* or "*arranging a weekend out of town"* and includes mobile applications such as weather forecasts, hotel information, hot spots, or even maps. Additionally, the particular occasion of visiting friends offers the opportunity to "*discuss in a relaxed manner*", "*go over news*", gossip and sports for which mobile data services also serves as a pool of ideas and subjects.
- **Entertainment venues**, namely cafeterias, city squares, and bars were the locations where the use of mobile data services is most common among teenagers and hardly among adults.

From the analysis of the teenagers' transcripts it became evident that the patterns of [acceptance] and [recognition] lead their behaviour when they are with their peers. More specifically, they thrive for the opportunity to gain acceptance and recognition by starting up a discussion or show off their latest music download. These needs are well facilitated by Service A, which appears to be interesting, is interactive and generally wins teenage attention.

However for some adult participants there is a conflict of social etiquette and service A usage. For example, while being with friends, using service A is an indication of failing to "*really live the moment*" be it either that they are bored or that that choose to alienate themselves from their peer group. As they admitted, using Service A when with friends contradicts the essence of entertainment, which according to them has to do with "*experiencing things with friends/partners*", "*relax*", and actively "*participates in a discussion with friends*". The use of Service A as such in leisure areas was not regarded as a typical behaviour among adults of any age, in contrast to calling and texting which they frequently use in these areas since they consider it as part of their social life.

- **Working establishments** were places in which the respondents argued that the access to Service A was poor. According to most of them, the "*availability of internet*" in their working environments does not justify the use of Service A in the first place. Participants argued that the internet outweighs the benefits of Service A both in terms of the "*available depth of information search*" and retrieval as well as the "*pertaining costs*". According to chapter 4, the typical fees to enter Service A and download are significantly more expensive and limited in choices compared to the respective services offered by the web. On the other hand, some participants argued that using mobile data services at work appears not to be an "*acceptable behaviour*", as extensive usage of one's mobile phone is not permitted or encouraged in certain working environments.

In indoor areas where the use of mobiles is banned such as theatres, cinemas, classrooms and airplanes, although phone ringing and vibrating is sometimes observed, the access of mobile data services seldom takes place according as the data showed. Almost all of the interviewees claimed that they leave their mobile "*switched on and always carry it*" with them, and they try to turn their phones to the silent mode when they are in the cinema, in a concert or in a classroom in order to be "*aware of who is calling or texting*", they claimed a strict "*respect*" of service A not use when in the above places.

The participants of the study often use their cars, the metro or the bus as means of transport. These spaces are a particular type of public place as for example being in the car can be considered as indoors and outdoors at the same time. Metro and bus stations are transitional places where passengers remain there more time than in the middle of the street. The users claimed that accessing service A "*just for having a look*" is one of the activities when waiting in stations. They argued that using service A instead of talking is a more "*discreet use of the phone*", with less risk of being overheard and thus bothering other passengers.

Finally, the data revealed that spaces such as stairwells, elevators or hallways have constraints, which stop users of mobile data services getting their tasks and goals. As such, no one of the respondents ever mentioned usage of Service A in such spaces. This is in accordance with Newman (1972) who claimed that since the boundaries between public and private space are sharp these spaces are transitional in nature.

5.2.3. The "Objects" factor

Sommer (1969), argued that certain arrangements of people and objects within spaces are more suited to certain activities than others, in terms of certain attitudes (cooperation, competition, usage of mobile data services, or separate action). Thus

objects define the user's options in terms of possible activities related to the occasion the user is found at. According to the findings, the concepts, the objects and the position of the objects within a space often determine to a great extend an action and thus very important for choosing a particular space to access mobile data services.

Concerning the concepts, the participants argued that their perception of the quality of the mobile network in terms of "*speed*" or "*dependability*", or the existence of crowds of people affect their physiological "*responses*", their "*emotional state*" and thus their behaviour. For example, as they mentioned "*fear of being watched in the street by unknown passers*", or knowing that in this area the "*signal is weak*", restricts their likelihood of accessing mobile data services. Thus as the participants argued, they prefer to use Service A within areas where the network "*assures the quality of the service*" as well as within private or semi-private places where "*security*" and "*privacy*" are ensured especially when they asked to provide passwords or send personal information as e-mails.

The analysis of the transcripts related to the usage of Service A in outdoors or indoors spaces, showed that the patterns of security and privacy were considered as important influencers of Service A usage. Thus the existence of objects within a space that allow users to "*secure their privacy*" is an important factor in their decision to access Service A.

5.2.4. The Environmental conditions' factor

The needs of the users which mainly relate to their human body requirements should be supported by the interior environment that should respond to vision, hearing, privacy, stability and mobility so that both comfort and efficiency is achieved. All of the events in relation to which the participants described usage of Service A were within the normal levels of lighting, noise and temperature and they did not generate undesired reactions from the users. None of the participants ever used Service A in too hot or too cold environments. The ability to hear and lighting were within acceptable levels and the personal distances were protected in order to avoid undesired eye contact.

This finding revealed that the patterns of security and privacy strongly depend on their peripheral vision. The participants argued that being able to "*observe the surrounding environment*" is crucial in their decision to access Service A. Thus although there is sufficient visibility and recognition of the mobile phone even in darkness users hesitated to use their mobile if the environment prevented their peripheral vision as in dark spaces.

Hearing on the other hand although is critical because it affects the general capacity to perform other tasks yet it does not seem, according to the findings, to play an important role in the decision to use mobile data services. All the events described, were characterized by audibility, intelligibility and low noise annoyance. Of course this can be explained by the fact that we seldom experience situations with increased levels of noise and thus the participants did not have experiences to contribute to this research.

Finally, another crucial attribute regarding the decision to use mobile data services that came out form the analysis of the data is the stability that the environment provides to the users. According to the participants, whenever they were not sitting but using Service A they were "*taking care to avoid unstable environments*" such as non horizontal floors, width of walkways etc.. In these situations they would choose spaces and objects which could support them in the performance of their task as for example they need "to lean against a wall".

5.3. Personal layer

In this section the participants' responses concerning the factors of the personal layer as defined by Tuan's theory, are outlined. The places and the mobile data services expose users to rational and emotional stimuli that generate reactions. The personal layer is defined by the mindset and perceptual framework under which the users experience, understand and relate with the place and with the mobile data services, the familiarity they have with them as well as the activities they are involved in.

According to the "model of place", the place layer consists of four factors that as the findings revealed are the most influential ones regarding the usage of mobile data services. The factors that constitute the personal layer are summarised in Table 14 : Attributes of the Personal layer. A detailed analysis of the findings is following in the next sections.

5.3.1. The "user's attributes" factor

This factor concerns the attitude and the mindset of participants within specific places and is depends on the demographic attributes of age, gender and socio-economic status as well as to the familiarity and experience the users have with the usage of information technologies. The analysis revealed that the above attributes seem to have strong influence in the decision of the participants to initiate Service A.

- **The attribute of age**

Younger users
The usage and attitudes towards Service A applications are influenced by age in the sense that younger users (15 -19 year old), described in this study as youngsters or teenagers, are more prone to use Service A more frequently and to a greater extent as shown in sections 4.5.2 and 5.2.2. In the total sample, teenagers were found to be more "*interested*" and '*emotionally attached*' to Service A which according to the findings appear to satisfy three core needs for this age group:

- Acceptance and participation in a peer group/relationship: this need defines teenage life and can be defined as wanting to participate in the communication codes the peer groups have, to remain always 'connected' and available to share news and thoughts with friends/partners. Maintaining constant 'touch' with friends/partners was found of supreme importance to teenagers as they fear that their unavailability can produce alienation by missing out what is taking place in their company of friends/partners,

> especially if they are from different schools. A 17 year old girl replied "*from time to time we call our friends' mobile phones and wait for reply. If this happens we know that everything is fine. We use to do it when we are out of money and we can spend more for prepaid cards. If we are within our budget and we have enough money to spend for prepaid cards we used to send MMS of emails using Service A as a way to communicate with friends. We do this every day*". According to this girl, there is a communication code with friends using mobile phones even when their friends are out of money. More specifically, they prefer MMS which is the teenagers' favourite form of communication second to SMS which was described as the most cost-effective option and third to just calling when they are out of money. This communication code reveals an inherent need for 'constant contact'. Therefore a strong pattern emerged which is the [securing constant contact] and concerns particularly the way youngsters appreciate Service A as a way for communication.

The analysis revealed that the Service A facilitates the communication codes between teenagers which sometimes are not so obvious or accepted by members outside this age group. For example, Service A was found to be serving the 'interactive' and 'daring' form of modern flirting among teenagers. As they reported they like to "*exchange pictures and music*" in their effort to "*screen*" prospective partners as well as while "*not being able to meet*" with their partners while being away as for example during holidays, school days, or late at night.

Also, a pattern that would frequently emerge during the different phases of the analysis process was that Service A was often found to be the [means to extract issues for discussion]. According to the interviews, Service A offers a pool of subjects of a light nature, that teenagers like to talk about with their friends, like astrology, chatting incidents, music news and gossip which they either access on their free/idle time or together with friends, browsing at sites during or after school. Even the capability the youngsters have in terms of using Service A becomes for these age groups the means to extract issues for discussion among peers. As the16 year's secondary education student reported "*I am the "champion" in writing texts in mobile phone. All the others are slower. How do I know that? We have tested our skills in this many times during breaks in the school. I am proud of that.* " As this teenager admitted he feels nice to be "*often*" the "*protagonist*" in discussions that concern his abilities.

- **Older users**

Older users on the other hand appeared to relate differently to Service A compared to younger users. While analysing the data trying to identify how the age defines service behaviour it became clear that differentiations also occur among adult groups. According to the data, young adults (early twenties to mid twenties, 19-24) relate to Service A in a more enthusiastic and self-involved manner compared to older adults (mid twenties to late thirties, 25-38) who appear to restrict themselves

to a rather narrow pattern on usage. For example, the 24 year old lady who owns the tourist shop replied to my question if she finds using Service A as something that can surprise her "*it is like surfing the internet with my PC. I feel like starting a journey to the "never land" where there is always something new to come up and surprise me. It's nothing like my car where I know what to expect. I find Service A as something that can give me unexpected enjoyment, at least I pay for that when I am bored and decide to use this service*". Her answer is full of enthusiasm since she compared access to Service A with a promising journey full of surprises.

On the other hand, as users grow older they are more likely to appreciate more the functional offer of Service A, namely services that can provide information and a type of facilitation that simplifies access to information they can use to perform a task. The 38 year old participant commended with "absolute confidence" during our interview that "*I know what to expect from Service A, its capabilities and its weaknesses. That's why I know "exactly" what it can offer me. Looking for new functions on Service A? No. Not now. I am too busy to experiment*". Thus it seems, as the detail analysis below will highlight, that compared to teenagers and younger adults, older adults are not so inclined to use Service A for their entertainment. In contrast they appeared to rationalise their behaviour, seeking a clear functional benefit from Service A.

- **Younger adults**

This age group seems to have a significantly 'wider' perspective than both teenage users and older adults according to the analysis. This analysis showed that this age group has both more 'opportunities' and more 'drive' to use any technological tool to make everyday lives easier and more fun.

Social world was found to be richer and more diverse among younger adults as they seem to be the most mobile and involved age group engaging in a variety of different activities. As such, they tend to appreciate the flexibility and freedom Service A offers. A 21-year-old female working in a sales department responded "*I need to feel that I can access my friends as well as information anytime anywhere. If this doesn't happen, I feel anxiety. Because of my new job I have to be away from home occasionally. Service A provides me the security of feeling connected. After a year with this service I am used to it. I find it necessary*". This lady is still free from family responsibilities. In combination with her high life entropy since her "*Because of her new job she has to be away from home occasionally"* defines a lifestyle which requires access to information and communication at all time providing to her the feeling of security.

- **Older adults**

The analysis showed that their behaviour relates first to this age group's relationship with technology which is defined mainly on a rational level and second to their amount of stress from everyday life. As the 38-year-old professional argued

"*agree or not, my business plays a very important role in my life. I work almost every day from morning to late evening. I can't spend my whole day in the office but on the other hand I need to take my office with me everywhere I am. I can't afford to miss an important e-mail. Service A allows me to be more mobile but always online with my customers.*" For this interviewee, Service A is valued for the purpose of making 'work' easier rather than making 'life' more fun. He also perceives Service A as a substitute of internet, allowing him to access services while away from his PC and internet connection.

The older adult participants argued that they use Service A during time slots in their day when they would typically "*go through a magazine, a newspaper or a news portal*" while not having access to them. Such typical usage occasions for older adults are those of 'idle' time mainly waiting or during 'soft' emergencies such as having to reschedule restaurants and holiday bookings or looking for a gas station.

For this age group a strong pattern emerged during the analysis of the identified codes which concerns the need of the users to maintain [work-life balance] by not becoming 'slaves to technology' establishes among older adults a more rationalized, functional behaviour towards Service A. The 32 year old IT administrator argued "*I need to check my e-mails frequently. I do it in my office. I also like to surf the internet for news. I cannot imagine doing what I do outside the office when I finish work…I am fed up with screens…be it the pc or my cell phone. Being with my family or friends out for dinner I usually forget all about Service A. My family is more important than any entertaining gadget*". This interviewee appears to be very protective of his private time against activities and tools used typically during his working time.

- **The attribute of gender**

During this study men appeared more involved and significantly more interested in exploring what Service A has to offer as well as using it. According to the interviews with men, they appear to have higher life entropy, which places them in a position to appreciate more the key benefit of 'always connected' as well as demonstrating a strong need for social recognition and distinction. Service A appears to satisfy both of these needs, as it provides them with access to information and functions not available to the average internet/cell phone user.

The need for distinction came out stronger among teenage boys and young male professionals who both demonstrated a stronger need to differentiate themselves. For example, a 16-year-old boy, participant in the media elicitation method, argued during the interview "*I am not good in sports but I am an expert in using lots of applications in my mobile. No need to mention how good I am driving the car in the "rally game" in my mobile phone. Let me show you……I can do more than*

anyone else in my class with mobile applications. I was one of the first users ever tried Service A in my class". On the other hand, for the young males, Service A helps them to establish themselves as more in line with what is happening in the world and with access to a wider set of information compared to other men of their age group. Following the above the teenager demonstrated a stronger need to differentiate within his peer group while the younger males among their professional and social environment.

On the other hand, **women** argued that they were interested but not really 'touched' by service A. According to the data, the female participants provided they appear to have lower life entropy thus a more systemized lifestyle and daily schedule, leading them to "*plan ahead*" their activities and to proactively seek for information that may be "*easily and cost effectively found through the web*". In total, women appeared in this study to use to a lesser degree electronic media compared to print media such as newspapers, city and entertainment guides and magazines.

Another pattern that came out from the analysis and could explain women's lack of strong interest towards Service A is their tendency to [relate more to their partners for seeking information] of either practical or entertainment value. For instance, it was reported by female participants that information which could be typically obtained through Service A in cases of need it is actively sought and retrieved by their male friends or partners in most cases rather than themselves. As such, Service A, to the majority of women of all ages in my sample, is a "*nice to have*" service, but not a substantially beneficial offer.

- **The attribute of socio-economic status**

According to chapter 4, Service A is marketed as an extra feature offered by a particular line of cell phones by each mobile telephony provider, priced at a certain premium for offering access to Service A. On top, the charges of Service A services are quite high for the Greek market standards, placing Service A beyond the reach of low socioeconomic classes. All of the participants noted, (Section 4.5.2), that the cost of the service A is one of the weaknesses of the service. In turn the users that participated in this study were found within the middle and upper socioeconomic classes. The majority of them are in a position to afford the cost of a rather expensive handset as well as the average cost of using Service A on a regular basis.

Besides the strictly financial constraints, which act as a barrier to Service A for the less privileged groups of cell phone users, socioeconomic status appeared in this study to define the degree of exposure and interest of potential users towards the Service A. Of the 3 youngsters interviewed the 17-year-old young boy said "*three of my friends have adopted MSN and using it over Service A. It seems to be fun chatting with mates even when they are far away from one another. You know, it*

doesn't make me feel well knowing that all the group is having fun chatting together, except me who doesn't own MSN. It's too expensive for me...". It is obvious for this teenager that his socioeconomic status prevents him to extend his usage rates to other Service A applications. On the other hand, a 32-year-old female consultant said "*all my colleagues, access e-mails and information in and out of the office. I don't find it_"proper" being the only one that doesn't use a mobile data service to access e-mails and news when out of the office.*" For her the social environment is a catalyst to further extend the usage of Service A.

- **The attribute of ICT culture**

Recent studies, for example Chang and Kannan (2006) indicate a positive impact of mobile technology use on user technology readiness and comfort with technology and highlights the importance of attitude towards IT as an influencing variable in the use of mobile services (Beurer-Zuellig et al., 2008). But the analysis of familiarity and expertise of the participants with Service A and with ICT technologies in general as an attribute that could influence the decision of the users to use Service A when within different places did not provide sufficient suggestions but only indications.

This is due to the fact that for this study I recruited users that already were frequent users of Service A and thus were sufficiently familiar with Service A. So the attribute of familiarity with service A was not an attribute that could be analysed in detail in the frame of this research. Of course the difference in expertise between different age groups or between male versus female users is an indication that the familiarity with information communication technologies is an indicator of the usage behaviour of mobile data services. The majority of the respondents, especially the younger users, were also familiar in their day to day activities with the use of ICT technologies since they owned PCs, game consoles and MP3 and DVD devices. These users as described above were the most active users of Service A in different places. This finding could be an indicator that the experience with ICT technologies can influence the use of mobile data services in a specific place.

But according to these indications it's difficult to conclude the exact influence of this attribute. Another research is proposed, in which familiar against less familiar users of the same age groups will be studied, in order to have conclusions and not just indications and thus enhance the results of this study.

5.3.2. The "Place attachment" factor

The analysis revealed an association between usage of mobile data services and place in terms of emotional and functional attachment with the place. Participants reported they mainly use Service A within "*familiar*" to them places such as home, school, cafeteria, their car and waiting rooms in local cinemas. As they claimed they have positive emotions and memories from these places since they "*usually spend enough time there*".

It seems from the findings that the pattern of [familiarity] (sense of comfort and repetitiveness of being in a place) is an attribute that positively influences the use of Service A. For example, when I asked the 32 year old lady, consultant, if she uses Service A in the metro she responded "*well no. I rarely use the metro and I don't remember using Service A in the metro….but I think that if I used metro more often, then... probably yes….I would used Service A there*". What seems to be happening here is that the lady does not feel familiar with the environment of the metro. But recalling from her memory similar situations and experiences she estimates that had she been a frequent user of the metro it would give her the necessary confidence and feeling of security to access Service A. In particular users argued that when they visit a place for the first time, or seldom go there they prefer to save their attention for the place itself. But when they visit a place frequently they become familiar with the characteristics and objects of the environment and they also become emotionally connected with this place. This connection according to Tuan (1977), is related with the past experiences or memories associated with the place and with the imagined or anticipated future experiences or expectations associated with it. The familiarity and the positive emotions they relate to familiar places lead them to use words as "*feel safe there*", "*I surely relax there*", "*yes I think I am protected*" and "*for sure I feel safe*". As an example the 20 year old university student, during the interview session she picked the photo she has sent me showing a table full of cups of coffee and said " *I took this photo at the cafeteria next to my cousins' house. I was having a coffee with my cousin and we were looking at the signs. I feel nice there. It's my place since I feel like being home. I know most of the people in this neighbourhood. I've been there since I was a student in the high school. I feel like I could spend hours there just by using Service A, without me or anyone else feel bad about that*". According to this girl, this cafeteria is comparable to her home in terms of feelings of safety and familiarity.

5.3.3. The "Emotional status" factor

The analysis of the collected data concerning the "Emotional status" factor relates to past experiences, beliefs, emotions, attitudes and feelings. More specifically, in daily life, endogenous and exogenous stimuli have an effect on humans (Trick & Enns, 2004). Due to these stimuli, people react to their environment in different ways. Some of these reactions are reflexes, emotions and feelings as shown below.

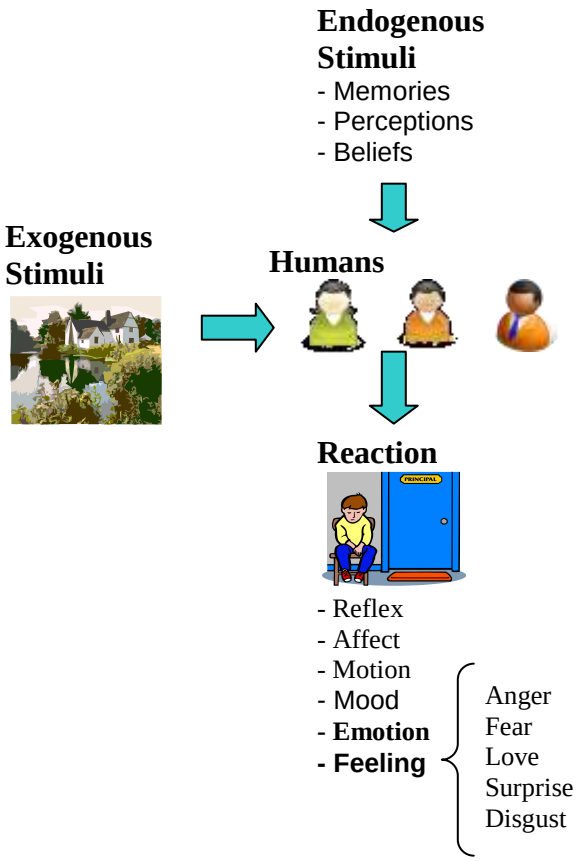

Figure 25 : Reactions due to various stimuli (Hoffmann, Fernandez, & Schweigmann, 2006)

According to the above schema, activities could be initiated or could be influenced by multiple factors such as social, cultural, motives, goals, identities, or other primary activities to mention but a few. But in order to perform any activity it would be required by users to learn and understand the environment they are in. Humans learn about their environment via perception that compliments cognition which defines how a person thinks (Carlson, 2005). People perceive the world, interpret and finally evaluate this perception. They analyse the objects and artefacts that describe how "information" is embedded within the environment. Finally, considering their goals and what they already know about the world they decide to pursue a sequence of actions and then they execute them (Norman, 1988). In order to understand the actions of users that lead them to use Service A, I follow the

notion that cultural and social information is embedded within "objects" and that the individual interacts with the environment and objects. This means that an individual brings with him past experiences and knowledge when interacting with the environment and the objects within this environment.

According to the above argument, I do not think that other models such as the Model Human Processor (MHP) model proposed by Card et al. (1983), of human performance that provides gross predictions of system behaviour would suffice to explain the usage of mobile data services. This is because these models focus on the individual alone by focusing on the information processing capabilities of the individual neglecting emotional and social issues.

According to the above, past experiences generate expectations to the users related to their interaction with the place. During the interviews with the participants in the media elicitation method, the participants were asked to describe their wants and expectations from the places they have used Service A and presented in the photos they e-mailed to me. The analysis of the characteristics of the places and their connection with participant's needs revealed that when these needs were not satisfied then the participants decided to use alternative objects to satisfy them as for example they accessed the Service A. For example, the 21 year old university student e-mailed me a photo of a cafeteria where he was there with two of his friends. He said that he was there Sunday night to entertain himself. When questioned about his particular expectations from this place he replied that he was "*looking for fun*" but in a more "*relaxed*" manner and of course to communicate and talk with his friends. As he replied "*Sunday night I want to amuse myself but in a different way than Saturday night. Monday morning is just a few hours ahead*". As he said, after having the coffee they planned to watch a movie. During this activity in the cafeteria which lasted for almost two hours before going to the cinema he recalled the topic his friends were analyzing. As he narrated, his friends study engineering at the university while he studies business administration. The topic they were discussing was totally unknown to him. In that particular time period the place characteristics would not satisfy the needs of the participant increasing the possibility to look for alternative sub-activities to satisfy his needs. That time, as he narrated, he did not want to interrupt his friends and thus he looked around him trying to find anything interested to spend his time. As he argued "*The TV was far away from us and I couldn't clearly watch…so since I got bored I decided to check within Service A the sports news*".

It should be mentioned that there are cases where although the users' expectations are met by the place they would still decide to use Service A. Whenever this was mentioned by the participants it was only to enable communication and collaboration of the members of the communities and the groups the users were participating. As mentioned in sections 5.4.2 and 5.4.3, participants used to access Service A either to "*share info*" with the whole group or to "*assist*" someone else. In these cases the use of Service A did not include voluntariness (the user initiates

the service by himself), but it was triggered by other persons. According to the analysis, 'voluntariness' is a pattern that could influence the intention to use mobile data services and has to be studied in a more depth in a future research.

The analysis of the data that concern real facts (present emotions, attitudes, feelings, beliefs, and mood) suggest that the perception process influences the mood of the human being. As the participants said whenever they perceived their environment as "*dull*" and "*uninterested*" they got 'bored'.

As it will be discussed in the next lines, 'boredom' is the strongest emotional pattern that positively influences the usage of Service A. According to the literature (Vodanovich et al., 1991), there is an inherent anxiety and depression in boredom which can be caused in any environment devoid of stimuli when there is low interaction with the environment. The analysis highlighted cases where there was lack of environmental stimuli. This is a result to be expected, since the participants, were mainly "low entropy" persons, as mentioned in chapter 3 and usually located in places that were familiar to them. Thus they were aware of the characteristics of the places so there was not so much within the environment to stimulate them. So if they had to wait in familiar places, the lack of stimuli from the surrounding environment facilitated the usage of Service A. As for example the 35-year-old HR manager said when I showed her the photo of the inside of her car that she had sent "*I am waiting for my little girl to finish her dancing class and pick her up. Parking in this area is a very difficult activity and often I prefer to wait in the car with the alarms flashing to avoid getting a fine from the police. Having nothing to do while waiting in this place at least once a week …. my hand unconsciously takes the mobile phone to check news or gossip or e-mail using Service A*". For this lady the usage of texting and accessing Service A was perceived as an unavoidable activity and was carried out almost subconsciously while frequently waiting in her car. Similarly for other participants the decision to use Service A for filling out their time especially when commuting in the metro, in cars, buses for longer periods of time or while waiting on cafeterias and have no alternatives, while at home it is an unavoidable activity. These findings are in accordance with previous studies according to which mobile phones are useful for hyper-coordination, socializing and relieving boredom (Baursch et al., 2001). It seems that the availability of other objects, (Section 5.2.3), play a vital role in the activity they decide to do. Objects and activities in the context of the user as for example possibility for sightseeing, alternative information sources and availability of social interaction influence the decision of the users to access or not Service A (Section 5.2). If the above alternative 'objects' are missing from the environment the humans are looking for information and entertainment alternatives to cope with these idle moments (Coates, 2001; Lasen, 2002a), which in the case of this study their needs are covered by Service A.

The pattern of Boredom

The study, as mentioned above, highlighted the importance of the pattern of "boredom" as a state of mind in cases where users access Service A. The analysis of the collected data concerning this pattern follows in this section.

There were quite a few cases in the collected data that revealed the influence of boredom in the decision to initiate Service A. For example, two of the participants who lived away from their jobs and had to commute by the metro to go to work and back home frequently reported accessing Service A in the metro, not during rush hours, as a way to pass the time. One of the two participants, the 30-year-old sales manager, said while he was describing the photo he had e-mailed me showing a metro station: "*In general I don't have free time to use Service A and search for new functions. I find it a time consuming activity and worthless to look for and try more applications than the basic ones I use with Service A. But waiting every day for the metro to come I tried new functions and got familiar with most of the menu of Service A*". It's obvious from the above narrative that the absence of environmental stimuli, made him feels bored and forced him to act in a way that usually he would not like to do. But except the transitional periods, older adults mainly prefer to access Service A usually during short breaks mainly to stay informed on business issues. As the 32-year-old IT administrator, who as a professional was doing his executive MBA course, argued that "*well...I work in the morning and during the evening I have to attend my classes for the MBA. I usually access Service A to check my e-mails during breaks between classes. This is a common activity for the other students in the MBA course also. We are students but we are also professionals*". This participant argued that he perceives Service A as a gateway between his professional life and his personal life. There are also other cases in which the older participants mentioned that during idle periods within business tasks they decide to look for information as for example news, horoscopes and others or when in idle times in their personal life they access Service A for example to check e-mails or stock market prices or access the last minute news headlines. This is the case also for the 25-year-old secretary who reported that "*at work when I don't feel like doing anything interesting I need to have fun for a while. Mobile phone is just next to me and Service A is an easy way to have a few minutes break*". In this case the user prefers to use Service A in between her tasks and this can be regarded as offering a quick distraction from a boring task that is in progress. Service A then would give her the "*feeling of freedom and fun*" and make her "*feel nice*" during boring tasks in the frame of her work. It should be noticed that the participants, who are employees and spend their day working in front of a PC, argued that they prefer to escape from the boring reality by checking their e-mails or surfing the internet rather than using Service A. also quite older participants argued that the pace of professional life would not permit them to experience frequently idle times.

Ofcourse this is not the case for younger participants. The analysis revealed enough cases that this age group access Service A due to boredom. Even when the use of mobile phones was not acceptable activity boredom led them decide to access Service A as for example the 16-year-old student who reported looking at Service A "*I see teachers all day, so I figure it's better to look at Service A from time to time*". Specifically youngsters argued that they use their mobile phone devices to enter text messaging or to access Service A, to cope with moments of boredom when there was no access to better activities as for example when at home, when travelling with their family, waiting for a friend or having a coffee in the cafeteria. As a 16-year- old student who participated in the media elicitation method said looking at the photo of his room "*my parents asked me to go to sleep. I couldn't sleep but I wasn't in a mood to access my PC or read a book. I was bored. What else to do while being in a room and have nothing exciting to do. It's one of the times I find myself having nothing to do or doesn't like anything to do. It's these moments that I forget the cost and start using Service A.*" During these moments this young boy perceives the surroundings of his room as uninteresting, since he is there every day so he gets bored. Similarly a 16-year-old interviewee said that, she would forget Service A for days when she had a good time with her friends, but it would become important when "*I have dinner with my parents, my grandmother and grandfather and I am really bored so I take out my phone and use Service A.*". In this particular case the girl feels unsatisfied and she cannot or do not want to communicate with her social environment and thus she gets bored also. Following the above findings, the service A usage as shown below is strongly related with boring moments, especially with the younger users:

Table 41 : Use of service A per age group

Teenagers	When bored	
Young Adults	Between breaks	During boring activities
Older Users	Between breaks	During boring activities

5.3.4. The "Activity status" factor

To analyse the data related to the activity of the users when they are in different places I adopted as lens the "activity" construct (Clancey, Sachs, Sierhuis, & van Hoof, 1996). According to Suchman (1987), activities are units for viewing and describing human behaviour. Following the literature review chapter 2 activities can be considered as a collection of actions performed by individuals, situated in the real world. Activities are socially constructed engagements and are defined by beginning and end, they have duration and take time, effort and application of knowledge and in any case they can be decomposed and/or subsumed and can be interrupted. People are always involved in some kind of activity. The activities that are performed depend on the situational context that the person is in or in other words activities locate behaviours of people (Suchman, 1987). People do not have a pre-specified plan to follow, but they behave on the basis on their perceptions, beliefs and stimuli from their context at certain moments. I can thus consider that the usage of Service A is an activity which develops within specific places and for specific purposes. According to chapter 4, the activities that Service A allows users to execute are mainly the following:

- The users can access information and amusement, playing games for example, look at pictures and icons stored in the phone or listen to music to mention but a few
- The users can take a picture or a video and publish content on the internet via their mobile phone
- The users can talk and send messages having person to person communication
- The users are able to share information with more users having online one to some communication as for example chatting over MSN with their friends
- The mobile phones provide to users services with their automatic Machine to Machines communication, as for example provide users with GPS information or allowing users to make electronic payments via their mobile phone.

Using the activity concept I tried to position the activity of Service A usage within the daily activities of actors in order to identify how this activity comes up. In other words, I tried to identify the context in which this activity occurred and what goals, purposes and motives it fulfilled. According to Leontiev (1981), the activities are translated into reality through a specific or a set of sub-activities which are complementary to each other and work under the idea to serve the same goal. If a person is to achieve a specific goal of, say, to have a coffee with friends, then this person must employ a variety of sub-activities to accomplish this goal. For example the 27-year-old male, member of a band argued that "*without my pack of cigars and without my mobile phone I am not going out to have a coffee with friends. These are considered as "must" in relation to leisure activities. If I forgot them*

when I am to go out, I would probably return to fetch them and then go on with my initial plans". Within his perspective, having coffee with friends is the main activity that always includes the sub-activities of smoking and using the mobile phone. Even if each of these sub-activities seems to act independently from the others, actually it integrates and acts as a facilitator to them. For example, as the 21-year-old student said when I asked him about the photo he had sent me of his office "*I find myself using more often Service A as a few minutes break while studying for exams*". This action seems not to serve the goal of study but in general terms it assists the user to relax for a few minutes and then continue the previous activity. In that case it acts complementary to the previous activity. The above data suggests that the Service A usage is not a primary activity rather the pattern of sub-activity better describes it. Users perceive Service A as a sub-activity, which comes between other main activities as for example having coffee with friends. According to the analysis, this sub-activity also serves multiple goals and motivations. For instance, the younger participants claimed that they use Service A mainly to "*entertain*" themselves or to "*have a break*" while the older participants claimed that they use Service A to "*obtain relevant data*".

Activities also can be subsumed by other sub-activities hierarchically, meaning that a person can be in multiple subsumed activities at once. For example, the 38 year old participant's replied to the question about the photograph from his country cottage he e-mailed as following "*being in this place, especially in the morning, I like reading my newspaper while having a cup of coffee. I enjoy doing that and from time to time I usually check Service A in between. I like the whole situation and I try to prolong it as much as I can*". In this case the user is in the process of the sub-activity of reading a newspaper, a magazine or a book; while at the same time he is in the higher level activity of being on holidays. When he felt tired, as he said he would pick up the mobile phone and access Service A and had a look at the news and checked his e-mails. This means that he interrupted the sub-activity of reading the paper, and started the sub-activity of accessing Service A. He actually never stopped being in the sub-activity of reading, but he just suspended it to focus on a new sub-activity, continuing with reading few minutes after he got the information he expected from the Service A. The hierarchy of activities as described above are shown below:

Table 42 : Activities and sub-activities in a case scenario

Activity	The user is on vacation. His main objective is to relax.
Sub activity 1	The user is having a coffee in the morning.
Sub activity 2	The user is access Service A to check emails.

Another example was given by the 27-year-old male participant who said that "*sometimes before going out for a dinner to a new restaurant or for clubbing to a new club in an area which I am not familiar with, I check Service A just to be sure*

of the directions I have to follow". In that case the participant is trying to track a cinema (main activity) and thus he accesses service A- map services (sub-activity).

The mobility factor

The analysis highlighted that users of Service A perceived places not as stable and fixed but rather as renewed and less stable understanding. For example, the 35-year-old participant in the observation phase said while having a drink in a bar "*having Service A in my mobile phone makes me feel that I am able to take the basic activities of my office with me as for example checking my e-mails, irrespective of the place I am in. Even now, here in the bar.*" This participant does not seem to relate the ability to access information and communicate with specific places. These findings are consistent with Shiode (2004), Wilken (2006), and Gustafson (2001), who argue that mobility and mobile networked technologies redefine the concept of place. It can be argued also that since the users can have activities in any place they can experience multiple places simultaneously. For example, the same participant argued that "*...furthermore I can have business phone calls or receive e-mails anywhere even being in a club dancing and having fun with my friends. It's really awesome, one moment drinking in a club, dancing and laughing and the next minute being a serious professional and talking to an associate or replying e-mails*". This ability contributes to a dislocation of place, or what Morley (2003,p.439), refers to as the "*death of geography*". Of course this does not happen in all the places since the participants claimed that they avoid using mobile phone and Service A in some public areas such as theatres where the activity of mobile phone usage creates negative emotional responses. This attitude will be analysed in details in section 5.5.

Mobility captured the scholar's attention and a whole class of definitions has emerged. Some authors tried to define mobility in terms of the user's freedom from physical geographical constraints (Bharat, 2003) while others introduced new types of mobility (Sorensen, 2002). I adopted the concept of "mobility" that denotes the user's movement between locations and places. According to this concept, the users are in low mobility status when they are lying, sitting standing or waiting and in high mobility status when they are walking, running, driving, travelling and wandering.

The main pattern that emerged during this part of the analysis is that the mobility status of users negatively influences their intention to access Service A. According to the analysis, the users were more prone to use Service A whenever they were involved in static activities such as waiting, laying, relaxing, sitting or having a coffee or a break. The majority of the pictures, the participants e-mailed, were taken within places where the participants were sitting. During these activities users were not in a hurry and always had spare time or were feeling bored being in an environment without stimuli. For example, in a photo a young boy was in his living room couch being bored while an older adult was sitting in his office. As the

adult said he was working in this office and staring at the same view for the last three years when he decided to access Service A. Following these arguments and since the usage of Service A is considered as a sub-activity by the users it is more probable to happen when the users are involved in longer lasting primary activities. Thus whenever the users are in the process of a low mobility activity for example sitting somewhere it is more probable to proceed to the sub-activity of Service A usage.

5.4. Social layer

Even when an individual may be alone, when for example reading, there is always some larger social activity in which he or she is engaged. For instance, an individual is reading alone a newspaper in an island or checking e-mails in Service A, while he is engaged in a larger social activity of being "on holidays with friends". Thus all the human activities involve the constructs of time, rhythm, place, and objects within a place which have social perspective. According to the activity theory, the objects that constitute reality do not only have the properties which are considered objective according to natural sciences but also socially/culturally defined properties as well (Kaptelinin, Kuutti, & Bannon, 1995). For example, Dourish and Chalmer's (1994), describe situations where the navigation of users within a space is guided and structured by the activities of others within that space. Although the notion of Social Navigation is related to place and activity, it is also a matter of artefacts. As such, the waiting line before a club is an indication of the popularity of the place. Such objects located in space functions as indirect social navigation indicators. Furthermore, objects such as the mobile phone and applications as Service A are considered as 'social defined artefacts'. For example, according to the data the participants consider their mobile phone as an object which provides to them the feeling of "*security*" while mainly the youngsters consider the Service A as a tool that provides to them "*freedom*". Almost all of the younger participants claimed that being able to call, to text, to send emails and to have access to data anytime anywhere would make them feel connected with their social environment. This pattern of the "*feeling of the continuous connection*" generates to the users various emotional reactions such as feelings of "*safety*", "*freedom*", "*power*" and other. "*it's nice to know that I can contact my boyfriend whenever I feel the need to do it, it makes me feel more secure*" a 19 year old girl argued. According to the above arguments, humans are always engaged in a broader activity mainly a social activity, which is shaped, constrained, and given meaning by the ongoing interaction within business, family, and community. But the social stimuli influence human reactions and their decision for action. In this section I analyzed the data regarding the influence of the social environment or "social layer" as defined by Tuan, within a place. The factors of the social layer that guided the analysis are the users' roles, the different interaction types between the users and other people in the same group and the types of the communities the users belong are summarised in Table 15 : Attributes of the social layer.

5.4.1. Roles of the users

According to the analysis of the data, strong patterns emerged in relation to the roles of the users within a place. More specifically, users seem to be more prone to use Service A when they are within 'specific social groups' adopting 'specific social roles'.

Formal roles
The analysis revealed that whenever the participants' role is formal as for example employees, students and others they mainly access Service A between breaks. Participants argued that they usually access Service A when they have "*long breaks*" in their work as employees, or as students in school or in university. They mentioned that when they are with colleagues the use of Service A depends on the "*purpose*" of their gathering. It was found that the [norms of the gatherings*]* constitute an important pattern within the formal environments which prohibited the easy use of Service A. For example, if they attend a business meeting then they could use service A only between breaks because of the "*norms*" ruling a business meeting. As the 35 HR manager argued "*I don't remember using often service A when in business meetings….I have used it a few times when colleagues ask for help, I can remember recently Peter looking for the flights to Italy during a short break….can't afford using Service A during a meeting even if it's necessary, where everyone looks at me waiting for a reply…it makes me anxious*…".

As for the formality of the family roles of husband, mother and child, they do not seem to have a negative influence upon the use of Service A within the members of the group of the family. Within the family group, especially the teenagers mentioned that whenever they "*feel bored and wish to escape*" they "*feel free*" to use Service A in the presence of the other members. As a 16 year old student noticed "*being with my family I feel nice the same being with my friends, but sometimes I feel bored….Service A is my "first option" for these moments…*".

On the other hand, as the participants mentioned, whenever they meet friends or even colleagues for a drink adopting a more informal role then its more possible to access service A. In this case the norms are more 'loosely' and this makes users feel more free. This could explain the difference in usage behaviour of Service A when users are within their working environment and within their family environment although in both these two environments users have formal roles. The roles of humans within family are less formal as within working environment and for that people "*feel more free*" to use Service A when with their family members. Asking participants to describe their feelings using one or two words when they are with their family they used words such as "*nice*", "*free*", "*cool*", "*happy*" and "*warm*". They used the same words when asked to describe their feelings and emotions when they are with their friends. As the 25 year old secretary replied "*my mother is my best friend, I can talk to her for hours*..".

Informal roles

All of the participants argued that they frequently use Service A when they spend time with their friends or their family or their partners. All of the participants argued that when they spend time with their friends their interaction mainly concerns communication and seldom cooperation reasons. Some other times of course the participants admitted that they started using Service A because they perceived the group they were in as boring or to change conversation topic because they found it as un-interesting. In these cases 'escapement' from present environment seems to influence usage of Service A.

More specifically, the users who participated and interviewed appeared sometimes to use service A to communicate with those around them and, specifically, to start-up or change the topic of their conversations. The 30 year old salesman commented "*my mobile phone is an observable object since it is most of the times at my hand…feeling that there is nothing else to talk during a social gathering, service A is a good reason to start a new topic…for sure start talking about service A is a topic that sometimes saves from moments of discomfiture*". Participants claimed that attention could be turned towards service A during talk by, for instance, making reference to the weather of the following weekend or the result of a football match or book tickets. As the 27 male member of the music group and football fun referred *"..I like being in a football match to support my favourite team thus when I am with my friends and we start getting bored we sometimes check our favourite team's site using service A, to book tickets or to have a look at news of the Team…the same happens when I am with my girlfriend and other couples. If I need to start a new topic of conversation I often use service A to look for entertaining venues as for example for bars*…".

Teenagers argued that they mainly access Service A when they have to spend a long time with their family. They usually "*try new features*" of Service A and "*play games*". When they are with friends they mentioned that they usually download mp3 songs and exchange these songs via blue tooth. The 17 year old boy who was interviewed confirmed that " *I remember usually accessing Service A when I am alone in my room, or having fun with my friends or being bored when with my family….it's a common activity to download mp3 songs when with my friends and then share them via Bluetooth…*". The picture he e-mailed to me was taken while he was travelling with his friends, being in a couch. As he mentioned "*we had plenty of time and we spent part of this time to take pictures and download and share MP3 songs*".

having fun with friends in a coach

Figure 26 : Sample of pictures with annotations

Similar to the above the 20 year old girl, a university student said showing me a photo of a café "*here we are having a coffee break before attending the afternoon classes…we are having a look at the new movie releases to plan how to spend our evening …I use frequently Service A when I am with my boyfriend…we surely can have fun using Service A…often we start topics of conversations after having a look at the signs of the zodiac*".

5.4.2. The Communities

Whenever people are engaged in social activities and use appropriate tools, external (e.g. mobile) or internal (e.g. a plan), to accomplish tasks they should take into consideration the rules and conventions that govern the activities and behaviours in the system (social etiquette). The role of the 'social etiquette' is more influential in the decision of users to use mobile data services than to have a call or text a sms. The etiquette in indoor places for example aims to lower the annoyance of the conversation to others and to avoid being overheard. Thus the participants claimed that they hardly ignore the possibility of being overheard and of disturbing other people when indoors, thus they try to talk more quietly in a low voice. "*I feel uncomfortably whenever my partner replies to a phone call….he has a very loud voice…especially when we are with acquaintances*" the 32 years female consultant replied. This social etiquette seems to influence more the organizational communities than the social and functional one

Functional

As mentioned above the intention of the users to initiate Service A when they are participating in functional groups depends upon 'the roles' they have adopted. For example, participants argued that being in a professional group together with other co-workers the formal roles of the employee they have adopted prevent the frequent use of Service A, independently of their emotional status. This would not happen when they have adopted a more informal role even when they are with the same co-workers. In that case their 'emotional state' seems to influence their decision to access or not Service A. Thus if they get bored or uninterested of this

functional group they will start using Service A more easily. One of the photos I received was one of a lobby of a hotel where the 30 year old sales manager was waiting his friends during a reunion with his university classmates. As he reported in the interview "*I arrived early to the gathering, unfortunately I knew very few people there. I had nothing special to discuss with them…While waiting for my friends I started using Service A to check options for bars…I rarely see these friends and it's a good opportunity of an all night fun*..". According to the participant, he perceived his role there as a member of the re-union but as a friend as well which is an informal role. His feeling of being stranger and his emotional state which was characterised by boredom led him to the decision to access Service A.

Organizational

The 'social etiquette' seems to be a more important pattern than the emotional state of the users, especially when they participate in organizational communities as for example in a business meeting. The proper behaviour concerning the use of Service A in these communities is ruled by formal and "*strict*" etiquette, rules and norms. As the participants mentioned the use of Service A would require from them to redirect their attention to the service itself in unfavourable circumstances at the presence of others. Thus, they have to switch roles and to redirect attention to another activity which is "*not a proper behaviour for professional gatherings*" as the older participants commented. In other words, using Service A makes the user to be in effect absent from the community and its activities and this is incompatible to professional activities. The inappropriateness of this behaviour concerns the fact that 'Service A has to be initiated by the users themselves' compares to the phone calls and sms which can be initiated by others since they are two way communication services.

Social -friends-family

This is not the case when the participants belong in a social community as for example when they are with their friends. In that case they do not care "so much" if they are overhead when talking on the phone or start using Service A as the case is when they are with more formal communities. In these communities the roles are informal and the main influencer comes from the emotional state of the users. Thus it can be concluded that whenever users belong in more informal social communities they are more prone to initiate by themselves the use of Service A. But this is not always the case for these social communities. When users are withdrawn into Service A, those who surround them become effectively absent. For that some users claimed that they try to avoid Service A usage when they are in social groups. This is more a common attitude for older users who spend less time with their social groups due to their professional commitments. The 34 taxi driver argued "*I drive almost 10 hours per day meaning I spend many hours away from home….being with friends or with my family is a very important issue…..I prefer to*

be "there" talking and listening …I don't wish to spend a moment doing anything else like using Service A". Even for younger users the social group identity is of such tremendous importance to them that it prohibits the extensive use of Service A "*for a long time*". As one of the two 16 year old boys argued "*it's not proper to catch up with your friends and use Service A for a long time placing yourself outside of the group…Service A and mobile services are cool to use for a short time ….not all the time*".

5.4.3. Types of interaction

The analysis of the data indicated that the types of interaction the users have with their social environment influence their intention to initiate Service A. The types of interaction that were studied are communication and collaboration.

Communication

In the part of the section that follows the situations in which the participants are having a talk with their friends and use Service A are analysed. In trying to analyse the data that is related to the types of communication I realized that the majority of the cases included synchronous communication mainly between friends. Only one participant, the 38 year old man, referred once to a situation of asynchronous communication where he started using Service A because one of his business partners e-mailed him a request. But according to the interviews, this does not seem to be a common situation.

Trying to analyse the data from the type of communication perspective, the pattern of [negative perception of using Service A for long time] when being within social groups emerged. The participants, mainly the older participants, claimed that they prefer to talk to their friends instead of using Service A since they "*believe that face to face communication is almost always more important than accessing information*". They believe, as they argued, that interrupting a conversation to do something else is a sign of "*bad manners*" and "*annoying attitude*". Especially the female interviewees argued that they are "*annoyed*" when their friends use their mobiles to call or access Service A for "*long periods or too often*" when they are together. They perceive this behaviour as a "*lack of respect*" and they feel that they are less interested for their friends. As they argued they feel that mobile services are often an "*obstacle*" to socializing, which leads to "*isolated*" individuals. The 23 year old girl, a postgraduate student outlined a situation, when it actually occurs "*being with my boyfriend and with my friends for a "short" time is relaxing and important for me …..most of the times we have coffee and talk about our concerns…if we have so much to talk there is no room for Service A*". The 'duration' as well as the 'frequency' of usage of Service A emerged as important factors that could prohibit users to access Service A when with friends.

Of course this was not the case when participants used Service A as a part of their conversations with their friends although they argued that phone calls and texting have the potential to become the "center of interest" of the whole group of the friends than Service A. For example, if an unexpected phone call or text is received then the group of friends may discuss whether they have to answer a call or not and as a teenager girl argued "*whenever a mobile phone rung all the friends stopped talking and looked at its owner*". This does not happen frequently with Service A. Only few times the participants mentioned that the "*Service A became the center of the conversation of the "whole" group*" of friends. The participants reported that they would establish small groups of two to three friends that would talk and use Service A in which other friends would not participate. "*When I have long conversations with friends there are times when I find the topics of no interest. It's a good opportunity within these time slots to start using Service A either by myself or with the one who sits next to me.*" the 24 year old lady, owner of the tourist shop, argued when she was describing a photo she e-mailed to me where she was with her friends in a living-room. Earlier during the focus group sessions, the 27 year old man had said "*even if the whole group run out of topics to talk, Service A seldom becomes the center of the "whole" group discussion….my normal tendency is to start using it with the one who is next to me*..". What happens in these cases is that the separate talk about Service A between two or three friends will separated them from the other group members. In that case the friends who using Service A will cope with two sets of interactions: the information retrieval through Service A itself and with their surroundings, the place where they are, and the people that are are present. According to Gergen (2002), this activity introduces an absent presence in the face-to-face context. This presence-absence in space restructures their sense of belonging to the place and makes them believe that they belong to another social network located in another place. This attitude of forming smaller a group of friends and access Service A is most likely to happen within a group of friends having long conversation sessions in cafeterias or in home. "*It is absolutely certain that if me and my friends will spend half a day together then sometime unavoidably we will start using Service A…it's a normal consequence after we will have nothing new to discuss*" the 18 year old high school student claimed.

What it seems to explain this attitude with Service A has to do with the social norms and the emotional state of the users. More specifically, during socialization with friends, an individual participates in common activities with the group of friends. When the activities with friends "*do not require much involvement*" the user becomes "*uninterested*" and "*bored"*. As mentioned above when the users are among friends then the feelings and emotional state are the main influencers of their decision to access Service A. In these cases and especially when they do not communicate with the other members of the group they might start using Service A most of the time with one or two of the friends.

5.4.4. Cooperation (sitting arrangements)

According to the data collected, cooperative activities between people do not seem to favour the decision to use service A. Only when there is a need for information between groups and there are not other alternatives the Service A might be used by the group to assist cooperation activities. As the participants mentioned, "*booking for an event*", "*looking for a best option to spent the night*" or "*looking for information on flights or ferries and news about the weather*" are some of the most common applications that Service A is being used by them to facilitate cooperation activities.

Trying to identify the space requirements the participants found appropriate for using Service A when they are participating or cooperating in activities the pattern of the personal space and thus the appropriate distance to use Service A emerged once more. As highlighted in Section 5.3, space requirements depend on personal preferences. The participants in this study were polychronic people, very much involved with each other, having thus a small acceptable distance and feeling uncomfortable and "cold" if the distance was too long (Bluedorn, Kalliath, Strube, & Martin, 1999; Conte, Rizzuto, & Steiner, 1999).

The analysis of the data that came out from the observation phase, from the photos the users e-mailed me and from the interviews with the participants in the media elicitation method revealed that as the room scale—its size relative to the occupants— diminished or the noise levels and distractions increased users sat closer together. In these situations they usually chose to sit side by side rather than across to one another. The increase of their proximity in most of the cases, and only when they were with their friends, led them to easily access Service A. The participants admitted that when they are with friends they accept having their personal space violated and are willing to "*share*" their personal space in order to access Service A. The younger participant in the observation phase, as for example the 21 year old boy, claimed that "*it's difficult more than two friends to use service A ….the display of the mobile phone is small enough and its impossible for let's say five or six people to have a visual contact of the content*" and as the 27 year old female consultant complemented " *I don't remember myself sharing Service A with strangers or even acquaintances….I don't feel very comfortable sharing Service A even with my friends, it's the same as reading a book with more than two people, for me it's impossible* ".

5.5. Cultural layer

The cultural layer concerns norms and rules as explicitly mentioned in chapter 2 that govern and characterise every place as shown in Table 16 : Attributes of the Cultural layer

The cultural layer of a place according to Tuan sets out the rules and convections relevant to human behaviour within a place. In the scope of this study, the cultural layer concerns the conventions, social standards and norms that determine what users can or cannot do in the place in terms of using mobile data services, shaping thus their options for activities and emotional predisposition.

Places have meanings, which are based on the beliefs people associate with them. These meanings determine the expectations of human behaviour in a place. According to Prohansky et al. (1970), specific contexts are related to specific roles and thus for each place there is a set of allowed behaviours that corresponds to it. The expectations for proper behaviour are a matter of social conventions, cultural norms, education, and ethnicity. Barker (1968), argued that the social conventions and settings influence behaviour, in other words it's impossible to make predictions about human behaviour unless the context the human is in is known. For example, there are certain behaviours appropriate for the Church, in a store or attending a class. Thus I can conclude that within different contexts people adopt different roles as for example in a store, people assume their roles as customers, in school and church they adopt the behaviour appropriate to the social etiquettes of the place. Of course although places are unique because they are in different geographical and temporal locations they are conceptually connected to other places. It is this connectivity that allows people to know how to behave, for example, in every church the proper behaviour is the same. In other words, the appropriateness of behaviour in a place is related to the behaviour in earlier circumstances, when with proper adaptations made to fit to the new context. I can thus conclude that the behaviour of people in similar environments is quite the same.

Based on the above arguments, during the analysis phase I divided the places into those that the behaviour of people is less restricted for example a cafeteria and those that the behaviour and activities of people are restricted under specific norms as for example a church. Regarding the usage of Service A, the distinction of places is related to the public places where the use of mobile phones is banned or not banned. This distinction guided my research of the cultural layer. Following this distinction I studied the proper behaviours and the usage of Service A in relation to social etiquette and cultural norms that are associated with these places.

I asked participants about their usage behaviour of Service A in places that the participants considered as "heavy" cultural sites such as museums and art galleries that were not considered at all as legitimate places for mobile data services usage and places such as concert halls, theatres, cinemas and classrooms where the use of mobile phones is banned. The interviews indicated that according to the cultural norms of the Greece where the study was conducted, whenever the expectations for proper behaviour are violated, the human behaviour is considered to be out of place. For example, as the participants argued whenever they are confronted with activities that conflict or disagree with the social conventions and cultural norms they "*feel out of place*".

The effect of the cultural norms was also found to vary according to age, as teenagers and young adults were keen to use mobile data services often stretching the limits of social rules and standards to satisfy their "*boredom*" or their "*curiosity*", older adults (late thirties) appeared to be more diligent to "*respect*" the cultural norms of a location, leading to a 'proper framework' of using mobile data services as with any form of 'mobile technology'.

During the focus groups most of the interviewees and especially the youngsters admitted that they leave their mobile phone devices switched on and always carry these devices with them, even when they would not really use them a lot, anywhere irrespectively of the cultural norms of the places. This behaviour comes from the attitude the youngsters have to stay always online with their peers as a 16 year old teenager admitted "*…can't afford having my phone switch off.....the very thought will panic me. What if the other "mates" go out for fun, without being able to get informed to join them"*? But this behaviour is not in accordance with the cultural norm and social standards that characterise places where the use of mobile data services is banned. To illustrate this better a set of examples of places where the use of mobile phones is banned versus places where the use of mobile phones is not banned are compared.

Banned places. Places where the use of mobile phones is banned such as the school or university and the cinema. Both locations are associated with a collective event, the first having to do with education while the later relates to collective entertainment. In both occasions it is considered inappropriate and irrelevant to the location and time to use any of the applications of the Service A. The users are expected firstly to respect the norm of participation in the collective activity and secondly to be focused on what is taking place within the place. As such, mobile data services are discouraged in those settings although, especially the teenagers and young adults deny such social standards and frequently use such services in these places. The young participants argued that they just "*put the mobile phone on silent mode*" when they are in places where the use of mobile phones is banned such as the cinema and in a classroom in order to "*know who is calling*" and who is "*sending text messages*" and thus not to loose the assurance of being in communication at any time. They of course argued that in such places they seldom

answer calls, initiate a phone call or decide to send sms. As the young 19 year old male university student said "… *I always keep my phone on silent in cinemas to know at least who phoned me… off course I don't feel well if I answer the phone in the cinema….I have never done that ……if it'ssomething important I have my phone turned to silent and I can reply by texting...*".

The younger participants argued that they use to have their phones set in silent mode in classrooms. The 16 young high school student, reported looking at the photo he e-mailed to me "*I took the photo during a break between classes. It's my classroom at school. During that class I checked my sms and I sent one to my friend saying that I am bored. I use to do it occasionally but only when the teacher is boring….even this is prohibited, yet I don't feel that I break a very important rule*". As they claimed they often see other students playing and checking their phones during the lessons "*most of the other students check their mobiles for e-mails or reply by sending sms occasionally…it's a common activity when the lesson is not interesting or its difficult to understand the lecture*" as a 19 years girl old argued. But as they claimed although vibrating and checking of their mobile phones is usually observed during classes, this is something that happens for short periods since the users are acting very fast "*I always worry if the teacher sees me when accessing my mobile phone…its fun doing it, it feels like having a quick adventure, but I have to be careful not to use the phone for too long*" the 17 year old teenager said during the interview session.

The focus groups revealed that when the users were in places where the use of mobile phones is banned and had their mobile phones switched on, the majority of the usage consisted of incoming calls and sms as pictorially shown below:

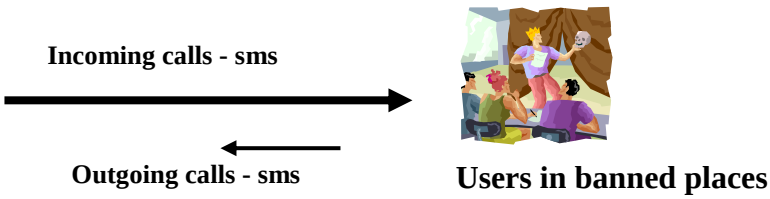

Figure 27 : Usage behaviour of mobile phones in banned places

But the use of mobile data services in places where the use of mobile phones is banned 'seldom' takes place by the older users. It should be mentioned that none of the photos that the older participants in the media elicitation phase e-mailed included a place where the usage of mobile phones was banned. Only the 21 university student e-mailed a photo from his classroom and in that case he took the photo after the class was over.

The older participants argued that they "*never access Service A*" when places where the use of mobile phones is banned because they unconsciously know that using Service A is a time consuming activity and they do not feel nice doing it. Even the older university students claimed that they avoid accessing Service A during classes, because the pressure they feel when using mobile phones would not let them to use Service A easily since this activity takes time to be accomplished. Specifically as a 20 year university student argued "*I don't want to do it...I think that surfing the internet or watching sports during a class even if this is the most boring class ever, it wouldn't make me feel much better. To enjoy Service A I need to feel comfortable and for sure not being under stress. On the other hand using Service A costs money…*"

They also claimed that they never find it so urgent to use Service A when in places where this is forbidden. "*Oh no…I don't find any need to take the risk during classes to have a look at the gossip news…I can afford to wait for a few minutes to access them when I will have a break with my friends in the cafeteria…we can comment on these gossip news and have fun.*." the 23 year old postgraduate student argued. What is happening is that using a phone in a place where its use is banned is not easily 'accepted' by the social environment. The interviews revealed that within these places people are afraid of the criticism if they ignore the strict rules that are attached to the place. A strong pattern that emerged from these data was the [acceptable activity] within a place which plays an important role in the decision to access Service A. Of course this was not the case for youngsters but this had to do with another pattern that emerged from the data which is the [free of norms] attitude the youngsters like to adopt.

Non banned places. On the other hand, places that the use of technology by users is not strictly forbidden as the car, the home when a gathering is taking place and the café are relaxed settings which allow people the necessary freedom to either socialize with friends and acquaintances or be occupied with personal thoughts or activities. In this context using mobile data services is perfectly fine, and in many occasions encouraged especially among the groups of teenagers who are eager to exchange information, jokes or share news. As the 19 year old university student reported checking her mobile phone "*…I prefer to access Service A and have a look at the gossip news when with my friends in the café….It's part of our communication protocol…. its a source of fun…*". Furthermore, the physical settings that in some places allow or constrain social interactions are related with the cultural and social norms that characterize these places. For example, the seating arrangement in the café is socio-petal, in relevance with the cultural norm of the place that assist the interaction between people compared with cinemas where the layout is socio-fugal and the etiquette require people to be quiet so they can watch the movie something that prohibits social interaction. "*The display of my mobile phone is small and me and my friends have to come closer when we try to use the Service A together, something that happens very seldom. That's why we need to seat and move comfortably and move around easily*" the 21 year old

university student argued during the focus groups sessions, in agreement with few other young participants who claimed that "*we need to feel comfortable in order to easily start altogether accessing Service A and watch the sports news…we can't do that while in the classroom waiting for the lecturer to come sitting far from each other…. when we have coffee we feel that using Service A is an easy action to do*".

What seems to happen in places where the use of mobile phones is not banned and the users easily access mobile data services is that these places are characterised by the [free of standards] cultural norms which plays a catalytic role in the decision to initiate a mobile service. If these places are accompanied by enabling settings as for example the appropriate sitting arrangements then the possibility for a user to initiate mobile data services is high enough.

5.6. Chapter Summary

The findings that resulted from the analysis revealed that the factors of the space layer play a vital role in the decision of the users to initiate Service A. Within this section we have learned that time is a relative factor and it depends on the user's perception of the stretching and availability of time. Indoor, secure areas are the most preferred ones for users to use Service A. Also, the environmental conditions should be normal for high usage rates of Service A as well as the existence of certain objects, concepts and their arrangements in spaces which will influence the decision to use Service A. These findings are presented below:

Table 43 : Spatial patterns that influence usage of Service A

1 . Space layer		
Factors	**Attributes**	**Emerging patterns which can influence the decision to use Service A**
Time factor	Time zones and dates	*Noon and early afternoon / All day during leisure time*
	Duration of stay	*Long stay within the place*
	Availability of time	*TTU < TAP*
	Emerging pattern : Perception that time is stretching can influence the decision to access mobile data service	
Location factor	Areas - *Kind of areas* - *Relation of areas*	*-Home/entertainment venues/visiting friends/Vacation Areas* *-No identifiable influence but any area that provides relax, security, stability, privacy*
	Move activity *-Connectivity and distance between areas (Path)* *- Indoors Versus Outdoors (near / far away)*	*-No identifiable influence* *-Indoors preferred*
Objects' factor	Real physical objects	*Movable objects to provide personal space and sense of privacy and comfort as tables and chairs*
	Concepts	*Perceive the network in this area as fast and dependable*
	Arrangements of objects	*Objects should be arranged in such a way to allow users create secure and private territories as the sitting arrangements*
	Availability of "objects" and alternatives for other activities	*- limited sightseeing,* *- limited ICT technologies to use,* *- limited sources of information,* *- limited social interaction*
Environmental conditions' factor	Lighting – Noise – weather conditions	*Normal environmental conditions*

The findings of the analysis phase also suggest that specific demographic attributes such as younger male users coming from medium and upper socioeconomic classes being sufficiently familiar with the use of information communication technologies and with Service A, influence positively the usage behaviour of Service A within

places. Of course the familiarity of the participants with Service A is an attribute that may influence the decision of the users to use Service A when within different places.

Furthermore, the familiarity and comfort the users feel when they are within friendly areas, expressed in this study as the emotional and functional attachment to a place, is a pattern that positively influences the use of Service A. Boredom on the other hand is an emotional attribute which makes users more prone to use Service A. The activities the users are involved in may trigger usage of Service A. More specifically, low mobility activities where the users are sitting or standing or laying are more possible to influence positively the usage of Service A. Also, since the usage of Service A is a sub-activity between other primary activities it is more probable for this service to be used when the user is involved in activities that permit other sub-activities to happen as for example when the user is involved in socializing activities with friends and not in professional activities. Furthermore, the longer each activity is lasting the more possible other sub-activities to be happening as for example the use of Service A. Finally, according to the findings, the "expectations" attribute was found to play an important role in the decision to use Service A. Following the above analysis I briefly present the findings within the simplified personal layer model as shown in following Table.

Table 44 : Personal patterns that influence usage of Service A

2 . Personal layer		
Factors	Attributes	Emerging patterns which can influence the decision to use Service A
User's attributes	Demographics	*Young, male, middle to upper social status*
	ICT culture	*Familiar with ICT technologies*
Place attachment	Emotional attachment	*Familiar places. Repetitive visits*
	Functional attachment	*Places that provide the feeling of comfort*
Emotional status	Past experiences, beliefs, emotions, attitudes and feelings	*Known places. Positive emotions and memories from these places. Routine activities within these places*
	Expectations	*Places don't meet users' expectations*
	Real facts **(**present emotions, attitudes, feelings, beliefs, mood**)**	*Emotion of boredom, feeling comfortable*
Activity	Type of Activity	*Usage irrelevant to the activity (working, relaxing, socializing, attending). The activity should allow sub-activities*
	Timeframe	*Preferred long time activities*
	Sub-activities	*Usage of service A is perceived as a sub-activity. It can be influenced and initiated by other sub-activities as for example having a coffee.*
	Mobility status	*Low mobility activity (sitting, laying, standing, waiting).*

According to the analysis, the social roles adopted by the users, the social groups they are participating and the duration of the communication processes affect their propensity to use mobile data services.

More specifically, the informal roles adopted by the users when in public places and the participation in social groups seem to influence positively the spontaneous use of Service A. When the users belong to organizational groups and have adopted formal roles, a call from someone else usually triggers the usage of Service A and always within breaks.

Also, the participation in long conversations sometimes might bore users or find it of no interest thus they would easily start using Service A. This happens frequently when they are with their friends but is not frequently observed when they are among business groups or with simple acquaintances whose formal roles seem to prohibit them from using mobile data services. The informality of their roles makes it easier for their feelings and emotions to influence their decisions.

Other patterns that have been highlighted by the analysis and influence usage are the proximity of the users as well as the sitting arrangements within the place. These patterns enable better cooperation and when necessary this cooperation triggers usage of service A. The main points of the findings are shown below:

Table 45 : Social patterns that influence usage of Service A

Social layer		
Factors	**Attributes**	Emerging patterns which can influence the decision to use Service A
Roles of the user	**Formal Roles**	*Service A can be initiated mainly after requests and always between breaks*
	Informal Roles	*Service A can be easily initiated anytime within group of friends and, between family members. Emotions play protagonistic role.*
Interaction status	**Communication** - Synchronous versus asynchronous communication - Formal versus informal interactions	*-Long time synchronous communication is most probably to trigger usage* *-Service A can be initiated easier within informal interactions or between formal activities.*
	Cooperating - Working activities versus social activities	*Social activities may trigger usage of Service A while the sitting arrangements may accommodate usage within cooperating activities*
Communities	**Functional/Organizational / Social**	*Among peers , where the users feel comfortable*

When the users are in places where the use of mobile services is restricted or banned then they would avoid accessing it frequently. Sporadic usage patterns were reported mainly by youngsters. Whenever the cultural and social norms of a place allow mobile services use or are less strict and there are appropriate settings in this area then the use is increased. The confidence that they do an 'accepted' activity makes users feel 'free' and happy to access such services. Above all, users need to feel free to use mobile data services. They need to feel that using mobile services is an acceptable activity. If this is not clear they avoid using it frequently. The main patterns that initiate usage of Service A influenced by cultural layer are shown below:

Table 46 : Cultural patterns that influence usage of Service A

Cultural layer		
Factors	Attributes	Emerging patterns which can influence the decision to use Service A
Norms and rules	Banned versus non banned public places	Usage is facilitated within places where the cultural norms allow users to feel free of standards and rules and consider usage as an acceptable activity.

6. Discussion of the findings

6.1. Introduction

A discussion of the key aspects, of the findings and the patterns of this research that came out of the analysis chapter is presented in this chapter. Potential explanations of the findings are provided introducing either new theory where needed or linking back to theoretical framework in chapter 2.The chapter concludes with the "Results and Reflections" section where it was made clear what has been learnt about place and how useful the theoretical frameworks of Tuan and Brahms have proven to be in the study of usage behaviour of mobile data services within every day environments.

6.2. Discussion of the findings and results of the Research

The main results of this research are summarized and discussed below.

According to the analysis that was conducted in chapter 5, the perception of the users regarding Service A and the characteristics of their usage behaviour are presented in brief below. According to this analysis, the most favourite applications that the Service A provides depend on the users' age. All age groups frequently use mobile phone as a calendar and address book and also for calling and sending sms. Younger users mainly perceive Service A as an entertainment and communication tool and thus they prefer to download realtones, welcome tones, mp3, photos, videos and games. They like to download files and have a rich in content mobile phone because, as they claimed, they usually exchange files via bluetooth with their friends. They also like to send MMS and emails, they like to kill their time playing java games or listening to mp3 and they also like to personalize their mobile phones with wallpapers and real-tones.

Older adults, as they claimed, do not use technology as a main part of their communication process with their social environment. For example, no one over 30 ever mentioned the use of a mobile phone to exchange downloadable files (real-tones or games) with friends. Those over 25 reported that they prefer to use service A mainly as an entertainment guide, to check e-mails and access news sites for gossip, sports and cultural issues. Among the least common uses is the online book services and for accessing online transactional services to have financial activities.

Participants generally like the idea of consuming multimedia content on their phone. Of course they claimed that this content has to be inexpensive since the cost of their mobile communication is a concern to them. The participants also claimed that they were interested in having content and applications that would be comparably short and fast. The relevant findings revealed that users perceive mobile data services as time consuming services where they have to spend effort and time to access information. Users need at least "few minutes time" and "private space" in order to use the services un-interrupted. Thus during the daily life of individuals the environments that are considered as suitable to use service A are not as many as it is believed. The participants perceive Service A as a service that can be used mainly to retrieve information and entertain them. That's why music, mp3 downloading, java games and radio services are popular options especially among the younger participants.

The participants claimed that amongst the information services they prefer those sites that provide news and gossip. News fits with the concept of mobility because of its brevity, it appeals to peoples' desire to be up-to-date, and its relevance to be mobile in the form of traffic news. But although they like the idea of having news

and data at any place and anytime, most of the professional users claimed that the information available from Service A is not useful for their day-to-day activities.

The participants also argued that Service A provides them with few applications that they really need during their daily life. For example, they mentioned they might like services related to the management of an emergency situation or services that allow them to manage and participate in social events. Especially younger respondents mentioned that their mobile handsets and the mobile data services are part of their socializing activities. But they clarified that they use mobile phones to facilitate their communication activities with their friends and not their social life through them as for example using mobile dating services.

Finally, the participants made it clear that the low quality service they have experienced from Service A, the slow connections, the poor menu options and quality of graphics, as well as the high cost prevent them from using their mobile device for financial transactions as for example when booking a hotel or a flight. The perception they have for Service A, would lead them easily to choose competitive services and products when they have available alternative options.

The way participants perceive Service A, as one of low quality, expensive, slow and poor in content substitute of internet, allowed me to better analyse and understand their behaviour when in different places as well as the influence of place regarding their decision to use Service A.

The study of the role of place started with the identification of the materials of place or in other words the variables that construct the "DNA" of the place. I based the study upon Tuan's theory, the Brahms model and the model of place that I constructed in Chapter 2. The analysis of the collected data allowed me to identify which variables (factors and attributes) of place, mainly influence the usage process of mobile data services.

The primary motivation driving this study is the identification of the role of place in the usage process of mobile data services. The analysis of the collected data indicates that the influence of the place in the usage process seems to be well-founded because although the research methods I applied (focus groups, interviews, observation and media elicitation method) were different in nature they brought into light similar findings. For example, the focus groups revealed that all the participants had calls or had exchanged sms as well as used Service A to send MMS or to check e-mails and news while waiting in their vehicles. The photos of the media elicitation method, accompanied by the interviews and supported by the observation method showed that the respondents usually have a place in their home where they prefer to be when bored and from there accessing service A or having calls. The same methods revealed the tendency of the participants in public places to create boundaries between themselves and others who were present whenever they used Service A.

It was quite clear from the field research that the use of the mobile phone to make a call to send an MMS or access mobile data services was related to functional as well as emotional aspects. During the focus groups as well as the interviews, I tried to extract more in depth information as for example the emotions, perceptions and needs concerning Service A of the respondents. Hence, I asked them to describe their feelings about their mobile phone as a tool that allows them to access Service A and to recall an instance when they had forgotten or lost their mobile phone and thus they were unable to access mobile services. The participants responded by using mainly emotional terms. They associated fear and anxiety to the loss of their mobile phone and fun and happiness when they referred to everyday use of their mobile phone. As a 16 year old boy stated "*I spend hours having fun with my mobile phone*.." or as a 19 year old girl replied "how *do I feel imaging that I lost my mobile phone? ...scary!!!! I feel like losing my world, my friends my social life*.". Focus groups revealed that mobile phones provide not only functional (talk and texting) as well as emotional (freedom, fun and control) values to their users but assist them to strengthen the existing relationships with colleagues, family and friends. These groups revealed that participants have an 'emotional' attachment to their mobile phone devices. More specifically, they were not attached to the device itself but rather to what this device enables them to do.

The activity theory (Engestrom, 1999; Kaenampornpan and O'Neill, 2004), could further explain this emotional attachment the users have to their mobile phones. In nature, an activity is typically unmediated if it involves a direct action between the subject and object. For example, picking an apple and eating it is a simple, unmediated activity. But people would usually mediate their activity by employing artefacts. For example, a software developer would use Java[90] software to develop an application, a teacher would use speech and books to teach students and an individual would use a mobile phone to access mobile data services to entertain and inform him. The reason that mobile phone devices are used as mediating objects between users and their social environment, entertainment and information, could explain the strong emotional and functional relation between users and their mobile phone devices. As all of the participants argued, they "*need their phones and Service A to access information and to be in continuous contact with their business, family and friends*", meaning that they associated information and communication with a technical device and the mobile data services this device provides. Furthermore, participants argued that sometimes they depend on their mobile device since they use it as a means to give information and store the phone numbers for their social contacts and diary dates.

What seems to be happening is that the participants want to be always 'connected' and available to share news and thoughts with friends/partners and to access information. This characteristic, according to the literature review, Chapter 2,

[90] http://java.sun.com/

reveals a deeper need that humans have to overcome the physical barriers of the physical environment. The participants claimed that being able to live in the same rhythm is of the greatest importance to them since it provides a feeling of a continuously shared life with their social environment, allowing every relationship to be continually present in every place.

Since the participants are able to communicate at anytime and anywhere with other people and to access any type of data they wish for, they seem to experience a "belief" that they can be everywhere or at least where the communication networks exist. These mobile networked environments give participants the feeling of power to control their social lives and balance disparities such as more working hours, less social life, parent away from children, more demanding jobs and traffic jams. These technologies according to the participants allow them to shift between different roles, to participate in/with different groups, to keep their working/social life balance, to keep their lives logistics irrespective of physical constraints. This is feasible because communication, data and information flow without constraints within these mobile networked environments as shown in the following figure.

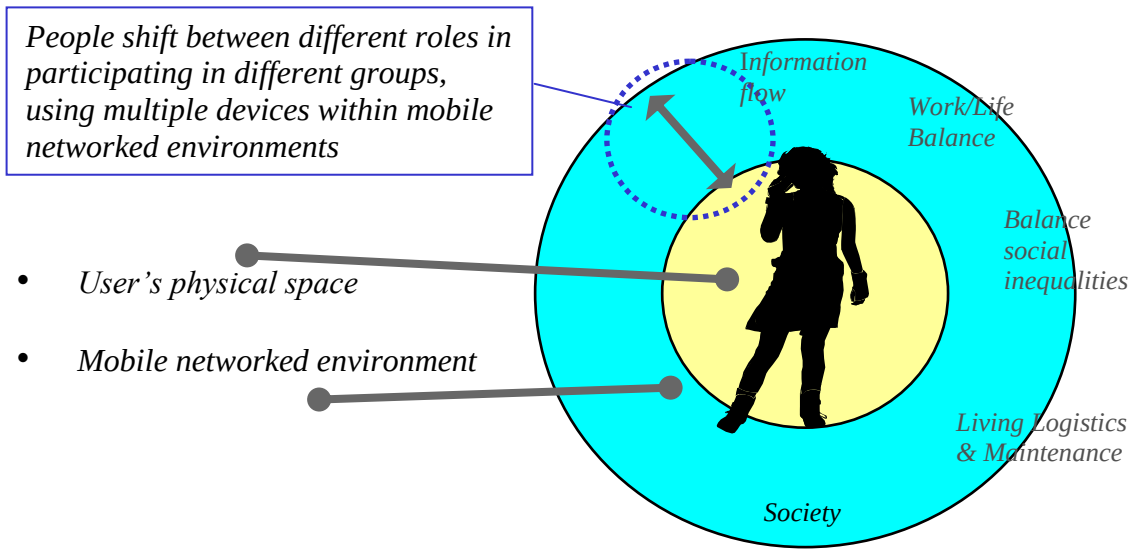

Figure 28 : Communication and information flow within mobile networked environments.

A virtual representation of these mobile networked environments where the physical meaning of time and space are diminishing is presented in the promotional videos[91] of Docomo's vision for 201X. I believe that the above attributes should be considered by the marketing professionals when they consider the development of new applications and services as being a crucial factor.

[91] http://www.nttdocomo.co.jp/english/corporate/future/hokusai/index.html

The emotional connection the users have with their mobile phones partly influences the decision of users to use mobile data services. The decision by a user to access mobile data services also concerns the relation of the users with their surrounding environment as the findings of this research indicated. In other words, this decision is not just a personal process of the user but it is influenced and triggered by the interaction of the user with the external environment. This external environment is represented in this study by the model of place which consists of the Tuan's layers of place, the factors and the attributes whose influence in the usage behaviour is discussed below.

The findings of the analysis in Chapter 5 are summarized and presented in the place model table as shown below:

Table 47 : Emerging patterns that positively influence the decision to use Service A related with the place's factors and attributes.

(The findings concern the mobile data services' usage behaviour)		
1. Space layer		
Factors	**Attributes**	**Emerging patterns which can influence the decision to use Service A**
Time factor	Time zones and dates	*Noon and early afternoon / All day during leisure time*
	Duration of stay	*Long stay within the place*
	Availability of time	*TTU < TAP*
	Emerging pattern : Perception that time is stretching can influence the decision to access mobile data service	
Location factor	Areas *- Kind of areas* *- Relation of areas*	*-Home/entertainment venues/visiting friends/Vacation Areas* *-No identifiable influence but any area that provides relax, security, stability, privacy*
	Move activity: *-Connectivity and distance between areas (Path)* *- Indoors Versus Outdoors (near / far away)*	*-No identifiable influence* *-Indoors preferred*
Objects' factor	Real physical objects	*Movable objects to provide personal space and sense of privacy and comfort as tables and chairs*
	Concepts	*Perceive the network in this area as fast and dependable*
	Arrangements of objects	*Objects should be arranged in such a way*

		to allow users create secure and private territories as the sitting arrangements
	Availability of "objects" and alternatives for other activities	*- limited sightseeing,* *- limited ICT technologies to use,* *- limited sources of information,* *- limited social interaction*
Environmental conditions' factor	Lighting – Noise – weather conditions	*Normal environmental conditions*
2. Personal layer		
User's attributes	Demographics	*Young, male, middle to upper social status*
	ICT culture	*Familiar with ICT technologies*
Place attachment	Emotional attachment	*Familiar places. Repetitive visits*
	Functional attachment	*Places that provide the feeling of comfort*
Emotional status	Past experiences, beliefs, emotions, attitudes and feelings	*Known places. Positive emotions and memories from these places. Routine activities within these places*
	Expectations	*Places don't meet users' expectations*
	Real facts **(**present emotions, attitudes, feelings, beliefs, mood**)**	*Emotion of boredom, feeling comfortable*
Activity	Type of Activity	*Usage irrelevant to the activity (working, relaxing, socializing, attending). The activity should allow sub-activities*
	Timeframe	*Preferred long time activities*
	Sub-activities	*Usage of service A is perceived as a sub-activity. It can be influenced and initiated by other sub-activities as for example having a coffee.*
	Mobility status	*Low mobility activity (sitting, laying, standing, waiting).*
3. Social layer		
Factors	**Attributes**	
Roles of the user	**Formal Roles**	*Service A can be initiated mainly after requests and always between breaks*
	Informal Roles	*Service A can be easily initiated anytime within group of friends and, between family members. Emotions play a protagonistic role.*
Interaction status	**Communication** - Synchronous versus asynchronous communication - Formal versus informal interactions	*-Long time synchronous communication is most probably to trigger usage* *-Service A can be initiated easier within informal interactions or between formal activities.*
	Cooperating - Working activities versus social activities	*Social activities may trigger usage of Service A while the sitting arrangements*

		may accommodate usage within cooperating activities
Communities	**Functional/Organizational / Social**	*Among peers , where the users feel comfortable*
4. Cultural layer		
Norms and rules	**Banned versus non banned public places**	*Usage is facilitated within places where the cultural norms allow users to feel free of standards and rules and consider usage as an acceptable activity.*

The model of place that was developed describes and relates key elements that influence human activity in terms of usage of mobile data services. However, although it tries to provide a model of place, to cover all possible factors and attributes in a wireless networking computing world the process is not a simple one. Further work is required to develop a more complete place model that can be used as a framework to interpret the context of user behaviour in a ubiquitous technological world.

In the following sections, I discuss the findings generated from the analysis in chapter 5 and I discuss to what extent the research questions outlined in this thesis were answered.

6.2.1. Space Layer

Mobile technologies and services lead to the places that users experience in their daily lives, by increasing our interest for the locations and the environments where interaction occurs. The argument posed by this study is that space matters and limits the options people have to use mobile data services which are lower than the options the users have to have a call or text a message.

Thus let me answer the first research sub-question of the study: *which spatial factors and attributes mainly affect the user's decision to use mobile data services?*

The findings revealed that the rates of use as well as the types of applications used by the participants are influenced by the factors of location, time, objects and environmental conditions.

Starting with the **location** factor, there was strong evidence in this research to support the premise that the location of the users and the built environment have an impact upon the behaviour of users of mobile data services and that the basic situational responses of the users are subject to the environmental conditions of the location. For example, when in holidays or in private spaces the users prefer mainly to use Service A as a tool for having fun, to obtain information and communicate

(the participants mentioned heavy use of MMS during summer holidays), while when they are in public areas the Service A is being used either as an escape tool between idle time or to assist interaction when with friends.

A possible explanation of this is that in rural locations, Service A usage becomes more important as a core communication vehicle, establishing a sense of "emotional security" for users. This increased usage of mobile data services satisfies the increased demand of users to remain connected with their social environment when away from the city which according to Dan Schiller (2005), is socially created due to societies' need for constant connectivity. As a user stated " *…when on holidays I need to contact friends more often using multimedia messages…I feel they are away from me and I try to show them what I see…".*

Also, "Holiday / leisure" places are away from the urban centers offering fewer options to their residents for information and entertainment thus limited possibilities for other activities or access to other entertainment sources such as internet. In these environments the competitors of mobile data services and thus the choices for information are fewer. As the 20 year old university student said when I showed her the photo from a rural area she has e-mailed to me "*this is the village I come from, 3 hour's drive from Athens and at an altitude of 2000 m on the top of a mountain. My grandfather lives there and we visit him time to time. There is no ADSL connection, no leisure areas just a TV set. As you can see there is not so much to do. Thank God there is wireless connection and in these cases Service A becomes a good friend*….". In these remote communities mobile data services such as the Service A enable users to remain in touch with their social network mainly via MMS and e-mail and with the "central sources" of shared news and entertainment increasing their importance and usage.

Also, the findings reveal heavy use of mobile data services when users are in indoor public places like public transport, bars, cafés or restaurants. According to chapter 4, Service A is mostly related with the search of information and the selection among alternative information sources. As such, it requires a degree of concentration that sets out the need for an indoors, rather relaxed and pressure free environment and situation. Being in a physical space which allows for sitting and some degree of privacy was the prerequisite for all users in order to feel they are able to focus on the mobile data services related information attained or exchanged. Within such environments the users are influenced by different types of landscapes (forest, park, water, sea and mountain) and for that they show relaxed feelings. This conclusion is advocated by the study of Chang (2004), who claims that different landscapes influence psycho-physiological reactions and more specific sights of nature (mountains, sea, forests etc) resulted in relaxed feelings.

The findings of the study provided a possible explanation according to which these places conform to the social rules and cultural norms as these described in the relevant sections of the analysis chapter (Chapter 5). For example, since users try to

avoid being overheard when indoors they prefer to apply activities with minimum sound level such as texting or using other applications of Service A.

The findings also revealed that although mobile data services can be used anywhere and at anytime the users would require locations that they perceive as secure before decide to use any application of Service A. Following this argument it could be concluded that during daily activities there are fewer options of "suitable" locations to use mobile data services than just to have a call or to text. Although users can themselves initiate the access to mobile data services at anytime and anywhere, the perception that Service A is a time consuming activity and the fact that they usually are busy and have no time to stand or sit lead them to avoid using Service A during their daily activities when in public places. On the other hand, whenever users are having a rest or being in vacations, they perceive that time is stretching making them believe that they have enough time to use mobile data services. During these moments the possibility to access Service A increases.

Time as such is a crucially important factor of the space layer because it includes not just current time but also past time (that contributes a history element to the context) since it represents the memories, and past experiences (users perceive Service A as a time consuming activity) as well as future time (that allows for the anticipation of users' actions from the current place). The study also highlighted the importance of the time slots when users have a rest and are relaxing and then it is more possible to use mobile data services. It was also evident from the interviews that during these periods users' activities are slower and last longer. What seems to be happening is that users perceive time as running slower since they are in a fun, relaxed and entertaining status; they are not in a hurry and have no anxiety. Within these time periods, there are not many other activities to be done and thus the possibility to use service A is higher since they perceive service A as a tool which is nice to have and which can offer them fun, communication and information.

Analysing the transcripts I tried to "measure" and identify the duration of the broader activity of the users whenever an event was in progress (use of Service A). As analysed in 5.3.4 the usage of Service A is classified as a sub-activity within a primary activity. For example, while the user is having coffee with friends (primary activity) he/she access Service A (sub-activity). The users mentioned that they prefer to use Service A whenever they are involved in primary activities that provide them with "*plenty of time*". More specifically, as mentioned above, the study highlighted the importance of the primary activities where users "*have a rest*" in their decision to access Service A. So I can conclude that the usage of Service A is preferred when the users "perceive" that they have a long stay within a place.

I also tried to identify when exactly they would rather use Service A during their primary activity, in the beginning, in the middle or at the end of this activity. The data did not show any specific preference of the users. But it became clear from the interviews that the users need availability of time before they decide to use Service A. As they mentioned they do not like to "*feel pressure*" when they use Service A.

The fact that the phrase "*I believe I had enough time at my disposal*" was used by most of the users when they were asked to recall the duration of their primary activities whenever an event (use of Service A) was taking place together with the conceptual codes of [feeling pressure], [plenty of time], [spend time to entertain], [feel not guilty to do nothing] that came out of the texts generated two important patterns. These patterns are the "perception of time" and the "available time" and were found to influence the emotional status of the users before using Service A.

The [time perception] pattern describes not the physical time itself but the perceived temporal relations as these are understood by humans. Perception is a process by which real facts about the world are (sometimes inaccurately) interpreted by humans, leading them to act according to these inaccurate interpretations. Thus the [perception of time] as this is being interpreted by users influences their decision to access Service A.

The [available time] pattern describes the time period the users believe they have in their disposal to do an activity. The perception of the available time the users feel they have in their disposal make them feel more or less under pressure when they decide to accomplish an activity.

The insight to be gained from the literature related to the subjectivity of time perception could give us a link between the pattern of perception of availability of time and the relaxed environments where usage rates are increased. People perceive time as something live since they perceive it to pass either faster or slower as for example time appears to be faster as one gets older. Also, certain drugs, Mathew et al. (1998), seem to make the external world to be running faster or slower or that people speak of "time flying" when they are enjoying themselves. Different people judge durations of time quite differently since culture and age contribute to the perception of time (Piaget, 1969; Whorf & Carroll, 1997). This subjectivity of time perception influences the stretching of time that people perceive during periods of leisure although after the end of this period they think that it lasted shorter. The post-hoc estimation of how long events have lasted is influenced by the amount of information that these events have generated. For example, sitting in a waiting room where not much is happening makes us feel that time is passing slowly, but looking back at it, we perceive this period as been shorter since it did not contain much information, events and happenings. This could be the explanation of why elderly people feel that days last longer, but the years flash by. They have less to do during daily life paying more attention to the passing of time and feeling that the time is stretched. But afterwards at the end of

the day their brains have not processed many events and happenings and so they think that time passed quickly.

A debate is in progress among different schools of theorists about the objectivity of time (Oaklander & Smith, 1994; Mellor, 1998). Tensed theorists argue that the passing of time is an objective fact while tenseless theorists argue that objectivity concerns the relation of precedence and simultaneity between events. In any case, according to James' (1999) argument, we are constantly aware of certain duration (dt ->0) within which all events that occur within this interval are experienced as present. Thus people do not perceive time as such, but the changes or events that occur in time and their temporal relations. The aspects of our experience of time include: (i) duration (ii) non-simultaneity (iii) order (iv) past and present and (v) change, including the passage of time (Poppel, 1978). According to Mundle (1966), what we are measuring when we measure the duration of an event or interval of time is in the memory. It is some feature of our memory of the event that allows us to form a belief regarding its duration due to the "time memory" model of (Friedman, 1990). A contrasting model is the "inference model", according to which we do not remember the event as such but we make inferences about relations between the event in question and other events (Kandel, 2006). Previous studies (Kuriyama et al, 2003), suggest that various psycho-physiological attributes have influences on human time perception. Psychological time depends on the time of day, the sun, the seasons, our current thoughts and actions, body temperature and mood are simply not synchronized with clock time, as manifested by wrist-watches, timetables, and appointments. Now researchers are beginning to understand the reasons for these subjective distortions of time. Biologists, Caroline (2006), divide our timekeeping abilities into three domains, one of which is "interval timing" through which we consciously perceive the passage of time. When the senses receive different stimuli associated with a single event (e.g. watching and listening to the TV), the brain asks "when" (time), "where" (space), "what" (identity), and "why" (Gelder, 2000). Based on these signals, a series of pulses are produced by an internal "pacemaker"; these pulses are collated, counted and then compared to stored representations in order to allow the brain to judge duration and produce time estimations (Gibbon, 1977).

Recently, parts of the brain have been singled out as specialising in timekeeping. A study by Livesey (2006), revealed that when non-demanding activities are associated with time perception, three small regions in the brain are active, while another study (reference) claimed that there are critical areas in the brain, the basal ganglia and the parietal lobe, for this time-keeping system. But the basal ganglia have nerve cells that primarily contain the neurotransmitter, dopamine, whose influence on temporal processing is also well established (Meck, 1996). Increasing levels of dopamine leads to a speeding up of subjective time and decreasing dopamine leads to a slowing down of subjective time (Koch, Oliveri, Carlesimo, & Caltagirone, 2002). Patients with Parkinson's disease for example, (Lewis & Miall, 2006) have an abnormal reduction in dopamine in the basal ganglia and commonly

experience problems with time perception, as do schizophrenics who have too much dopamine activity in the brain and whose clock is so fast that it feels like the whole world is insane. So the normal levels of dopamine produced are responsible for maintaining normal affective tone and mood, while unusually low dopamine levels, for example when less active or when taking sedatives, may result in boredom and some forms of depression. If we increase dopamine levels, for example by taking stimulants or giving rewards to certain stimuli we produce mood elevation and euphoria reducing depression, anxiety, anger and boredom (Blakeslee, 2002). Of course we can increase dopamine naturally by increasing pleasurable activity or increasing exercise.

Combining the findings with the theories, I could argue that users in relaxed environments as for example during holidays, away from the hectic pace of the daily life may loose a sense of actual time. During these periods as the participants mentioned they feel "*cool*" and "*relax*", not much is happening and they have a feeling that time passes slower or in other words the time stretches. What seems to happen is that users "perceive time" to run slower since they are in a fun/relax/entertainment state, they are not in a hurry and have no anxiety. More specifically, the absence of stimuli, the relaxed environment and the isolation that users experience, lead them to subconsciously pay attention to the passing of time, checking on their interval-timing system (Meck, 1996), affecting their perception of time and leading them to the belief that time has passed slowly. This situation is advocated by the argument that in relaxed situations the dopamine level is lower and thus older people have declining dopamine levels in certain regions of the brain as compared with youngsters, altering temporal judgment and making time pass slower.

Within these periods, there are not many other activities to be done and thus the possibility to use Service A is higher since they perceive Service A as a communication/ information/ fun/ game tool which is nice to have. The duration of stay within spaces, where user access Service A, is most of the times long enough to have the necessary time to execute the usage process. The user perceives that there is enough available time before leaving the place and thus he/she decide to start using Service A.

But the perception that time stretches and that that there is available time at the disposal of the users to perform an activity are influenced by another pattern that came out from the data. The pattern of the [response time] describes the perception the users have for the quality, sustainability and speed of Service A. More specifically, users of Service A are engaged in time-consuming activities for which the issue is how well the system is proceeding with tasks that may vary in response time from instantaneous to several minutes. Mobile data services' "response time" defines how rapidly the service should respond to requests. This time depends, among other things, on the download speed and the quality of the network. Let me now describe a situation where the user tries to order flowers using Service A.

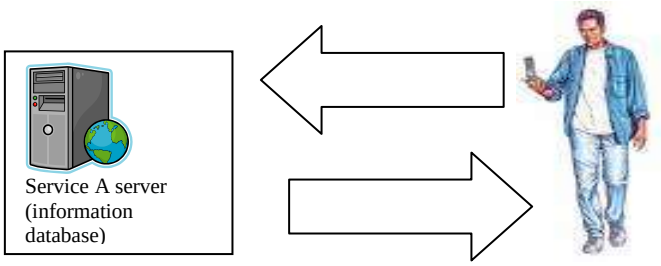

Figure 29 : User retrieves Service A platform

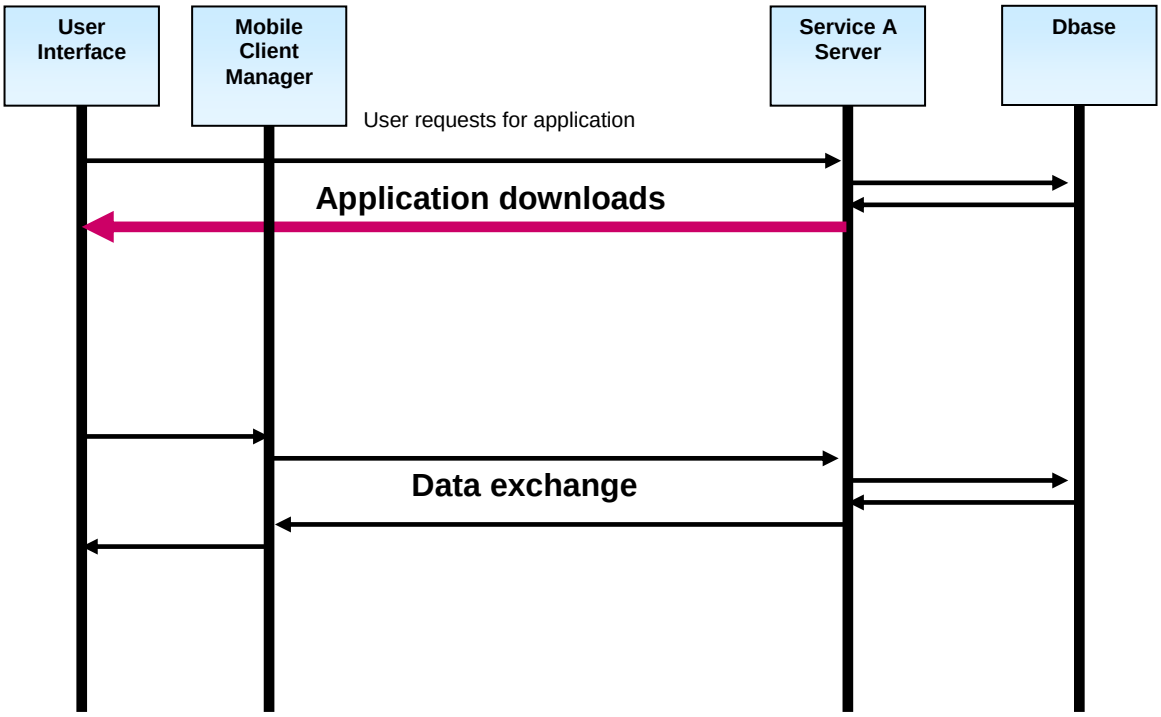

Figure 30 : Sequence of processes when user access Service A to retrieve data

The user accesses Service A to determine the availability of certain products and to request further information, spending considerable time "surfing the Service A menu". Once the user arrives at the menu for ordering information, he reads about the desired products, deals with a set of requests and fills out fields of personal data such as name and home address. It should be noted that the Service A interface is user-friendly, displaying many of the reasons for time delay and status information as they occur. However, the main issue is that the user experiences time delay. I could define the total time from the moment the user decides to use Service A until the time he completes his task and gets the information, as TTU (Time To Use). TTU is simply the time period between a request and the completion of the request and it relates to the reduced system latency which is the time that users wait for the

system. If the user wishes to order flowers via mobile phone, TTU is the time needed for the purchase to be completed. TTU consists of periods during which nothing appears to be happening even though the task may be proceeding normally and of periods when the task seems to be proceeding normally and there is no reason for concern. Since TTU for a service does not have a constant value because of the different characteristics of the network (as for example the heavy traffic or the errors and retransmissions), what matters is how users perceive this time period. The study revealed that users of Service A, on the basis of their experience, perceive this service as causing "*time delay*" in contrast with calls and SMS which they consider as "*quite fast*" processes.

Service A of course includes applications such as m-banking and m-commerce, which are perceived by the majority of users as time-consuming activities, and some other applications, for example checking e-mails, which are perceived mainly by younger users as "*fairly simple*" and "*speedy*" processes. Quite often participants argued that *"I need at least 3-4 minutes to access enough of the applications of service A*". Users *know* that accessing Service A may take a while and that there is a possibility, based on the quality of the network, of longer delays which can cause dysfunctional behaviour. Therefore users in their minds classify the use of Service A as a time-consuming action. But the main point is how much response time the users consider acceptable for their request. In other words, how much time users are willing to spend from the moment they decide to use Service A and start the process until the moment they finally receive the information.

I define as TAP the "Time Affordance Period" which is the time period users will allow before deciding that a task is too time-consuming for the situation they are in. The time affordance period is both individual and context sensitive and I could argue, based upon the participants' arguments, that it can be affected by the sensitivity or urgency of the situation, the location of the user at that time, individual differences and by familiarity with the use of ICT. Individuals have different TAP's because they have different levels of patience, different cultures and different expectations of the problems they might encounter. Based on the findings, it can be argued that when the TTU exceeds the TAP, particularly in emergency situations when users sense a lack of time and feel under pressure, they will not initiate Service A at all. Even if the user is receiving important information, unexpected delays that exceed his expectations of the scope of the task will make him terminate the task. It is important for mobile services to provide short TTUs, enabling users to observe the progress of their tasks.

It should be noted that the above ideas in relation to which time is presented as the indicator of the information-seeking process and the time affordance and the response time models were based on Norman's concepts (Norman, 1988), as well on Schneiderman, Geist et al., Gaver and Savolainen work (Schneiderman, 1985; Geist, Allen, & Nowaczyk, 1987; Gaver, 1991; Savolainen, 2005). Thus I can conclude that within urban settings, at inconvenient locations and because we are

busy and have no time to sit back and relax; our TAPs are mostly shorter or believed to be shorter than the TTU of the Service A. In rural areas during holidays users perceive that time advances at a slower pace leading them to believe that they have enough time to use any mobile data service; in other words, they perceive that TTUs are much shorter than TAPs, leading to an increase in their usage.

Combining the findings that concern location and time factors the argument of the study is that within urban daily settings, users have to deal with inconvenient times and locations since they are busy and have no time to stand, sit and relax. Within these locations and busy times their TAPs are most of the times shorter or perceived as been shorter than the TTU of the Service A. On the other hand, within rural areas, during vacations time, users perceive that time stretches making them believe that they have enough time to use any mobile data service, in other words they perceive that TTUs are much shorter than TAP leading to usage increase.

Concerning the "objects" and the "environmental conditions" factors the study revealed that the surrounding environment has to provide among others the feeling of security, the necessary objects to construct private territorial space and normal environmental conditions in order to trigger usage of Service A.

According to the literature, objects and things that occupy a place have a certain state and location that allow us to define different functions. Erickson (1993), proposes that objects can generate and catalyze interactions: he talks about "evocative objects" that can capture people's attention and encourage interactions. According to Cherulnik (1991), people plan their actions based on their understanding of a setting relying on environmental inferences. The position, orientation, and movement of the objects in the environment are an important source of information showing the state of people's interaction with them (Gaver, 1991; Dix , Finlay, Abowd, & Beale, 1993). For example, tables and the spatial layout outside a cafe give us insights about the topic of space show that in a place where people can have a rest, a coffee, they perceive time as running at a slower tempo and have a quick look at the news reading a newspaper or accessing mobile data services.

Sometimes of course it is possible for objects and spaces, combined with the activities, concepts and conceptions of people to transform spaces. For example, an ordinary part of the street or the park relatively enclosed and protected with the proper dimension for one person to proceed to the necessary activities and have the visual contact with the passersby, could be transformed and used for resting and thus for accessing mobile data services. Also, the physical objects, such as walls, tables, chairs and sofas somehow organise the space segmenting it into smaller micro-spaces. Persons orient themselves with respect to the micro-space they occupy because they feel as they own it form groups that interact internally while externally they project separateness. Thus whenever these micro-spaces are

perceived as capable to satisfy the needs and concerns of the user there is increased possibility the user to access Service A.

According to Hall (1966), fixed-feature spaces allow people to organize activities and are characterized by objects and activities that are related to these spatial arrangements. Socio-petal spaces are those which bring people together and stimulate involvement such as the tables in a café, while socio-fugal spaces keep people apart and promote withdrawal as railway waiting rooms (Hall, 1966). This argument is in accordance with what the users claim that they mainly access Service A both within fixed-feature spaces as their house, their rooms as well as within semi-fixed feature spaces such as cafes and others. The socio-petal and socio-fugal arrangements of objects within public places seem to relate to the degree of Service A usage. In Athens the chairs most of the times surround the table, socio-petal place, and those who sit there face each other. There the intimate zone is usually not violated as chair spacing maintains the personal zone and a comfort level for each individual. Thus the user is able to visually observe the personal space and feel more comfortable to use Service A.

Within socio-fugal places the users position themselves so as not to sit next to a stranger unless there is no other choice as when waiting for the metro. In these cases of crowded areas the intimate zone of proximity, as explained below, is violated although there is often a small physical barrier (arms and the back rests of the chairs) and users will accept this situation for short periods of time, though not necessarily without stress. In these situations the participants argued that they avoid using Service A. It seems that the absence of objects such as furniture in public places would deter them from using Service A.

Finally, it should be mentioned that the role of the objects is also analysed, (Section 5.2.3), because their availability within a space allow users to have alternative options for activities, as well as into the Section 5.3.4, which analyses the availability of activities in terms of social interaction.

Within the next paragraph I further discuss the findings and link them with relevant theories and models providing possible explanations of the phenomena generated within the analysis chapter.

According to the findings, participants usually access Service A within or near buildings, in cars and on beds, sofas and at tables. A close look at the characteristics of these micro-environments will show that these environments provided or perceived by the users as they provided certain features, like a feeling of privacy and a feeling of safety. Before analyzing the findings I could explain how people understand and behave within a place. The insight which was gained from a review of the relevant literature indicated that the patterns of feeling of privacy and feeling of safety are well founded. Altman (1970; 1975), in particular introduced four basic concepts (behavioural forms, situational factors, antecedent

factors and social needs), to explain human territorial behaviour. The concepts of behavioural forms and situational factors were adopted in order to explain the findings. Behavioural forms are the environmental frameworks and the objects that human use in order to mark or defend a territory like a wall around a person's office, a table and chairs in a cafeteria. Situational factors describe the amount of space required to conduct an activity as for example the necessary space that the users need to access mobile data services or to have a call.

Also, according to Gilbert (2006), the humans understand a place using the senses (perception), and by using thinking, remembering, or evaluating the information (cognition) in order to respond to the environmental information that was acquired. Space characteristics as colour, noise, the furniture layout may influence the perception of space by the users and it can positively influence mood and behaviour. Humans initially perceive a place as safe or as stable or not etc. and then decide how to respond to the environment they occupy. During the perception process people use spatial features like proximity, salience and permanence to select reference objects and frames (Tversky & Lee, 1998), in order to delineate the location of figures. Having realised the functional properties of the space they will take into consideration the physiological attributes of the place such as functionality, ergonomics, life safety, health concerns, security level, visual privacy, acoustic privacy, and aesthetic factors. These attributes will affect the user's physical comfort and if their psychological and physiological needs and concerns are appropriately satisfied they perceive the environment as appropriate and decide how to behave within the area by proceeding to specific actions for example using mobile data services.

Combining the findings from the study with the literature concepts I tried to have a deeper insight into the need of the participants for security and privacy before using mobile data services. The pictures, the interviews and the observation revealed that for users, the feeling of privacy was a central issue when decided to use service A and thus they tried to make themselves less accessible to others. To achieve that, they tried to place themselves within spaces that provided to them personal space and territorial ownership. The situational behaviour of the users in relation to the space they occupy can be explained using the concept of "Proxemic Zones" as defined by Hall (1966) and human territoriality (Edney, 1976). Territory is the geographic area that indicates ownership and provides a desired level of privacy. Within a territory, individuals and groups have exclusive control of a space and defence of this territory against "invaders". The territory is defined by the following features, social roles, trust, control, which is the ability to gain access to, utilize, influence, gain ownership over and attach meaning to a space (Francis, 1989), place attachment, group identity and the visibility and the permeability of its boundaries or social membranes as defined by (Lyman & Scott, 1967). Territoriality can be defined as a way to achieve and exert control over a segment of space (Prohansky et al., 1970) and then to maintain and achieve a desired level of privacy. Control entails the priority of access to a spatial area, the choice of the

type of activity that will occur in the area and the ability to resist the control of other persons in that area" (Holahan, 1982).

Goffman (1971), defines personal space as the space that surrounds an individual, where the presence of others would be considered as an intrusion leading the person concerned to show displeasure and sometimes to withdraw. This space is not a sphere, but a contour; the spatial claims directly in front of the face are larger than those at back. Therefore the personal space is enlarged by turning your back to other people, sitting at a table, avoiding eye contact or fixing the gaze on some object and talking with a low voice. Although users try to expand personal space by avoiding eye contact and seem to withdraw from the surroundings, they are aware of what is happening around. If someone for example stares at them they return the gaze over the curious observer, forcing him or her to look elsewhere.

The users themselves carry four zones, intimate, personal, social, and public within which certain behaviours are acceptable (Hall, 1966), as shown below.

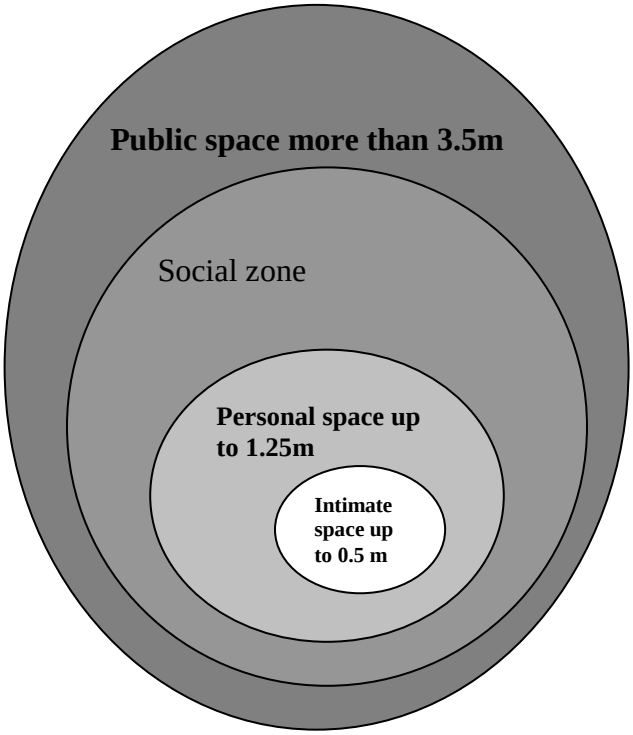

Figure 31 : Types of distances that vary according to space attributes.

In normal situations people maintain a small protective sphere, personal zone, between them and others. The personal zone is a space around the body of into which other people may not enter since this area is considered as their domain or territory. Within that area people will allow selected friends with whom personal

conversation is mandatory. People do not want to sit next to strangers without a protective barrier since this is stressful. Often other undesirable persons enter this space and this will make them feel uncomfortable. Whenever Service A was used to facilitate a conversation or as a means of exchange information between acquaintances this happened within this space.

Physical "objects" such as desks and tables usually help people maintain the social distance within which they expect to make purely social contacts on a temporary basis. Social distance according to Hall (1966), is culturally conditioned and arbitrary. Finally, everything happens outside the circle of involvement, the individual does not expect to have direct contact with others that are within the public space.

According to Altman (1975), interpersonal distance can be used as an index of privacy that includes information privacy and privacy of other dimensions, can serve as a mechanism of privacy. Previous studies showed that culture (Huff, 2001), personality (Ray, 1984) and information privacy (Shu & Yan-Mei, 2006), will influence the interpersonal distance. Following the above concepts I reason that the relationship of interpersonal distance and information privacy needed to operate mobile data services in public places can be described as:

Interpersonal distance necessary for using mobile data services = operating space needed to access mobile device + distance for privacy to exchange personal information.

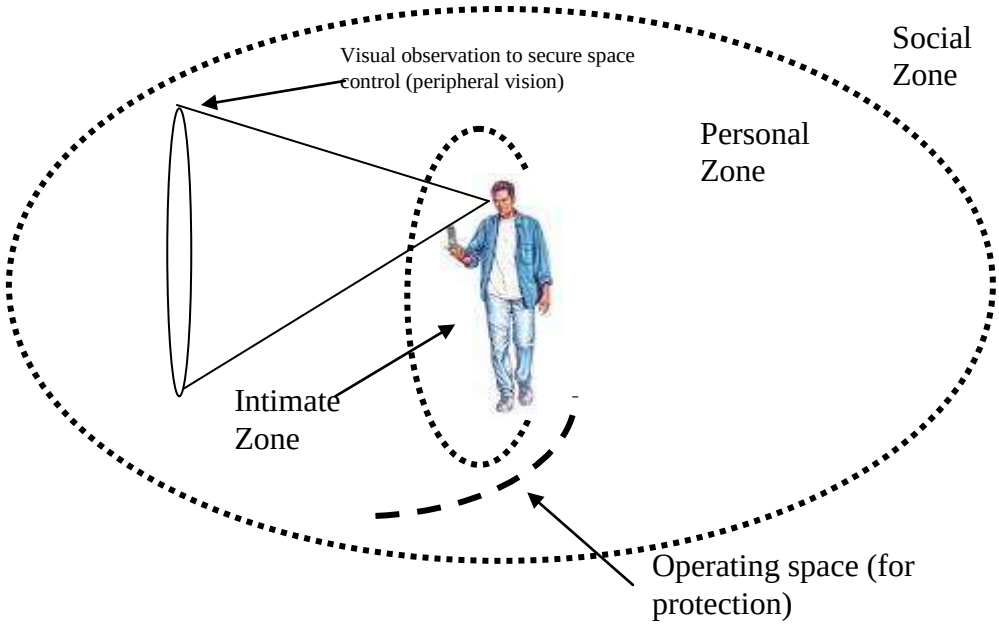

Figure 32 : Individual Interpersonal distance when using mobile data services

In figure 32, a doted line around the individual represents the main needs of that person (the intimate zone as defined by Hall (Hall, 1966)). Protective barriers such as environmental frameworks and tables represented by a bold interrupted line at the bottom of the figure is used for more privacy and to provide the necessary operating space to access Service A. The users protect their personal space using their body language and environmental objects as the chair they are sitting or the wall they are laying.

The visual observation (shown as a cone) should provide visual access from the individual to the personal zone. This visual access includes the peripheral vision, the view from the very edges of the eyes when one is looking forward.

Integrating the above concepts with the findings from the study an explanation of the users' behaviour is provided below. According to the analysis, the participants claimed that they need larger interpersonal distance when using Service A than when they just use mobile phones to call or send a text. As the 35 years male that participated in the observation phase argued "*usually I watch the news when at home on the TV when I am relaxing, I can't perform simultaneously more than one activity at a time....it's the same with Service A, I need to feel comfortable and be able to focus on this activity before deciding to have a look at the news*..". I also asked him to recall few spots in his house where he usually access Service A. Although, as he said, he could access Service A while having coffee in the kitchen or when he is for a longer time in the bathroom, his favourite spot was in the center of the sofa where, as he claimed, he likes to sit, watch TV and use often Service A. During the observational phase and while I was out for coffee with the participants, I observed that when they were being approached by other persons while using Service A they would maintain a longer distance than usual, to protect themselves before they were certain of the purposes of the approaching person.

What was happening is that users were trying to assure space control in order to secure visual privacy and protect the information they retrieve via Service A. According to the findings, the visual privacy, that is the ability to limit the view of oneself to others, is an important issue in relation to the decision to use mobile data services. As the 24 year old lady who participated in the media elicitation study stated *"I don't feel comfortable when I have others next to me…how can I prevent them from having a look at my mobile?*". Users tended to sit and stand near pieces of furniture, and walls to avoid situations in which they could not see who was watching. And although they avoided eye contact and seemed to withdraw from the surroundings, they were aware of what was happening around. Whenever someone stared at them, even the researcher during the observation phase, they returned the gaze or asked about curiosity, forcing the observer to look elsewhere.

Users also avoided using Service A, in densely crowded places where personal space and territoriality mechanisms function ineffectively, resulting to excessive undesired external social contact with minimum vision privacy. In an environment also where commuter flow is large, it is more likely that the personal information of a user will intentionally or unintentionally be seen by a stranger, the risk of losing control of personal information is perceived as high by users. Since privacy can be best understood as protection against certain kinds of risks such as that of loss of personal information (Perri, 1998), using Service A in a public area may facilitate the information privacy concerns of a user. According to Shu and Yan-Mei (2006), people have a sense of information privacy usually higher than that anticipated by others, and they require others to understand and respect such privacy concerns. Thus using service A in public areas could generate risks of losing control of personal information and involve various levels of information privacy because some services as m-banking and e-mail, require from users to provide their personal information, such as their passwords. In contrast, whenever they had a call, they protected the security of the relevant information either by just lowering their voice or by using a coded language. The 23 year old girl, a post graduate student said "*..when I am talking on my mobile phone it doesn't mean that I am shouting and everyone listens what I am saying, it's my decision what to say and how much information to exchange.…*".

Furthermore, because it is difficult to manage two settings of interaction, the interaction with mobile data service and the physical presence of others, users prefer to start using Service A, after they have created their own space (Murtagh, 2001). What is happening is that the spatial "arrangement of the constructs" within indoor places accompanied by the body language led users to create their own "area" and protect their personal space. Furthermore, the creation of such a space within public places helps people to cope with the lack of civil inattention in public places. People feel observed and the creation of an own space with newspapers and mobile phones convey the information that the person is not alone. The participants in the study argued also that the creation of their own space in public areas when using mobile data services is not always related to the pursuit of privacy, but it seeks to facilitate concentration on the service. This is a hypothesis that was derived from the study and needs further research to be validated.

Thus the above findings lead to the main conclusion that the main competitive advantage of mobile data services that they can be used everywhere anytime is not as significant as it is believed. The argument according to which space plays crucial role in the usage of mobile data services while it influences the decision to initiate a mobile data service is supported by the characteristic of the Service A that it is a unidirectional service, meaning that users have to initiate by themselves the access of mobile data services. Calling and texting on the other hand are bi-directional services since voice call and sms could be received when someone is everywhere as on the street or on public transport. A conceptualization of the role of space in the usage decision is shown below.

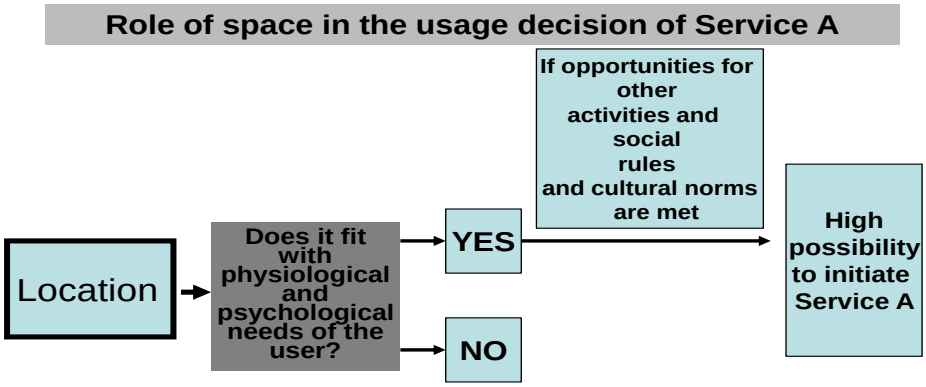

Figure 33 : Role of space in the decision to use service A

Finally, the findings suggest that the research on the material of space is of great value related to the usage behaviour related to mobile data services. Personal factors and attributes that influence the final decision to use mobile data services follow.

6.2.2. Personal Layer

In the analysis of the section 5.3, I attempt to identify examine and stress the role of the personal layer as a factor that influences usage process of mobile data services. The personal layer concerns the interaction (emotionally and functionally through the activities) of the user with the surrounding environment. In this section issues related to demographics, emotional, place attachment and activities as key factors of the personal layer are identified.

Let me then try to answer the second research sub-question of the study: *how does the personal layer, as defined by Tuan, affect the decision of the user to use mobile data services*?

The study revealed that the "personal layer" can impact the behaviour of users of mobile data services when they have to decide to use mobile data services. According to the findings, the background of the user (demographics and familiarity with technology) is an attribute that can influence the attitude of users to become heavy or light users of Service A. For example, younger male users,

coming from medium and upper socioeconomic classes that are sufficiently familiar with the use of information communication technologies, are more prone to use heavily mobile data services.

More specifically, the communication codes which are the 'constant contact using Service A during the day', 'flirting using Service A' and discussing issues relating to Service A, fulfils the users' need to be accepted by the other members of the group of peers. According to the younger participants, they adopt such kind of codes because "*all friends do that*". What should be studied further is how important is this need to be accepted by peers in their decision to adopt and use Service A as part of their communication code.

The needs that Service A fulfils seem to be the following:

- A proof of their individuality and emancipation; teenagers look for ways to prove their emancipation mainly to their peer group and to safeguard their private life from parents. As such, the analysis proved that Service A offers the vehicle to communicate and exchange information between teenagers while at the same time it safeguards their privacy of communication. They are even positive with challenging advanced applications if this is empowered by a technology that sets them apart from older people as their parents and teachers. MSN for example was the most relevant application of Service A that would satisfy the need for emancipation as it is a form of instant, interactive, live mail that cannot be accessed by parents and remains private, stored in the cell phone of the users, as a sort of a private 'archive' of the teenagers' social life. Young people in contrast to older ones do not find MSN messaging service particularly inconvenient. It is this technological inconvenience as perceived by adults that enables young people to keep an autonomous space outside the scope of their parents' supervision. The 17 year old boy, high spender reported "*I have already downloaded all the applications from www.symbian-freak.com website. These make my mobile a powerful tool. My friends believe I am a "master of mobiles" and I am feeling well with that. My parents don't have a clue of what we are talking about*". In addition services that offer personalization of their mobile telephone (downloading realtones & wallpapers) are particularly valued by teenagers in the sense that they 'signal' personality traits among their peer group. The 16 year old girl that was interviewed told me that "*I bought this lovely accessory for my mobile. It fits with the real-tone I use .They both come from my favourite movie "Shrek*". *My mobile phone is part of me, part of my character*". According to this transcript, because the girl established a sense of her own individuality, she tried also to establish a 'non-verbal code' which communicates to the others her traits, preferences, views on life or even values. As such, this 'non-verbal code' of communication establishes relationships by bringing together

teenagers of similar preferences, common interests or preferences, bonding them to each other and forming peer groups

- A medium to 'escape' from their everyday school related pressures, namely a vehicle to take a break within activities or an alternative to boredom, when they are restricted at home. "*If I cannot join my friends, I ring them waiting to send me an MMS. This gives me a feeling that I am there with them*." the 17 year old high school student reported.

Usage occasions of Service A mostly occur among teenagers, are depicted in the following diagram in relation to the typical Service A usage conducted by teenagers during each occasion. On occasions when they are outdoors a higher degree and frequency of Service A usage is observed as they relate to the key needs of teenagers for acceptance and participation in a peer group.

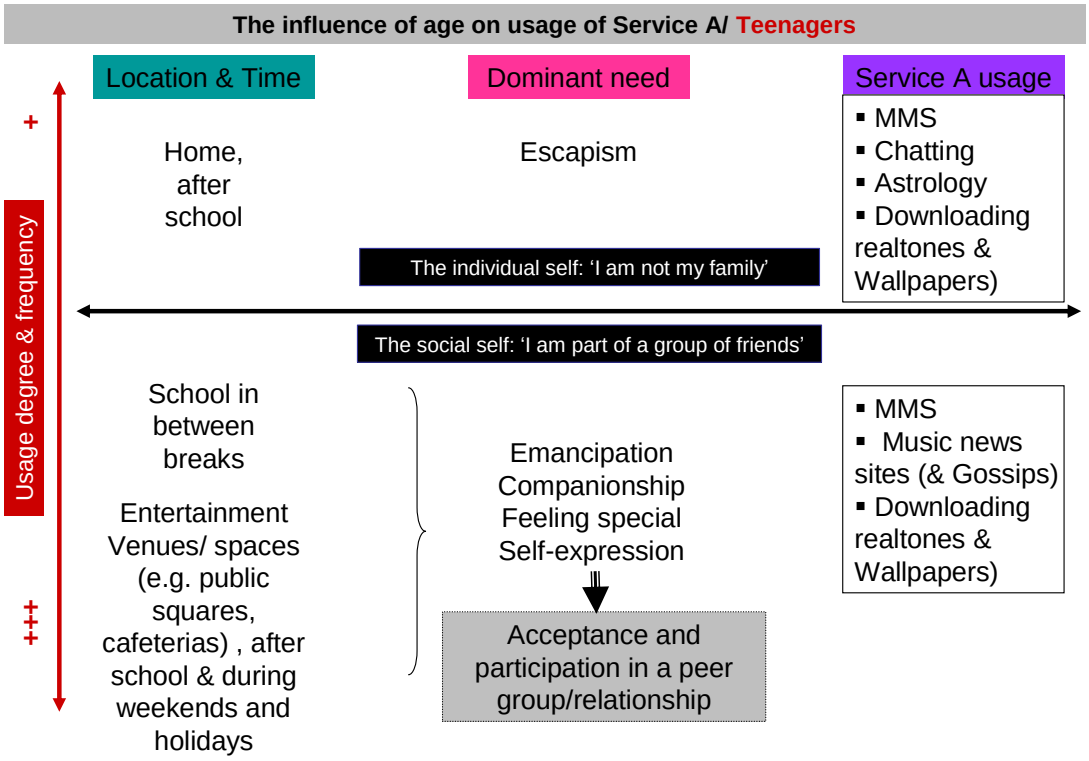

Figure 34 : Teenagers' usage behaviour of Service A

Also, as the analysis revealed most relevant usage occasions for younger adults were found to take place mostly during socializing with friends. These usage occasions allow for relaxation and sharing information related mostly to recreational activities that a group of friends may share as for example checking out the weather before planning an excursion or the results of a sports game. It can be argued then that the 'social benefits of Service A' are of predominant value for

this age group as they relate to a stronger set of needs such as needs for companionship, for sharing and others.

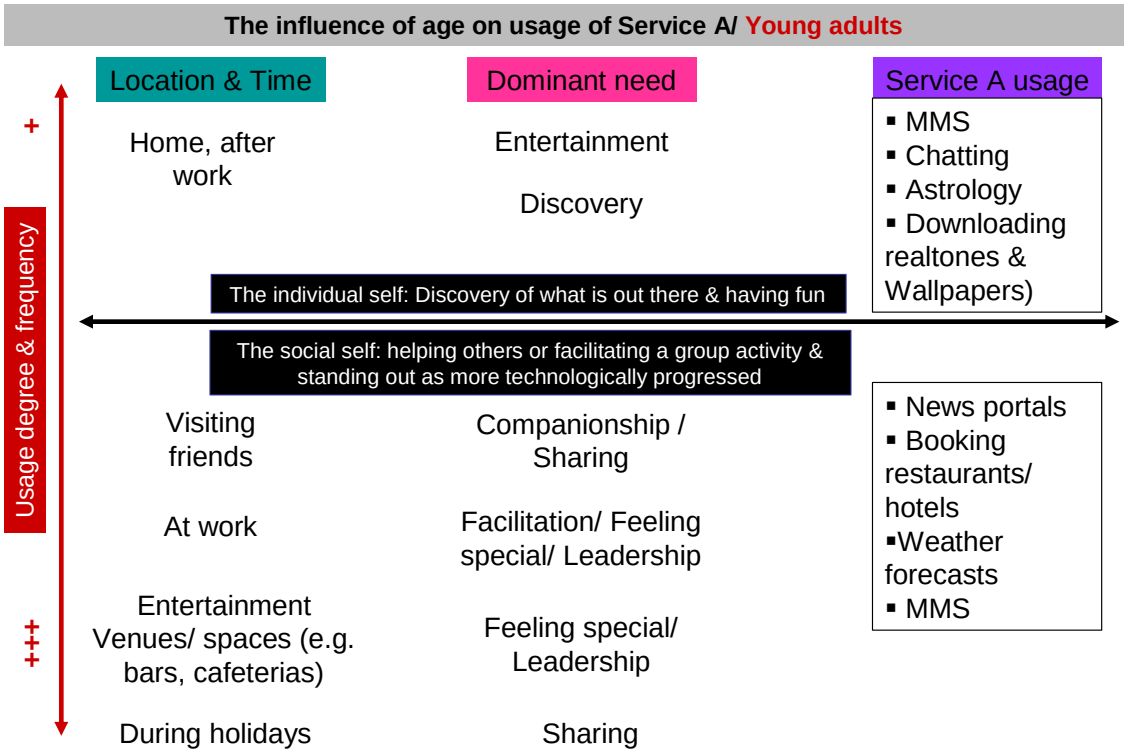

Figure 35 : Young adults' usage behaviour of Service A

Furthermore, the older adults age group seems to feel that 'work-life balance' should not be disturbed by being overly consumed by technology 'gadgets' and their merits, such as Service A. As they claimed, "*keeping up with the latest tools and services*" could be considered as a "*full time job*". A different behaviour suggesting usage of Service A was perceived by respondents to produce social withdrawal besides being the defining characteristic of a stressful overworked lifestyle.

In addition, the degree of expectations created by setting the internet as the comparison yardstick of Service A among older adults it will not work in favour of Service A. This age group recurrently made a point that Service A in its current form and extent does not seem to satisfy their expectations in terms of breadth, variety of content and speed. As the 35 year old female, HR manager, replied "*I expect more functions, more content, more applications and more fantasy from Service A in the near future. As it is now, it reminds me the launch of the windows operating system or the first version of Netscape browsing system...It looks kind of*

primitive." According to her, rational appreciation of Service A in combination with its perceived inability to perform tasks as good as the internet, results to her distancing from Service A, limiting herself to what is necessary and truly helpful.

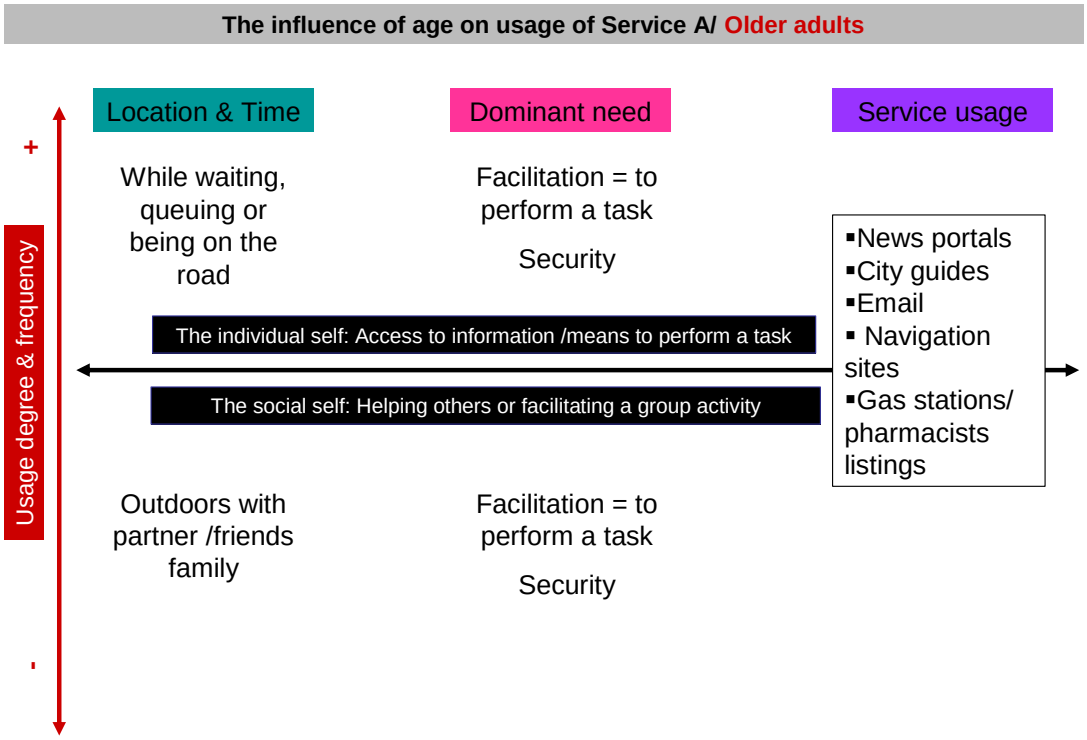

Figure 36 : Older adults' usage behaviour of Service A

Following the above findings I clustered the mobile data services between emotional and functional layers in terms of the users' age as shown in the following figure.

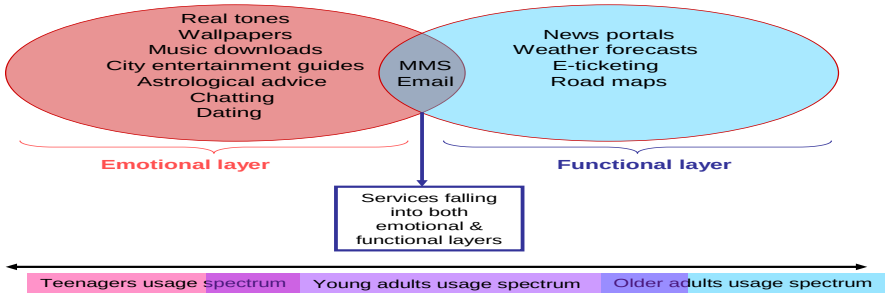

Figure 37 : Clustering emotional and functional layers of Service A per age groups

According to the above arguments, the older users are more likely to appreciate the functional offer of Service A, namely services that can provide information and a kind of facilitation that simplifies access to information they can use to perform a task. In contrast younger users perceive Service A more as an entertainment service and that is why they mainly use it to satisfy their emotional needs. Following these findings I could argue that the age is proportional to functionality concerning mobile data services.

Following the above discussion I conclude that the participants in this study appeared to appreciate Service A as part of their everyday life, delivering value either at a functional or at an emotional level. These participants were able to afford and to pay the price of using Service A as compared to lower socioeconomic classes which are expected to reject Service A on the basis of a poor value for money ratio and the absence of a clear and relevant functional benefit to 'legitimise' the expenditure.

Beyond the demographic characteristics and background of the participants the factors related to "place attachment", "emotional status" and the activities the users are involved in, play an important role in their decision to use Service A. I can connect the data coming from the section analysing the "place attachment" factor (Section 5.3.2), with the arguments according to which the familiarity with a place has to do with the awareness of the objects and the metrics of this place (Section 5.2). If this awareness exists then the users can create more easily their personal space within which they feel more protected and safe to access Service A.

To further explore the complex people-place relationship I adopt the concept of 'place attachment'. According to Williams et al. (1992), place not only provides opportunity to satisfy needs and achieve goals, but it creates strong emotional bonds between a person and particular places. This strong emotional relation can be described by the place attachment concept or the 'habit' constructs which entail the meaning of the user's status regarding geographical movement (Low, 1992; Riley, 1992; Castro & Gonzalez, 2008). Today, some social theorists describe place attachment and mobility as two contradicting and mutually exclusive phenomena (Giddens, 1991) while others suggest that this is not necessarily the case (Gustafson, 2001). According to Williams and Stewart (1998 ,p.19), place attachment is "*the collection of meanings, beliefs, symbols, values, and feelings that individuals or groups associate with a particular locality*". Brown (1987), introduced the functional place attachment term, which is closely tied to the types of activities users pursue and the emotional place attachment term which refers to the emotional aspects of a person-place relationship. According to the analysis, the users prefer to access Service A when in places with specific attributes where they feel functionally attached with them. For example, users mentioned that when they have to wait for a few minutes time in their car they feel protected and they have the privacy and the stability they require to access mobile data services. In other words they are attached to their car. But the emotional place attachment would

influence the usage of Service A only in cases that the place provides the functional requirements for that. The 27 year old member of a music band who stated that he was a keen football fun, during the focus group sessions respondent "*I like to go to the football ground and support my favourite team…..I have been doing that for more than a decade and I feel like being in my home while being there …but there is too much noise, tension and suspense to access Service A there*". People judge the functionality of a place based on their previous experiences and knowledge of alternative places (Warzecha & Lime, 2001). This can explain most of the replies form participants according to which they find themselves using Service A in familiar to them places where they visit often.

As mentioned in chapter 5 human activities are influenced by humans' goals and motives, by the social and cultural context and by the humans' identities. Thus the participant that accessed Service A between reading sub-activity, while on holidays is at the same time a Greek post graduate student in Athens University, and a person on holidays with his friends. These identities are dynamically composed and define 'what he was doing that time'. Following the above argument, a human activity for example using a mobile phone to call or text or surf the service A is inherently social since it is not just something humans do, but a manner of interacting.

The activity concept could also be used to explain the findings related to the emotional status of the users that access Service A. Suchman, (1987), emphasizes the emergence of activities within situations. A 'situation' is the relation between acting people and the place within which they act. The analysis of the data revealed that Service A is used indoors as a routine activity during breaks within other activities such as between classes or while waiting. This means that although Suchman argues that actions are never planned and thus behaviour is not strictly serial from perception to action, there seems to exist a relation between Service A usage and situation. For example, whenever the situation involves bored youngsters at home or waiting in places the possibility to use Service A is high, "*I use Service A when I am bored*" is what all the youngsters and almost all the younger adults replied when they asked to recall their emotions when they usually use Service A. Of course the activity of a human can be influenced by other modalities of conceptualization such as the sense of timing and by emotions. Emotions according to Frijda (1986), have an action tendency associated with them that can cause a set of possible actions. For instance, bored users may consider only a subset of the activity alternatives that exist within their environment. And probably they will consider the low demanding activities as the usage of Service A. The 16 year old boy stated during the interview "*when I am home alone and I am bored I don't even think of using my PC console to play a game or I don't care about using wii*[92]. *I look for something less demanding to spend my time*". Engineers should take that into consideration and develop applications that are as simple and user friendly as possible.

[92] http://wii.com

Finally, the ability of the users to have alternative activities even if they are in a place has to be considered. Meaning that if in a cafeteria there is a TV, this does not mean that watching TV can be considered as an alternative activity for the users to spend their time instead of using Service A. This depends on the personality of the users. If for example the users never watch TV then for them there are no alternative activities as compared to others who like to watch TV programs. Or another example could be the existence of newspapers in a café. If the newspaper is a Greek one then it would not consist of an alternative activity for foreign users.

The findings that resulted from the observation phase are in accordance with the indications in chapter 5 and support the argument according to which low mobility activities could positively influence usage behaviour. As I noticed, users in public indoor areas prefer to create their own space using their body language before starting to use Service A. They do that by turning their back on other people facing the table where they are sitting, avoiding eye contact, and looking at their mobile avoiding at all talking or talking at a low voice. In fact they personalise space in public settings by insulating themselves from the environment they are actually in, creating a kind of '*psychic cocoon*' around them (Morley, 2003 ,p. 451), although this may lead them to cut themselves off from those around them losing thus sociability and generating strong negative emotional responses by non users (Haddon, 2000b). This is not an easy task when they are out in the street while on the move.

Mobile technologies also bring into light spatial zones known as 'non-places' such as trains, airports, large retail outlets, road vehicles, on motorways and other zones where people spend an ever-increasing part of their time (Augé, 1995). But users' micro-mobility status acts as a catalyst that facilitates the use of Service A within some of these spatial zones. For example, as mentioned in Section 5.2.2, all of the participants interviewed, admitted to using mobile phones outdoors even making and receiving calls while walking on the streets. Younger users argued that they are capable of sending text messages when they are outdoors, as the 16-year-old student reported "*if it's necessary, I can text while walking*". This was not the case for Service A where places to sit or stand were more preferred, as a 30 year old female participant claimed "*I avoid accessing Service A while on the move*".

Concluding it could be argued that low mobility status positively influences the decision to use mobile data services. This is more evident whenever low mobility status is accompanied by low stimuli environments, perceptions of time-pressure and specific emotions such as boredom. The high mobility status of the user on the other hand such as moving fast, seems to be a constraint, decreasing the use of mobile data services. Figure 38 conceptualizes the above arguments relating the usage of mobile data services with mobility.

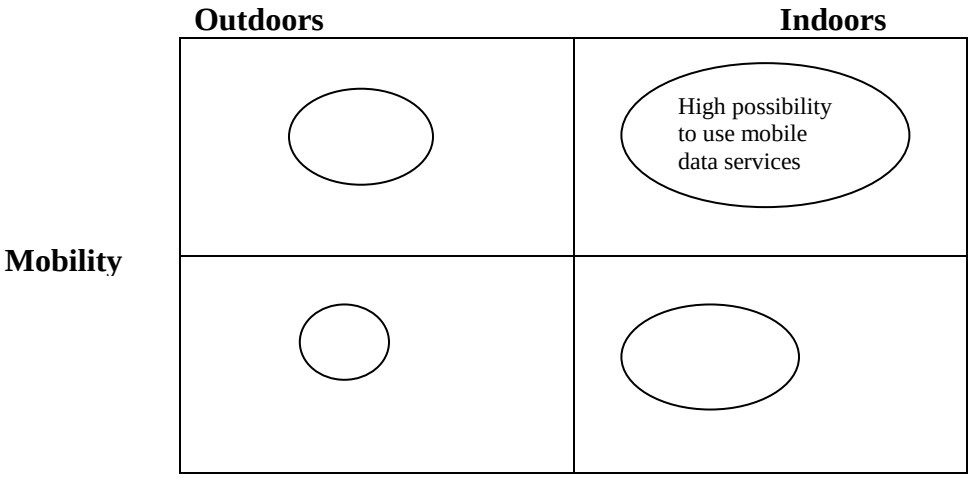

Figure 38 : Possibility to use mobile data services when indoors.

Hence, the findings showed that the users' low mobility status whenever surrounded by low stimuli environments, feelings of familiarity and comfort, and feeling bored, are patterns that can influence positively the decision to use mobile data services. Thus there exists an increased possibility to start using Service A when users are in a low mobility status and in a familiar environment of low level stimuli. There they feel less anxiety and have the perception that time somehow stretches out. It seems that the familiar place characteristics trigger emotions which may result in boredom which in turn may influence the decision to use mobile data services positively.

But why do users prefer to access Service A when they get bored? The literature together with the findings suggest that Service A easily helps to resolve boredom and thus users access it during periods when they feel low motivation to do anything else. Furthermore, there is another factor that has to be considered in relation to this explanation which is the fact that the users carry their mobile handsets most of the time with them. Thus as mentioned in Sections 4.6 and 5.3.3, the absence of stimulation causes low levels of arousal (state of boredom) which is important for motivating certain behaviours, as for example mobility. When users are bored they are not willing to move and prefer to position themselves in static environments. For example, the younger interviewees said that they use Service A in their homes when there is nothing else to do, as the 16-year-old girl argued "*when I am bored I don't want to go out and do things …..I don't want to move and switch on my PC...I am just laying in the coach and the only think I can do is to use Service A…it is just two clicks away from me..*".

A detailed explanation of the phenomenon of the younger participants accessing easily and frequently Service A whenever they get bored is provided below. According to the literature, boredom lowers the performance of human beings

while sometimes it can have negative impacts on people as for example it could generate stress. Yerkes-Dodson Law (1908), demonstrates an empirical relationship and predicts an inverted U-shaped function between arousal and performance.

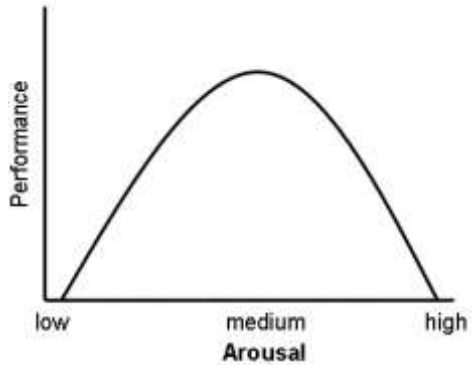

Figure 39 : Graph of Yerkes-Dodson Law

The Yerkes-Dodson Law proposes that when our physiological arousal decreases (indicator of boredom), our performance related to any task will be poor. As we get more aroused on the other hand and thus more motivated, engaged and enthusiastic performance reaches a peak point, the brain's sweet spot. Beyond that tipping point, though, further arousal translates into a debilitating stress – the greater the stress, the worse our performance.

Recently neuroscience has delved into the brain mechanics underlying how different states of arousal shape performance. When arousal decreases parts of the brain are inactivated, leading to decreased heart rate and blood pressure and a condition of low sensory alertness, low mobility and low readiness to respond. Four major systems originating in the brainstem are based on the brain's neurotransmitters, with dopamine among them. So during boredom the inactiveness of the brain lead to low dopamine levels (Goleman., 2006). The normal levels of dopamine produced are responsible for maintaining normal affective tone and mood. Increased dopamine levels as for example under the influence of drugs, by having pleasurable activity or exercise or given rewards to certain stimulus (Blakeslee, 2002), produce mood uplifting and reduce boredom. The change in the dopamine's levels alters a person's temporal judgment. The way the human mind measures the passage of time, combined with the infrequency of events perceived as notable often makes time to seem as moving at a slower pace to someone who experiences boredom. The perception that time is stretching during periods of boredom is amplified by the state of low dopamine levels. Following the terminology of "TTU - time to use period" and "TAP - time affordance period" in periods of boredom TTU is perceived as much lower than the TAP.

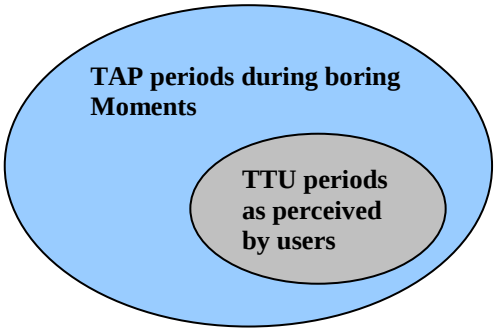

Figure 40 : TTU and TAP perceptions when boring

The perception of time stretching when users are bored may influence them to look for stimulating activities and thus access Service A. I argue that the possibility to use mobile data services increases in situations of low levels of arousal because people actively seek stimulation to avoid boredom. In these situations people believe they have enough spare time and perceive usage of mobile data services as an activity that demands low effort compared with alternative activities.

Based on the findings it can be argued that the possibility to use mobile data services increases in situations of low levels of arousal because people actively seek stimulation to avoid boredom. Furthermore, when users are bored their brain leads to low dopamine level, making them perceive that time is stretching. Thus within periods of boredom the necessary time period to use Service A is perceived by users as much lower than the necessary time that they could afford for such an activity which according to Papadopoulos (2008c), increases the possibility to use mobile data services. Thus bored people believe they have enough spare time and perceive usage of mobile data services as an activity that demands low effort compared with alternative activities.

The majority of the younger participants of this study complained that they often feel that "*they have nothing to do"* or that they have "*too much spare time during a day*". This easily causes them to feel bored. So since boredom is often associated with adolescence and usage of Service A is related to boredom I can safely conclude that youngsters are frequent users of service A. This conclusion is in accordance with the argument that youngsters are more prone to use Service A than older users.

As mentioned above sometimes Service A is perceived by the users as an escaping tool from their routine task. During these boring periods Service A provides an escaping opportunity from current boring tasks and help users get through tasks that challenge their concentration. I tried to relate the activity of the brain during periods of boredom with similar activities of the brain in other situations in order to understand how does the brain act and behave. Although in such periods no one is quite sure what the brain is doing except that the brain is resting, I argue that the

activity of using Service A to relief boredom could be approached and explained by looking for similarities in the activity of daydreaming.

'Daydreaming' is just a term that is used to describe situations in which people while awake often have fantasies of spontaneous thoughts relating to the past or future not connected to their immediate situation. (Mueller & Dyer, 1985). According to Klinger (1980), in 'boring jobs,' such as truck drivers, people use daydreaming to "ease the boredom" of their routine tasks. Daydreaming leads people away from being aware of their immediate surroundings, similar to using Service A, and concentrating more and more on these new directions of thought and can be considered as a lazy, non-productive pastime. Of course the above argument is based on the similarities of the users' behaviour when using Service A while being bored and daydreaming. It should be mentioned that none of the participants ever mentioned or correlated the use of Service A with any daydreaming activity. Even during the observation phase the existence of the researcher next to them, was minimising the periods they got lost in daydreaming. The methodology I applied is not to relate usage of mobile data services when participants are bored and daydreaming. By using a new methodology, such as using brain scans to participants who are just 'resting' and using mobile data services, a connection between usages of mobile data services and daydreaming could be established. In any case I suggest that the connection between Service A usage during periods of boredom and daydreaming if proved will allow us to model and predict the behaviour of the user during these idle times.

Another issue that has to be discussed is that human-mobile interaction is fundamentally a social one and that the social rules guiding human-human interaction could be applied equally to human-mobile interaction. According to Nass et al. (1993; 1994), humans tend to believe that computers and thus mobile phones are like people, assign to them human attitudes and behave to them as if they were human. According to the participants, they have the feeling that their mobile phone is a friendly "object". Thus when they feel bored they tend to seek the company of their mobile phone either checking sms, e-mail or accessing Service A.

Summarising the findings I argue that the "personal layer" can impact the behaviour of users of mobile data services when they have to decide to use mobile data services. According to the findings, the background of the user (demographics and familiarity with technology) is an attribute that can influence the attitude of users to become heavy or light users of Service A. For example, younger male users, coming from medium and upper socioeconomic classes that are sufficiently familiar with the use of information communication technologies, are more prone to use heavily mobile data services. For users of the same characteristics and background the factors related to "place attachment", "emotional status" and the activities the users are involved in, play an important role in their decision to use Service A.

Also, the findings showed that the users' low mobility status whenever surrounded by low stimuli environments, feelings of familiarity and comfort, and feeling bored, are patterns that can influence positively the decision to use mobile data services. Thus there exists an increased possibility to start using Service A when users are in a low mobility status, and in a familiar environment of low level stimuli. There they feel less anxiety and have the perception that time somehow stretches out. It seems that the familiar place characteristics trigger emotions which may result in boredom which in turn may influence the decision to use mobile data services positively. The decision to use mobile data services for sure does not mean that the users decide to change their activities and do something else since these services are considered by the users as secondary activities between other primary activities. For this reason users are more likely to use mobile data services when they are involved in primary activities this would give the possibility for other secondary activities to develop as for example when they are involved in long lasting socializing activities with friends.

According to the findings, the "expectations" and "voluntariness" attributes played an important role for the decision to use Service A. According to Powers (1973; 1998), people expect to be satisfied by specific needs that are linked to specific places as for example someone goes to a cafeteria to have fun and communicate with other people. If these expectations of people that are related to their specific needs are not satisfied, then they will tend to occupy themselves otherwise as for example with mobile data services in order to satisfy these needs.

Utilizing the findings from Sections 5.2 and 5.3, I developed the following construct which connects the participants' needs with the places they are in and the applications they decide to use in order to satisfy these needs. It seems that if this concept is linked with the data then the applications used, will be consistent with the needs and expectations the users have in the places they are. It appears that based on this construct an explanation can be given regarding the decision to use a specific mobile application.

For example, when a participant was in a place and needed communication then the application they would decide to use satisfied this need by checking e-mails. There were times where a participant spontaneously decided to use an application that provided services incompatible to the needs that were consistent with the place the user was. Studying the collected data I tried to identify what lied behind that decision. The analysis highlighted that places generate more needs than the evident ones. For example, when the 30 year old sales manager was away from his hometown on a business trip it was expected that his communication needs would be increased. But he mentioned that frequently, when he travels out of Athens for business, he searches for downloads and listen to mp3 songs. Analysing in more depth his interview I found out that when he is away for business he usually has

hectic working schedules and his needs for relaxing and managing his stress also increase lead him to seek entertainment via mobile data services.

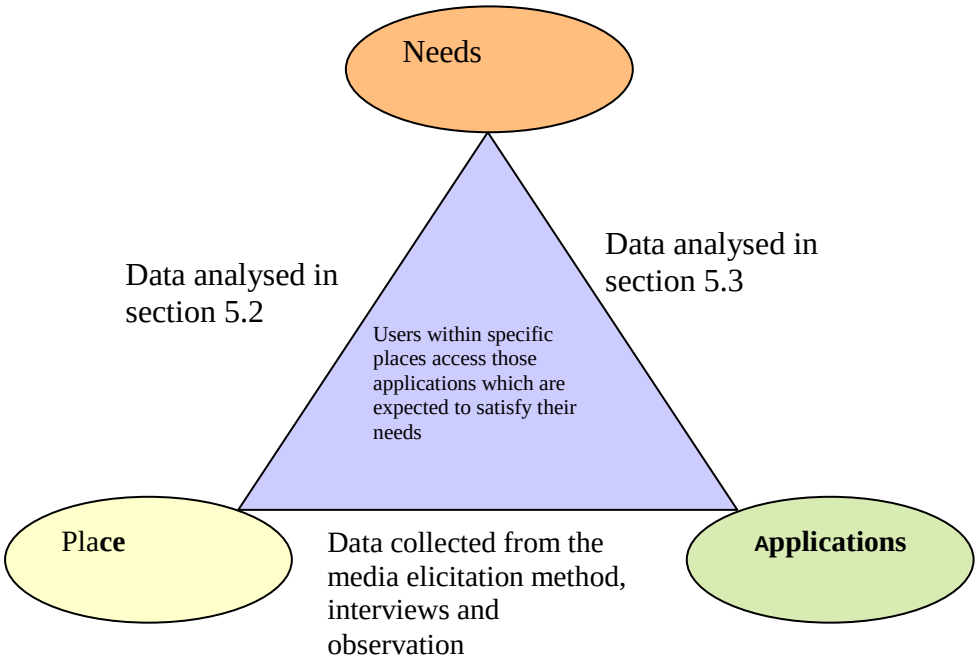

Figure 41 : Connection of participants' needs with the places they are in and the applications they decide to use.

Working with the collected data I produced a table which connects the most visited places with the needs (for fun, communication, relax, and kill time), the users mentioned that they have when in these places and with the applications the users mentioned that they usually use in these places. The results are consistent with the above construct meaning that specific places generate specific needs. In that case the possibility the user to initiate the applications that are expected to satisfy these specific needs is increased. Thus I can predict which specific applications of Service A could be initiated within specific places.

Table 48 : Relation between applications of Service A with places

Place (How users perceive these places)		**Users' needs**		**Applications**
Cafeteria (Meeting point for socializing)		Fun / Communication		News / email / MMS
Home alone / end of day (Personal space)		Relax / Information		If no alternative options then news/games/surfing internet
School –break (Time slot for communicating)	**<-Section 5.2 ->**	Communication	**<- Section 5.3 ->**	Emails /Games and mp3 as a way to communicate with friends
Car -waiting (Undesired time slot)		Kill time		Games / surfing internet
Metro (Unavoidable time slot for commuting)		Kill time		News / Radio

In conclusion I could argue that Service A in situations where the place does not match the expectations of users can be considered as an object that can enhance the place and fulfils users' needs. I present a few case examples, from the data collected, of unfulfilled expectations from place that triggered the usage of service A.

1. A user goes to a venue for entertainment and to communicate with other people. While this was in progress and the user mentioned that he was having fun there was no need to use Service A. When the expectations were not satisfied then the possibility to use service A was increasing.

2. A user travels away for business. During the journey he needs to be connected with his family and friends and be kept updated on his business and news back home. The availability of information and communication, TV channels, newspapers, internet, telephone and radio would satisfy these needs. When the user is in a place, as in the room of his hotel, in the case these options are not available he would probably try to satisfy these needs by checking at the news or his e-mails using service A.

3. A user goes to a party looking for fun. If this is not happening, then the user will try an alternative way to seek it, by trying to send funny e-mails, playing a quick game on the mobile phone or accessing funny sites using Service A that could provide a substitute to satisfy the expectation.

6.2.3. Social Layer

People attribute a high value on social connectivity by giving priority to communication and particularly to conversation. The findings revealed that the type of social groups, the roles which the users adopt within these groups and the type of interactions between the members of the social groups influence the decision of the users to initiate a mobile data service.

Let me then try to answer the third research sub-question of the study which is: *how do social activities and rules within a place mainly affect the user's decision to use mobile data services*?

The findings showed that the type of social interaction that mainly triggered the use of Service A was the one that provided them with the confidence that the use of Service A was acceptable by their social environment.

More specifically, following the above analysis I can argue that when the users are with friends they feel free to access Service A as opposed to situations where they are with just acquaintances. A group of friends is a social group that shares 'same values' and 'same communication codes' and these seem to be influential patterns that make users more prone to use their mobile phone to access mobile data services. For example, during the observation phase the 21 year old university student participant while she was having coffee with two of her friends told them "*I need change in my life, I even got bored with my mobile's wallpaper….I think it's time to find a more "colourful" one…so let's start working…Does anyone know how to do it with Service A?...*". The conceptual code of the 'common understanding' or in other words the common communication code seems to be the catalyst that influenced the access of Service A.

The analysis of the data revealed that users access Service A, because they have "*plenty of time*" in their disposal, because they find this activity a "*common topic for conversation*" or a topic to "*initiate conversation or change the topic of conversation*" or 'for showing of' to the other members of the group. Thus I can conclude that the use of Service A frequently takes place during conversations between friends and during socializing events.

According to the observation data, what appears to happen when two or three friends decide to access Service A is that they suspend current activities or

interactions with the other members of the group. They are not moving away but remain in the same physical location within the group, unless there is a special occasion, as for example the 35 year old project manager changed his position, came and sat next to me and with a low voice he showed me an adult site using Service A. But as I observed in other similar occasions when two or three of the group of peers start using together mobile data services, they tend to lower their voice to avoid being overheard and annoy the other members of the group. As I observed these micro groups of two to three friends are created for short time slots, of few minutes while accessing Service A. The above findings addressed the role of spatiality in these situations where part of the group was isolated using Service A. The pattern that came out from the study is 'proximity' which refers to the low distance between the participants of a team. According to Kraut et al. (2002) and Kiesler and Cummings (2002), proximity is associated with numerous emotional, cognitive and behavioural changes. The findings indicate that the pattern of proximity between friends triggered communication and Service A usage either as a topic of communication or as a means to information extraction.

Following Sommer (1969), who claimed that certain arrangements of people are more suited to certain activities than others the study revealed that when in public areas the users prefer to access Service A arranging themselves in certain positions. It is obvious that when a couple of friends use Service A, they are involved simultaneously into two activities, communication and cooperation. So users choose such positions and sitting arrangements that assist these interactions. Analysing the data the factor of the "sitting arrangements" emerged as an important influencer in the decision of the users to access Service A. Scholars argue that the sitting arrangement in a place is an attribute that could influence usage of technology and is related to the cooperation activities. More specifically, Joiner (1976), highlighted the clear impact on interaction patterns of the objects' position and location settings within the environment while Hare and Bales (1963), argued that sitting arrangements appear to influence the interaction patterns of social groups.

According to the findings, whenever users access Service A with a couple of friends they prefer to sit side by side creating thus a good possibility to cooperate either to play a game or to access information while having a visual contact to the screen of the mobile phone. Following Sommer (1969), who argues that side by side is a good position to cooperate and to explain something to others the 21 year old participant in the observation phase argued "*side by side is the position I use to play a game or try new features in Service A when with my little brother in my mobile phone…it's almost the same as when we cooperate to play a game in the same PC*". Also, in this position users are focusing more on the Service A since it is more difficult for the users to look at each other. Also, sitting side by side a more intimate sphere is being created, with no physical barriers in between. It could be argued that the sitting arrangements that influence usage of Service A when users are within friends are the following:

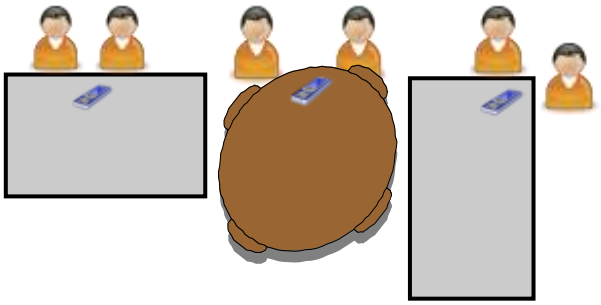

Figure 42 : Seating arrangement: Friends are using service A

Furthermore, sitting side by side is the position which facilitates the cooperation between people. So the use of Service A by more than one user can be considered as a cooperation activity with two or more people trying to achieve a goal, in that case to access information.

Overall the findings coming from Section 5.4, showed that the type of social interaction that mainly triggered the use of Service A was the one that provided them with the confidence that the use of Service A was acceptable by their social environment. Thus the possibility to start using Service A, got increased in "social communities" where the users are involved in a "synchronous" communication activity and assume "informal roles". The main point that the users took into consideration regarding their decision before start using Service A when being in a social community was the chance that this action could interrupt their social activity. If they felt comfortable and certain that this was an acceptable activity, then they would initiate use. This leads to the conclusion that the pattern of [feeling comfortable] in a place is an attribute that positively influences usage of mobile data services.

This conclusion is supported by the analysis of the data collected across the study which reveals that users prefer to use Service A when they are alone in home, in their bedroom, or they are with their life-partner and with their friends as shown below in the pictorial representation. In all these cases the users argued that they feel comfortable enough and free of social constraints.

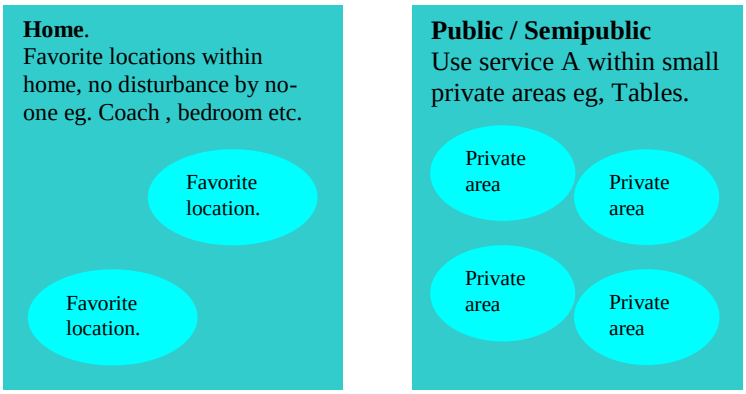

Figure 43 : The users prefer using service A in places that provide them with comfortable

There was substantial evidence to suggest that when in public places for entertainment purposes, even at work or school during breaks, users prefer to use Service A when they are with their friends adopting informal roles. Thus the presence of groups of people that have strong social connection as for example friends is an attribute that positively influence Service A usage, while the presence of strangers would deter the use. Furthermore, long conversations make users sometimes to get bored or loose interest on it and thus they would easily start using Service A. This happens frequently when they are among their friends where the informality of their roles would facilitate their feelings and emotions to influence their decisions.

When in public places with friends, people experience the feeling of "being there" establishing thus interactions between them. What seems to be happening when the users are with friends is that they do not feel any pressure from social etiquettes and social rules, their anxiety is low and they mainly feel nice and happy. This emotional state seems to act as a catalyst that increases the chance to use mobile data services. So whenever there was a specific opportunity as for example whenever Service A was used as a communication topic with one or two of the members of the group, provided that the sitting arrangements allowed proximity, or when they felt bored if the type of the activity of the group was of no interest to them, then they would probably use mobile data services. During this activity and when users are with friends they feel that they are accepted by the social environment and that using Service A for a short time is a non annoying activity. This is not the case when the participants are with a group of people with whom they have no strong social link, as for example when they are among business groups or with simple acquaintances whose formal roles seem to prevent them from using mobile data services.

6.2.4. Cultural Layer

While assessing the impact of the cultural layer on using mobile data services there was substantial evidence to suggest that certain locations with specific cultural norms encourage Service A usage while others discourage it.

Thus finally let me try to answer the fourth research sub-question of the study which is: *which cultural identities of a place mainly affect the decision of the user to use mobile data services*?

As shown by the study, the use of mobile phones and mobile data services in public places has become generally accepted in the area of Athens where the study was conducted. The use of mobile phones has also reached public areas where their use is either not acceptable or prohibited, such as in cinemas, concert halls, classrooms even planes. The use of mobile phones and mobile and Service A is also present in taverns, restaurants and cafeterias. The data collected led to some interesting conclusions regarding the use of mobile phones in indoor public places since this entails the possibility of being overheard and disturbing to people around. This is more evident when civil inattention does not always rule and users can see and hear the reactions of strangers around them. But the younger the users are the less they feel that this is a problem. Nevertheless, a common norm of indoor etiquette is to talk in a low voice since loud noise is not acceptable in such places.

For mobile data services, contrary to voice calls, there not does seem to exist a huge conflict between usage behaviour and rules of social etiquettes and cultural norms, since mobile data services are not noisy. Users claimed that they feel more comfortable to use Service A when indoors than outdoors. The indoor places they prefer to use mobile data services are those where there is no conflict with cultural etiquette and sensitivity of the place. As the participants argued they prefer to take careful consideration of the cultural identity that influences the use of mobile services in public places. This cultural identity, which is defined by the perception of the importance and impressiveness of the place and the freedom of norms and rules, would prohibit or permit the use of mobile data services. In other words, the cultural identity of the place, as the user perceives it, the importance and impressiveness of the place play a significant role for the decision to initiate mobile data services usage. Yet the use of mobile data services as such can change the perception of the cultural identity of the public places and thus the behaviour patterns in such places.

Overall the main outcome of the research indicates that the defining attributes leading to the encouragement of mobile data services are freedom of norms and rules. Whenever the use of mobile data services was not clearly defined by the cultural norms as an acceptable activity, the users would avoid using it. Thus in places that were characterised by strict rules users avoid accessing Service A

frequently. Sporadic usage patterns were reported mainly by youngsters even in places where the usage of mobile phones is banned.

I categorised the places where users mainly use Service A in relation to the freedom of rules of behaviour that characterise these places. According to the findings, the usage of Service A was high in places where the norms and rules of behaviour were loose as shown in the following graph.

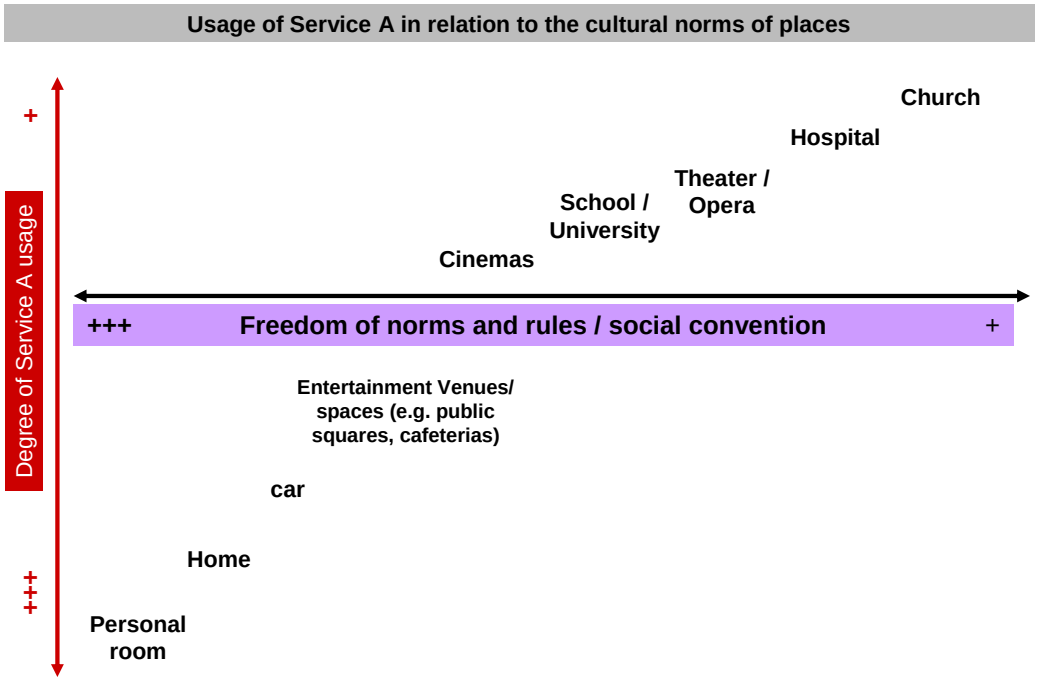

Figure 44 : Usage of Service A in relation to the cultural norms of places

Finally, should be noticed that no strict and well defined norms and rules of behaviour were observed in places that usage of Service A is high.

6.2.5. Place matters

The use of mobile data services is a ubiquitous activity by nature, meaning that it provides permanent accessibility and availability of information and communication to its users. According to the literature review, these services transform the way people experience space by personalizing it or by allowing activities in any place and at anytime. But contrary to voice calls and sms mobile

data services have to be initiated by the users themselves. This characteristic increases further the importance of place in the usage process.

Following the four research sub-questions let me attempt to answer the main research question which is: *how does place influence the usage of mobile data services*?

According to the findings, there are instances in time and places that would decrease or increase the possibility to use mobile data services. For example, the possibility to initiate usage of mobile data service while attending a business meeting or a service in church is very low. On the other hand, being in a car alone for a long time would increase to a great extend the possibility of using mobile services. In the following figure some instances in terms of their influence in the decision of the users to initiate mobile data services are classified.

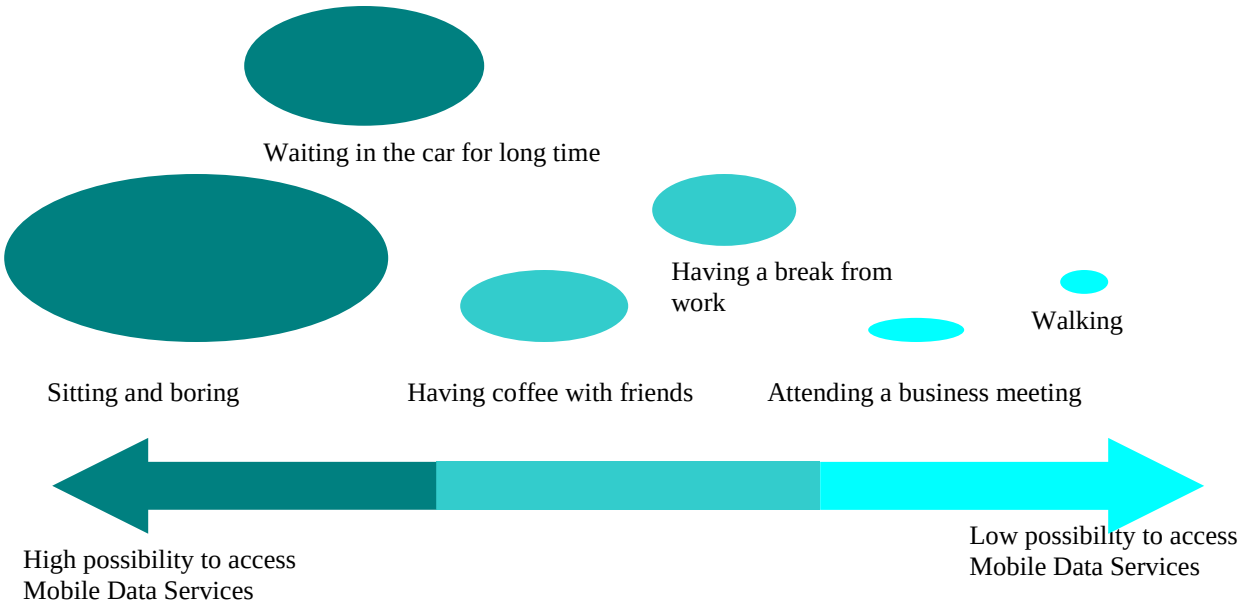

Figure 45 : Instances in time and place with different possibilities to access mobile data services

The main conclusion that was derived from this study is that **place matters** and can influence the users' decision to access mobile data services. In other words, place is a variable that cannot be neglected in the adoption and usage models when they are employed to explain the phenomenon of mobile data services usage since it appears from the data that people did experience the different places in a similar way when they decided to initiate Service A.

Furthermore, the study argues that the occasions in place and time to access mobile data services in the course of a day are not as many as it is believed. This is due to the fact that users are not alone when they are to decide to access mobile data

services but the interaction with the surrounding environment which consists of other people and artefacts has to be taken into consideration in relation to this decision because for example they can create negative emotional responses when used in specific public places. The interaction among these people and artefacts is mediated and bounded also by social rules and cultural norms.

6.3. Chapter Summary (Results and Reflections)

The research questions I have set out to explore have been answered through this thesis since the importance of place in the study of mobile data services usage process has been highlighted, and so has the need for further analysis. I have explored several conceptual approaches, and justified the adoption of a geographical perspective. Finally, I have applied this notion to the study of the influence of place upon users of mobile data services and studied how these users experience such a place before deciding to use mobile data services.

The results of this analysis and discussion show how the focus on the four layers of place throughout the research can give us important insights and patterns which could influence the attitude of users regarding usage of mobile data services. More specifically, the discussion of the data collected during the research phase reflected on how users experienced their surroundings when they decided to use Service A. I have focused, specifically, on their sense of place and cultural norms of it, their characteristics, their activities and their interaction with others within that place when they decided to use Service A. I discussed, analysed and explained – in some detail - the patterns that emerged through the data. It appears from the data that people did experience the different places in a similar way when they decided to initiate Service A.

Regarding the first layer, the physical design of the space aimed at immediately communicating to users that they were within a secure and comfortable space in terms of availability of time, sitting arrangements and privacy. Regarding the personal layer, the participants' specific demographic characteristics, their memories and past experiences that this physical arrangement would not produce unexpected events together with their emotions and feelings such as boredom generated within the place made the participants more prone to use mobile data services. The social layer of place was affected mainly by the informality of roles of the participants while the cultural layer was experienced by the fact that the place allowed more acceptable rules of behavior than those places where the rules of behavior were more stricked.

The attention towards the attributes of place appeared of great relevance in studying people's reactions and activities. The data also showed, following Tuan's beliefs, to what extent the four layers of place are tightly interconnected, thus the importance of an approach that considers them all as integral constituents of humans' behavior when they experience a place.

Overall, the conceptualisation of place that I have proposed in this thesis, the model of place produced through the combination of Tuans' theory and the Brahms language, was a significant factor in researching the usage process of mobile data services within real every day environments.

The four layers of place –physical, personal, social and cultural- together with the factors and attributes of them have proved useful in structuring the field studies and the interpretation of the data.

The multi-layered activities of the users of mobile data services were effectively and efficiently studied through articulation of place that I have proposed generating the model of place. In particular, this notion of place was effective in highlighting the importance of the influence of the physical, personal, social and cultural layers upon the decision of the users to initiate mobile data services, as they emerged from the data, and of the dynamic interconnections of the four layers of place.

7. Conclusions

7.1. Introduction

A summary of the key aspects of this research is presented in this chapter. It begins by reviewing the research objectives and briefly discussing the research approach opted for in order to achieve these objectives. The implications of the study for researchers, scholars and professionals in the mobile data services market are then discussed in detail. The limitations of the research are presented in the next section. The chapter concludes with a discussion on some potential areas for future research followed by the overall conclusions of the research.

7.2. Review of the Research Objective

As discussed in the introductory chapter (Chapter 1) as well as in Chapter 2 of this study, the low diffusion of mobile data services in European societies asks for more investigation in order to explain the users' behaviour within mobile networked environments. Furthermore, the limitations of the adoption and usage models for the case of mobile data services as discussed in Chapter 2 would require the examination and identification of more variables that could enhance and increase the prediction power of the adoption and usage models.

The first objective of this research was therefore to conduct an exploratory in nature research in order to study the usage process of mobile data services in real time conditions and everyday settings.

The analysis of the literature in Chapter 2 as well as the collected data in Chapter 4 showed that most of the mobile data services have to be initiated by the users themselves and for that, place is a variable that might have a "strong influence" upon the mobile data services usage process. Consequently the second objective of this research was to explore, understand and highlight how users experience the places they are in before they decide to use mobile data services. After linking the data collected and the model of place constructed in Chapter 2, the data presents numerous examples of how the different places influence individual actors on how to use mobile data services in order to respond to different situations. Thus the results presented here tend to suggest that place does influence the usage of mobile data services and for that reason it is advised to integrate its moderating role in the adoption and usage process.

On account of the complexity of the study of the users' behaviour in everyday settings, as discussed in Chapter 3, the final objective was to address the field study challenges by proposing and applying a combination of conventional and innovative research methodologies. I believe that the combination of traditional research methods with the introduction of new data collection methods that was applied, as described in Chapter 3, finally helped me to achieve this objective.

Above all, I believe that the following steps and decisions I took helped me to respond to all of the above objectives. These steps concern:

- the decision to study which instances in place and time are more prone to generate usage of mobile data services and identify their main characteristics
- Tuan's framework that was used as the conceptual model for my investigation, to deconstruct place into its materials, which called as layers in this study.
- the model of place that was constructed, by combining Tuan's framework with the Brahms model, as a tool for analysing the data,

- the interpretive qualitative research approach that was followed to study the influence of each one of the Tuan's materials in the decision process to use mobile data services
- the mix of traditional with the innovative research methods that were applied
- and the case study of Service A that was used in the study,

7.3. Review of the Research Approach

This particular study is regarded by the researchers to be an exploratory, interpretive, qualitative one, conducted in the field. This study took the form of exploratory research, given that it promotes the understanding of the role of place in the interaction of users with ICT technologies where little work has been done and little is known about the nature of the phenomenon" (Patton, 1990).

The research plan involves the development of the research questions, the collection and analysis of data and the presentation of the findings. Based on the philosophical and epistemological assumptions that have been adopted, the research approach I finally adopted, as stated in Section 3.1, is as depicted in the following figure.

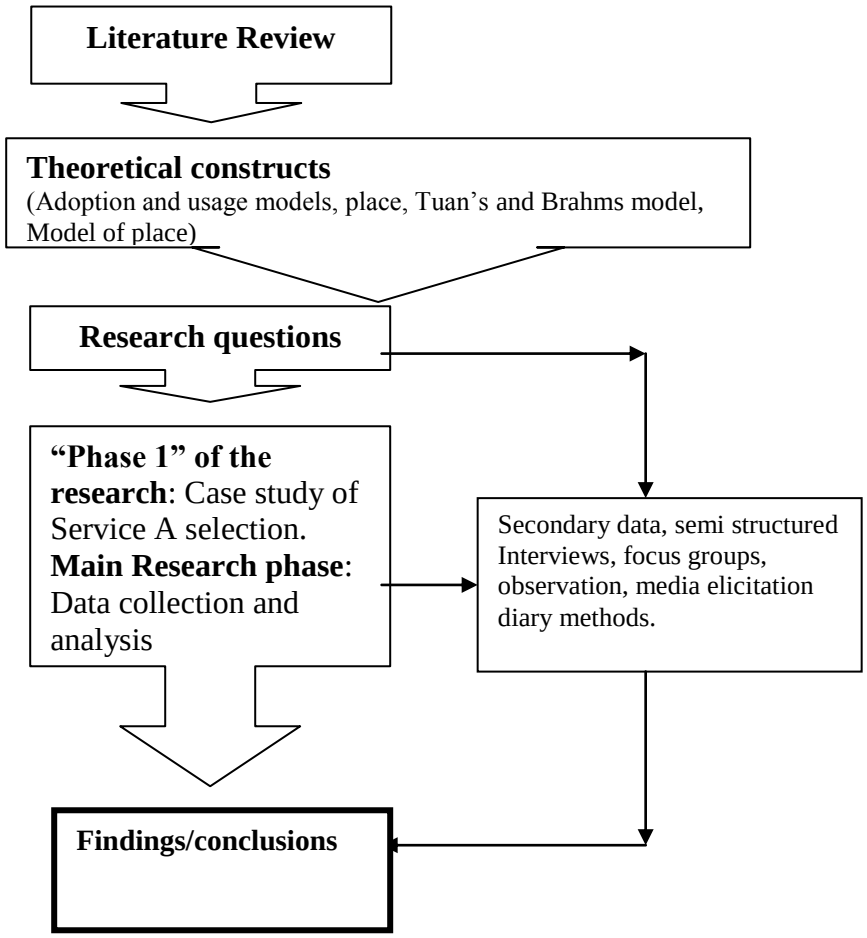

Figure 46 : Review of the Research Approach

In Chapter 2, the first phase of the study, the literature is reviewed and the research problem is defined. This problem, as described in the introductory Chapter 1, regards the low diffusion of mobile data services within European countries and the need to refine the adoption and usage models in order to increase their explanatory power and to provide a better explanation of the usage rates of information technologies in wireless networked environments.

In the next phase in Chapter 2, I established the fact that regarding the adoption and usage models the variable of place is not quite included. Since the new wireless networked environments allow users to use information technologies while moving from one place to another this fact led me to the decision to study the role of place in the usage process of mobile data services. In order to study and model place I decided which theoretical constructs to apply, hence based on Tuan's framework, and using the modelling theory of Brahms I developed a simplified "model of place". The decision for the theoretical constructs and models that would be used in the study assisted me with the development of the research questions.

A "phase 1" study of the Greek mobile data services market included in Chapter 4 gave me the possibility to select the case study of the mobile data services platform, called Service A that was used in this research.

A set of classic qualitative research methods in the form of in depth interviews and group discussions combined with self-reporting methods and a piece of ethnographic research, namely observation methods, as described in Chapter 3, were then conducted in the main phase of the research. The analysis of the collected data is presented in Chapter 5.

Finally, the findings are presented and discussed so as to illustrate the whole phenomenon. The final result is an interpretation of the phenomenon studied within the frame of the case study of Service A in the Greek territory.

7.4. Implications of the Research

There are several aspects of this study that are novel and interesting and give a number of upshots both to researchers and front line professionals.

I believe that examining usage and adoption of mobile data services is compelling, particularly due to technology's slow adoption rate. The application of an interpretive method enriches our understanding regarding the adoption and use of mobile data services beyond usefulness and ease of use and provides new variables that can enhance existing theories and models. Finally, and perhaps the most compelling aspect of this research is that the role of place as an important variable in the usage of mobile technologies and services is acknowledged. I believe that these upshots could influence those in research as well as the front line professionals, as explained in the following sections.

For Researchers

In this study I aimed to explain the usage behaviour of mobile data services by looking at a platform, Service A, which was successfully launched in the Greek Market but after 5 years it was gradually abandoned by Company A. Empirical data for the study was collected in the capital of Greece, Athens.

To answer the research questions I decided to describe how users behave within different places before starting to use mobile data services and how this behavior relates with the concept of place. The approach to study mobile data services usage behavior within different places through the lens of the geographical perspective, i.e. Tuans theory, gave me important insights and patterns and has proved to be useful in structuring the field studies and the interpretation of the data. More specifically, the conceptualisation of place, model of place produced through the combination of Tuans' theory and the Brahms language, and the attention towards the attributes of place has proved very useful in studying people's reactions and activities within real every day environments.

According to the findings, place seems to play an important role in humans' decision to use mobile data services since people did experience the different places in a similar way before deciding to use mobile data services.

Since technologies are becoming ubiquitous, being able to be used anywhere anytime, place seems to be an important factor which cannot be neglected in the study of the adoption and use of these technologies. Within these studies the notion of place that was proposed could effectively highlight the dynamic interconnection of the physical, personal, social and cultural layers upon the decision of the users to adopt and use ubiquitous technologies.

I could argue that although this research tried to explore how humans experience place before deciding to use mobile technologies within a specific context, its findings can be used to highlight other aspects of human behaviour as for example how place relates to the mobile data services usage duration and frequency.

Overall, a logical and interesting avenue to explore with respect to mobile technology adoption and use is the place where such use takes place. I could argue that utilizing Tuan's perspective on place is an appropriate approach and can provide a theoretical basis for a stream of future research. For example, other research domains such as the application of cognitive neuroscience for the IS discipline (Dimoka et al., 2007), could benefit from this study since it can explore how the attributes of place as proposed in this study relate to conscious and unconscious decisions of humans when using ICT technologies.

I also believe that the methodological implications of the adoption of the geographical perspective as expressed by the Tuans theory could constitute a perspective that could be used to facilitate research on studying the interaction between the users of ubiquitous technologies with their surrounding environment. Within this study this approach was expressed through the research methodology that was introduced, that is the combination of traditional with innovative research methods, along with the "model of place" that was constructed.

The literature review in chapter 2 highlighted the fact that the adoption and usage of models when studying mobile technologies and services need to be enhanced with more variables. This study can be successful in helping researchers understand issues related to mobile technology adoption and use that are richer and more compelling than the TAM variables because the latter examines the adoption and use of mobile technologies that do not include only "overt" discussions of ease-of-use and usefulness.

Furthermore, this study can assist researchers understand issues related to Service A failure in the Greek market as described in chapter 4.

The study proposed the needs-place-applications concept concerning human behaviour patterns which as I believe; further research to this end will improve current capabilities of human-mobile phones interaction. In this perspective it becomes imperative for future devices to reflect efficiently on user attitudes and infer an internal model of a specific user in order to accommodate the particularities of its behaviour. This would give the possibility to create devices, including mobile phones with increased personalization achieving thus the best possible user-friendly environment. Given the increased interest in pervasive and ubiquitous computing, such a next step becomes a must given that most of our surrounding environment will be occupied by all kinds of intelligence. Emotional intelligence then will not be just a luxury, but a necessity for the efficient and smooth cooperation between working humans and machines.

Thus it is proposed to researchers to design a general strategy for setting up continuous models of personality and emotional profiles based on appropriately classified external signals for a hypothetical user whose state is continuously scanned by a set of sensors. The starting point could be the approach which is proposed by Machine Learning theories and robotics which deal with the problem of manipulating expressions of the human face (Nishiyama et al., 2003). This approach could be extended by making use, for example, of the so called "Big Five Personality Traits" the descriptive model of psychology. From this model a dynamic system capable of recognizing the particular behavioural pattern corresponding to the specific user could be developed.

For the front line Professionals

While a key measure of any theory is its practicality, some scholars have noted that many theoretical concepts, models and frameworks usually are nonetheless influential on practice (Van de Ven, Angle, & Poole, 1989; Weick, 1995). Also, the conclusion from a number of studies is that the problem of relevance and practicality also plagues IS research (Galliers, 1994; Benbasat & Zmud, 1999).

This study has provided conclusions to those involved with the ability to promote mobile data services adoption and usage and to manipulate users' perceptions for better interventions. There are several key design upshots for mobile data services and the devices and infrastructure to support such services that emerge from this study. The findings indicate that, when developing new mobile data services, the mobile service developers should build on the characteristics of place, mobility and on the benefit of being always online. Successful mobile data services are therefore likely to provide users with localized and tailored to the needs of the user services within the specific place. The findings also ask for simple and timely mobile applications which are easily accessed in order to improve the users experience when on the move and avoid delays and thus negative feelings and of course ask the industry to minimize the cost of the service.

The implications of the practical findings are proposed and discussed below.

Firstly, the users complained about a lack of available applications and content as compared to the corresponding ones of the internet. It should be mentioned that Service A allows users to access content through its own web site. This does not seem to satisfy the users who would ask for another way of access to the mobile internet accessed via the mobile phone. For that reason, there is a need for more branded sites and more available content providers. The participants argued that they would usually access 3-4 favourite portals such as google[93], in.gr[94] and cnn.com when accessing internet. All participants mentioned the high cost of

[93] www.google.com
[94] www.in.gr

mobile data services; hence the industry has to consider trying for alternative business models that would lower the cost of use in order to boost the market.

The users complained about their negative experiences related to the low aesthetics of the internet sites they accessed via Service A and the frequent interruptions and slow downloading speeds they experienced. This should make mainly the marketing departments less optimistic in their advertising messages when promoting mobile data services usage.

The front line professionals have also to take into consideration the demand of the users for more applications that will serve other areas of interest as for example emergency situations, fitness and health care. The analysis of the data revealed that the majority of the participants do not attach any emotional values hence they are not emotionally attached to Service A, so front line professionals have to develop more applications that will strengthen the social needs of the users and thus deliver more emotional values to them.

Also, according to the findings, some groups of users (youngsters, middle to upper social status) seem more prone to use mobile data services more often and more easily than others (older users) because of their motivation, skills and confidence in these technologies. It seems that there are barriers such as the lack of skills and lack of confidence regarding technologies which are hard to overcome for those who are at a social disadvantage due to their age or due to their financial situation. Thus the development of ease of use and lower cost mobile applications is a fundamental prerequisite for expanding use within disadvantaged groups and reducing digital inequality.

The argument that some of the materials of place, such as the state of boredom when the user is in environments of no interest, could play influential role in the decision to use mobile data services and thus benefit the developers of applications. This conclusion implies the requirement for an "emotionally aware" mobile phone that can react to our emotions and pick the right emotional moment to try to sell the suitable mobile data service. For example, one conclusion of the study is that there are time slots when users fall into conditions of boredom. Since people express their mental states all the time through facial expressions, vocal nuances and gestures an "emotionally aware" mobile phone could have the ability to determine the individual's mental state based on his/her behaviour. This mobile phone could exert a mesmerizing power of distraction, somehow absorbing the users' boredom making them for example join a mobile game or surf the web or watch an advertisement. Advertising mobile services, such as the Blyk,[95] allow advertisers to reach young people using the only channel that they carry with them everywhere, their mobile devices. They are targeting youngsters because they use mobile phones not just for talking but also as multimedia devices capable of playing music and video. Blyk's advertising products are based on a mobile behaviour pattern

[95] www.blyk.co.uk

among 16-24 year old consumers, which is getting a message and responding to it. Being able to identify the time slots when youngsters become bored is an opportunity to send advertising messages and increase the response rates. This is the orientation of the research, that is developing mobile phone interfaces that can gauge an individual's thoughts by analyzing facial expressions (Fagerberg, Stahl, & Hook, 2003; Trank, 2004).

Secondly, the argument that the time to use as compared to the time to afford would influence the decision to use could provide a good way to developers to add value to the mobile data services by designing shorter and faster applications. These applications should also observe the behaviour of the users, and over time optimize its data retrieved to reduce the amount of time the client has to wait. The users will decide to access an application and download data if the value of this action is higher than the cost and the time they have to spend. For example, the content providers should promote and provide shorter videos for mobile platforms compared with the videos that are provided on the Web. This will lower the cost of downloading files and the necessary TTU the users have to afford to use the service and will increase the value of the applications to the user.

Thirdly, it became evident from the study that the characteristic of the mobile data services to unidirectional applications is a parameter that increases the importance of the surrounding environment in the decision to initiate an application. The developers could overcome this constraint by equipping mobile phones with context aware applications. These applications together with emotional aware applications could send stimulus to the users or propose to the users' specific services when they identify certain behaviour patterns. For instance, the mobile advertising companies could better promote their products by sending their advertisements to the users when they are in specific locations. These applications will give mobile data services a more proactive role increasing the usage rate.

Furthermore, the findings showed that users prefer locations where they feel protected from unwanted viewers. This argument calls for the development of screens whose content is invisible to the others allowing users to access mobile data services even in crowded environments without the concern that someone may look at their screens. The finding that users are very concerned about when they use mobile data services in public areas, would require from the front line professionals to invest in security issues when developing mobile applications.

Finally, the finding which reveals the fact that users prefer indoor places to access mobile data services has to be considered by the mobile service operators as a threat. This is due to the trend that wireless networks such as WiFi are being developed within indoor areas. It should be noticed that the new mobile devices equipped with WiFi receivers as for example Nokia N95, allow users to access free mobile internet by bypassing mobile data service platforms as the Service.

This study explored the ways users experience time and space when they decide to use mobile data services. According to the findings, we do not simply sit or move around. We interact with other people, surrounding places, objects and symbols all the time. Therefore, the mobile data services need to provide more than simple information, communication and entertaining services to satisfy the needs of a user who is alone. Thus front line professionals need to develop mobile data services, integrating the so called Web 2.0 technologies into mobile devices, to support the various needs for interactions as we exist and move in time and space.

7.5. Limitations of the Research

The present study offers several research avenues, yet it certainly has some limitations. Hence, the findings of this study should be interpreted in the light of these limitations.

First, one drawback is that it is difficult to argue that the findings of this study definitively represent the views of the entire community since the participants represented only a small sample of the community. More specifically, the thirty users who participated in the study had common ethnicity and religion and thus similar emotional perspectives to cultural understanding of the places and no user above 38 participated in the study excluding a major part of the social community. Thus, there is a criticism vehemently supported by Kraemer and Dutton (1991), who argue that random sampling is the only strategy whose results are truly generalisable. Furthermore, Lee (1989b), has associated the concern of the generalizability of the results with case studies, whereby the results from a case study cannot be applied to other settings, but only to the context where the study was conducted.

However, within the scope of this study it was considered more beneficial to the research process and objectives to construct a sample of interviewees not randomly, but rather purposefully. Thus the sample of participants had special characteristics. For example, they (i) were users of Service A and (ii) were residents of Athens having similar cultural characteristics. Such a sample is suitable for the context of exploratory research where any conclusions would form the basis for future research and validation using different research methods.

According to Tuan (1977), the cultural identity of a place is related to the cultural influences, social rules, values, conventions, norms and meanings people assign to the place. Cultural layer has also communal elements since the presence of others who physically share a space and culturally share experiences contribute to one's making of a place.

Tuan discusses the architecture of the built environment as an example of a cultural identity that converges in the creation of a place. Furthermore, in order to understand place it is necessary to link the spatial, the personal and the social layers of a place to more cultural understandings of place, shaped by, for example, religion and spiritual beliefs, ethnicity, cultural heritage, race, country of origin, language, gender, age, sexual orientation, socioeconomic class and education.

Although place carries different sets of meanings in different cultures and different groups of people I have decided, within the realm of this thesis to keep the model of place as simple as possible considering only the social etiquettes and cultural norms of public places. More specifically, I decided to study the cultural layer of a

place studying only the banned versus non-banned places in terms of use of mobile phones and mobile data services. I believe that although the cultural layer in the future should be enhanced with more cultural identities as described above, the proposed identities provided in the realm of this study can give quite a complete picture of the relation of a place with usage behavior of mobile data services. Furthermore, few of these identities such as age, gender and socioeconomic class have been considered, studied and analysed in the personal layer of the model of place. Others such as religion and spiritual beliefs, ethnicity, cultural heritage, race, country of origin and language couldn't be studied as variables because all of the participants came from the same ethnicity group.

Within this study I have adopted the Humanistic Geography perspective presented by Tuan (Tuan, 1977). This perspective as described in chapter 2 adopts an interpetivistic stance and focuses on qualitative research methods. Adopting this stance my goal was to qualitatively assess the collected data. Although the methodology I applied together with the coding process allowed me to identify trends and patterns, a lack of generalisability can be claimed for the selection of Service A as the case study to research and present the outcome of this research. However, as discussed in Chapter 3, the research complied with Yin (2002), who states that a single case is acceptable if that case is significant or unique. The objective of the selection of the case of Service A was to illustrate the role of place using a state of the art mobile data services platform that offers in practice a bouquet of applications. This study had not been done before, the phenomenon of usage of mobile data services within wireless networked environments is quite new, and therefore rendered it unique and revelatory.

Second, the case, service A, the context of research and the chosen methodology are not typical or representative of other IS studies and therefore someone would expect that an application of the study to other group of users in other countries would yield quite different results, given the social nature of the usage of mobile data services. Furthermore, because my empirical results are based on a single-case study in one country only, far reaching conclusions should not be derived from the data. As I did not identify studies with a comparable approach, I have not compared the results to the ones of other countries.

On the other hand, when conducting interviews, there is always the possibility that a researcher's bias may cause "through inappropriate suggestions, word emphasis, tone of voice, body language, and question rephrasing" (Cooper & Schindler, 2003), and is accepted by interptretivist as inevitable. While still accepting this as a limitation, this research used open-ended questions that would give the interviewees every opportunity to express their own opinions in their own terms. There is also a possibility that the researcher may introduce bias through their physical presence, especially during the observation phase, influencing thus the responses of the interviewee. In this research, although interviewees were generally relaxed, forthcoming, informed about anonymity and of the fact that they were

being recorded by means of a digital audio device, there always remains the possibility that some unnatural behaviour was caused by the intrusion of the interviewer.

Finally, another limitation of the research methods applied is that while they provide deep insights into usage behaviour of mobile data services within different places, they only represent a snapshot in a given timeframe, which for the case of the main research phase was March to May 2007. As presented in Chapter 2, the mobile technologies are evolving rapidly generating more advanced applications and services, and therefore research such as this may require periodic updates in order to avoid obsolescence.

7.6. Potential Areas for Future Research

Given the fact that the market is still at an early stage and the lack of profound empirical evidence on the influence of place upon mobile data services usage behaviour the results do suggest avenues for future studies. First of all, future research could also attempt to refine the findings of this research by drilling down on some of the constructs and models in greater depth. Secondly, as stated earlier, this study is exploratory in nature; therefore, the first obvious path for potential future research would be to conduct the study again, but to adopt a more explanatory scope by formulating a set of hypotheses based on the findings of this research. Applying quantitative data collection methods and analyzing users' location data coming from the mobile service providers would assist the validation of these hypotheses.

Thirdly, further research is needed on this emerging topic to conceptualize and define all the factors that characterize the place in a more precise manner. The sample of participants selected for the study was not random, but rather purposefully constructed. The users were chosen according to specific criteria.They had to be frequent users of Service A, low entropy users in order to have certain behavioural patterns and not too elderly to eliminate time perception differentiation. Also, the study was based on a worldwide success platform, rich in content and applications, mobile data service, but on a single culture and with familiar and experienced users. The need to expand the study with users coming from other cultures (culture is an important layer in the place model) and different "entropy" categories are necessary to strengthen the findings and identify other attributes that may influence usage behaviour. Furthermore, the identification of more hidden factors and attributes could be facilitated by studying the behaviour of less experienced users as well as including users over 40. Thus the study should be replicated with larger sample sizes and more representative groups of respondents.

By conducting qualitative research we have to remember that the responses of interviewees are influenced by the paradoxical way of living and conceiving the use of mobile technologies (Mallein, 2007). For example, concerning the space layer users are using mobile data services for gaining time (to book a cinema on the move) and wasting time (idle moments). In the personal layer users are devoting themselves to multitasking activity (using Service A in whole) and concentrating on one task (absent from the group). I also noticed the paradox of mobility and immobility, activity and inactivity meaning that the users want devices and services helping them to be active and inactive, mobile and immobile when they want, when they need. Furthermore, in the social level users relate to others by living separate and living together. Future studies could also test and further develop the model of place to better understand how the paradoxical way of living and conceiving the use of mobile technologies is related to place.

The main drawback regarding the design of human behaviour models is the human nature itself: the quantity and variety of behaviours of human beings is so wide that it becomes very hard to build a human behaviour model, even in restricted discourse domains such as the usage of mobile data services. Thus the accuracy of the modelled behaviour depends on the accuracy of the a-priori knowledge used. The confirmation of the accuracy of the findings of this study could assist developers to model human behaviour in terms of usage of mobile data services. More specifically, the conceptual descriptions that have been generated and qualitatively described the observed behaviour of users of mobile data services could assist software applications to predict social behaviour. A good example is the Brahms' application (Sierhuis et al., 2007), that models human behaviour and extract patterns of behaviour. These models could be used by marketing people and market research practitioners to better predict usage and adoption of specific mobile technological products.

According to Eichele and Albers (2008), lightweight and portable mobile and wireless EEG (electroencephalograph) devices to measure the brain's electrical activity, are being designed and developed allowing the researchers to understand more easily the brain mechanisms underlying human behaviour on making decisions. Dimoka et al., (2007), argue that IS research can benefit from recent cognitive neuroscience advancements, introducing the field of Neuro-IS since these have brought into light and have provided insights of the neural bases of human psychological processes and behaviour. Thus such EEG devices could be used to study the brain activity considering the attributes of place for example when users decide to use mobile data services when being in a boring situation or within different places. These issues go beyond the scope of this thesis, although I am aiming to continue investigating them in future work, as well as continuing my investigation around place and its influence of behaviour against mobile technologies.

This study could also give enough data to the scientists who study the users' behaviour and human interaction within real context based on usage of mobile phones[96]. On the other hand, this study should be complemented not only by subjective sources, for example quantitative data but also by the application of the objective techniques of the "reality mining[97]" discipline. This method could provide a more accurate picture of what people do when they are out of their offices, of where they are and with whom they communicate or collaborate when they use mobile data services and thus deduct more accurate conclusions regarding the influence of their environment upon their decisions. In terms of potential research topics and questions in a general sense, this study showed that there are

[96] www.businessweek.com/technology/content/mar2008/tc20080323_387127.htm?campaign_id=rss_tech

[97] http://reality.media.mit.edu/complex.php

many issues that remain unresolved, for example the perception of time in the usage process of mobile technologies.

Based on the acceptance models of (TAM) and UTAUT which have been suggested by prior studies as applicable frames of reference for mobile commerce context (Hung et al., 2003), in chapter 2, I could argue that this model should be enriched with the moderating factor of place. Furthermore, the place fully mediates the effect of usefulness and ease of use on use intention, suggesting that the benefits of mobile services will depend on the places where they are used. The results indicate that the general adoption theories need to be augmented with specific attributes of place which seem to affect the intention to use mobile services.

In future work I aim to further develop the model of place and its attributes and focus on:

- Investigating its relevance to mobile data services usage behavior when applied in different applications (e.g. the advanced 3G compatible iphone service).
- Exploring other attributes of the model of place, such as the underlying attributes of voluntariness, culture and others.
- Studying the potential of a greater variety of methodological tools such as the methods coming from the cognitive neuroscience field as proposed by Dimoka et al. (2007), in capturing peoples' experience of place when they decide to use mobile data services.
- Modeling the use of mobile data services within different places using the Brahms modeling tool in order to generate a tool, which could be used by market research companies, which can predict the adoption and use of new mobile data services within different places.

7.7. Final conclusions

Within this chapter I reviewed the research objectives and tried to address how this study answered these objectives. These objectives were to explore, understand and highlight how humans experience the places they are in when they decide to use mobile data services, to conduct an exploratory in nature research in order to study the usage process of mobile data services in real time conditions and everyday settings and to address the field study challenges. According to the research approach adopted, an exploratory in nature research was conducted combining conventional and innovative research methodologies which addressed these research objectives. The units of analysis were end users who perceived the mobile data services platform that was used for the research (case study of Service A) as a poor substitute of internet. A model of place was generated which served as a sensitizing device for looking at, interpreting, and analyzing the collected data.

According to the findings, place seems to play an important role in the humans' decision to use mobile data services since people did experience the different places in a similar way before deciding to use mobile data services. Also, the findings suggest that during daily activities there are fewer options of "suitable" places to use mobile data services. Quite a few factors and attributes of place seem to be influencers of mobile data services usage behaviour. Among others the influencers that would trigger the usage of mobile data services are the users' low mobility status accompanied by feelings of familiarity, security and comfort, the emotions of boredom, the perception of time, the feelings of freedom of norms and rules and the informal roles the users adopt in their social interactions.

The upshots of these findings concern the researchers who have to consider place as a potential variable for future research as well as the front line professionals who have to consider the importance of the above place attributes in relation to the design of mobile applications. Finally, the limitations of the research approach that was applied have been presented and the potential areas for future research have been proposed.

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Appendix A - Contact E-mail Sent for “Phase 1” Interviews

Dear [name],

Let me first introduce myself, my name is Papadopoulos Homer and I am having my Phd thesis in the University of Bath/UK, examining the influence of place in the usage behavior of the mobile data services.

The objective of the study is to identify which spatial factors influence the usage behavior of mobile data services and to propose methods to increase usage.

I have selected a group of 14 experts in the field to participate in a series of interviews, and have included you on this list, as you may have guessed by the fact you are receiving this email.

I was hoping to grab around 1 hour to chat with you at some stage in the near future. I appreciate the fact that you are probably very busy, but it would mean a lot to us if you could find the time to take part. I have attached a brief document which describes my and the rationale behind it. Please do not hesitate to contact me if you have any queries. You can contact me by phone at +210 6511020, or on my mobile at 6932677311 at any time. Alternatively you can send any written queries via email or to my postal address below.

Regards,
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Appendix B - Interview guide – « Phase 1 » of the research

(Semi-structured interviews were carried out from September 2004 to May 2005)
I tried to gain key insights from the Greek mobile market, to understand the key characteristics of the mobile data services and understand the adoption drivers for most of them.
Four main groups of questions aimed to highlight the previous objectives.

- New mobile data services development process
- Understand Service A competitive characteristics, its business model and how this might assist the adoption of mobile data services in the Greek context
- Target groups and mobile data services I should focus for the main research phase
- Trends and future strategy from the companies concerning mobile data services

1) Collection of Background Information (Regarding the role of the company)
(<10 mins)
(i). What is the main business subject of your organisation?
(ii). How would you classify your organisation ?

- Services provider
- Content provider
- Technology provider
- Content producer
- Public organisation
- Organisation specialised in producing studies and researches
- Other (please specify):

(iii). Which of the following subject areas is the main activity of your company?

- Consulting
- Information technologies/Telecommunications/Engineering
- Industry/Manufacturing
- Services
- Other (please specify):

(iv). Approximately how many people are working on this area?
(v). Are you a producer or provider of mobile data services?
(vi).Please indicate your main role within the mobile data services value chain:

2) Collection of Main Information (Development process/ Service A advantage /Target Groups/ Trends)

A. New services development process (15 mins +)

(i). Do you consider the mobile data services that you offer as successful?
(ii).What improvements in the mobile data services have been achieved in the last three years?
(iii).What are the processes and technologies that lead to the development of new services?
(iv).To what extent new product designs are tested and validated for the end user prior to product development?

B. Service A competitive characteristics / business model ***(15 mins +)***
(i). Are you satisfied with the Service A Business Model?
(ii).How do you relate with the other members of the value chain?
(iii).Do you believe that the quality of these relations is important for the success of these services?
(iv).What are your revenue streams from these services?

C. Target groups / attractive mobile data services ***(15 mins +)***
(i). What is your feedback from the users of your services?
(ii).What groups of users are the most attractive to you?
(iii).What are the characteristics of heavy users in Greece?
(iv).How is the market segmented? (*To help building market segmentation)*

D. Trends and Future strategy ***(15 mins +)***
(i). What are the most attractive applications and the most promising mobile data services?
(ii).What characteristics do these mobile data services have?
(iii).How positive do you feel about the future of mobile data services and the ARPU that these will generate?
(iv).In what direction is your future strategy? For example, do you intent to target business niche markets?
(v).How do you intent to increase mobile data services adoption and use? In what characteristics are you focusing and investing heavily?
(vi).How does the corporate strategy and the new services development processes integrated into the product strategy?

3) Any Other Relevant Information

Appendix C - Interview guide – « Main Phase » of the research

Discussion outline for the focus group sessions among users of Service A

Estimated duration of the session: 2, 5 hours

Section I : Brief description of the scope of the interview and brief introduction with respondents

- Description of procedure to respondents and their role within the group discussion

Brief explanation of duration of discussion, topics to be covered and purpose of the session that is: to identify attributes – (aspects) of place, mobility and always online benefit that influence more the decision to use mobile data services and thus act as moderating factors to the facilitating conditions to use Service A services.

Introduction with respondents in terms of name, user profile (age , gender, educational background), occupation, favored activities, lifestyle.

I asked users to fill a simple questionnaire as following.

1. Age group
   - 14-18
   - 19-24
   - 25-38
2. Sex
   - Male
   - Female
3. What is your profession?
4. Do you find Service A an expensive service compare with your economic status?
5. How often do you use a computer?
   - Very often
   - Frequently
   - Sometimes
   - Never
6. How often do you use the internet?
   - Very often
   - Frequently
   - Sometimes
   - Never
7. How often do you use Service A?

- Very often
- Frequently
- Sometimes
- Never

8. Do you find Service A an easy to use service?
    - Yes
    - No
8. Did you find Service A useful?
    - Yes
    - No
9. Please you describe your most favorite activities.

Section II: Exploration of attitudes and influencing parameters affecting usage as described unprompted by respondents:

- Familiarity with the list of services offered by Service A
    1. Awareness
    2. usage
- Sites visited: news, maps & info, chat & date, sports, mobile banking, entertainment, astrology & humor, games, travels & on line booking, games, wallpapers, ring tones, on line buying.
- Frequency of visitation of the above sites
- List influencing parameters to Service A usage as described by respondents
- Assess relative importance of these parameters according to respondents with justifications
- Record frequency of usage of Service A services by respondents
- Fluctuations of frequencies stated by respondents with justifications
- What does the user tries to achieve through the service (Work-oriented versus entertainment, emotional cover, protected, security etc.,)
- References of occasions during which Service A usage has facilitated respondents needs for information, entertainment, communication or any other as apply. Describe these occasions illustrating: time, place, mood, need state of respondents
- Perceived practical benefits associated with the use of the different applications of Service A
- Perceived emotional benefits (security, freedom, stress management, fill your boring time etc)
- Which of the Service A services is the most important to you (provides you the most benefits)
- Explore the competitive advantages of assumed Service A competitive services: \teletext, internet, press, TV, radio, mouth to mouth information transmission
- Advantages and disadvantages of Service A; per service as compared to rest alternatives

- Conclusively; Assumed added value by using Service A as compared to all other alternatives

Within this section I explored if and how the "always online" benefit affects usage behaviour:

- Can you describe how do you feel having your mobile phone with you?
    - What does the benefit "being always online" mean to you personally? List and prioritize these benefits.
    - How do you feel each time you don't have your mobile phone with you?
    - probe on : more power, safer, with less anxiety, more efficient, more effective etc. describe this feeling ?

- Do you think that the following benefits influence your decision to use Service A? If yes in what way?

Having control over contexts that are far away
Being able to contact anytime – anywhere other users who are not physically co-present.
Having access to data and services anytime anywhere

- Does the feeling of carrying your mobile phone with you and that being "always online" change your perception about the place you are? If yes in what way?
- Do you believe that being in an emergency situation (surveillance services, use LBS to go faster, use telemedicine services etc) influence your decision to use Service A services? In those cases how does the "always online" benefit make you feel?

Section III: This section concerns the main Research Question.

This question asks how does place influence the usage of mobile data services?. The questions explore the place's characteristics, according to the model constructed from the Tuan's theory and Brahms model, that affect users' decision to access Service A services. I will try to identify which factors and attributes based on the proposed model affect users decision to initiate usage of Service A.

Research sub-question 1 (Space Layer): Which spatial factors and attributes mainly affect user's decision to use mobile data services?

First I will ask respondents to recall in their mind where they mainly use Service A services to identify time zones and key locations with high rates of mobile data services usage as well as to identify the environmental conditions and the objects that surround them when they make a decision to initiate usage of Service A:

- **Time influence**: What season, day and time was it? How much time did you spend within that place?
- **Location influence**: being in the city versus being outside the city or abroad, being inside a building versus being outside a building etc.
- **Objects influence**: Can you describe the location you were in and the built environment? Was there, anything important to you? Perceived competitive advantage of using Service A as compared to other alternatives (eg. using Service A to access news instead of radio news): I invite respondents to spontaneously recall alternatives activities within this place. Which of the following senses, sight, taste, smell, hearing and skin sensitivity, if any characterized that situation when you used the Service A service?
- **Environmental conditions influence**: Can you describe us the physical conditions, temperature, light, noise, wind speed, raining etc., existed in that place? Which of these weather conditions characterized that environment? Anything special to mention?

Research sub-question 2 (Personal Layer) : How does the personal layer as defined by Tuan affect user's decision to use mobile data services?

I will ask them to attach to these key locations their condition (psychological, mobility status, activities, their attachment with the place etc.).

- **User's attributes influence: Most of t**hese attributes where covered in section

I tried to explore the perceived level of complexity for each service from the users side. Probe on: MMS, email, video recording, internet downloads, Sites visited: news, maps & info, chat & date, sports, mobile banking, entertainment, astrology & humor, games, travels & on line booking, games, wallpapers, ringtones, on line buying

- **Place attachement influence:**

Previous knowledge of the place: have you ever been there before? How often you go there?
Personal experiences and memories related to the place: what specific experience or memories do you relate with that place? Can you list positive and negative experiences you relate with that place? Do you feel safe in that place?

- **Emotional status influence:**

What emotional and practical benefits attached to visiting the above place?
What beliefs, emotions and attitudes are associated to that place?
How do you feel being there? eg. safe, anxious etc. a consumer considers practical and emotional benefits.

Investigate emotional aspects affecting usage; explore dimensions relevant to mood, emotional state of user. Can you recall in your mind your emotional status (Anxiety / stressed, tired, bored, happy, sad, angry, frightened)? In what way does this status relate with that place?

- **Activity influence:**

I tried to explore the influence of the user's mobility status upon the decision to use mobile data services.
For that first I have to identify the role of mobility and the always online benefit in the usage process first exploring which factors affect usage in relation to the modalities of mobility:

What was your activity status, (standing, sitting, walking , running, exercising in a gym, working etc)?
Modalities of mobility: what was your type of mobility, (traveling, wandering, and visiting) ?
Detail questions will clarify the mobility status:

- Where are you going to and coming from?
- How are you traveling?
- What are you doing during your travel?
- Do you expect to arrive early, on time or late?
- How long do you expect to wait?
- Did you consult any resources when you were planning this trip?
- Is there anything special about this trip?

Did you use Service A services when in a specific modality of mobility eg. being in a car, or walking, or visiting shops, or being in a café etc. ? Which mobile data services did you usually use when being on the go?

User's life entropy (high – low): Can you describe the activities of an average day of your life? You can choose activities from the following matrix, which describes any possible daily activities when away form work and home. (Self complete exercise).

Transportation:	**Shopping**		**Business activities**	**Educational activities**	**Health activities**	**Fitness activities**	**Social activities**	**Entertainment activities**
By foot	**Daily :**	**Other shopping**	Banks	Kinden garden	Hospital	For walking in the park, in the square	Visiting friends	Cafeteria
By taxi	Supermarket	For clothes – shoes	Municipality	School	Doctor e.g. dentist	Fitness – swimming – tennis – football etc	Cultural events	Cinema
By car	Flea market	For home	Public services etc.	High school	Pharmacy	In the kinden garden	Watching a sport event as a football match	Theater
By bus	Butchery, bakery, grocery	PC	For sales	University	Pension funds as IKA	Jogging – walking		Concerts
By coach		Books , cd, dvd						Restaurants
By train								Bars – clubs
By bike								Sports events
By motorcycle								
By airplane								
By metro								
In a car someone else is driving								
Private bus : school bus								
Electric – Trolley								
By boat								

Research sub-question 3 (Social Layer) : How do the social activities and norms within a place affect user's decision to use mobile data services?

- **"Roles of the user" influence:**

Can you describe the social environment in that place? You were alone, with friends, with partner, with family? Can you describe your social role you had there? (employee, student, being with friends, member of family, member of a team, alone, with a girlfriend/boyfriend etc)

- **"Interaction status" influence:**

Did you have interaction with others in that place? If yes can you specify what kind? (communication, collaboration within the place etc).

- **"Communities" influence:**

What did you do in that place? You were for business issues or you were having leisure activities among friends? Culturally sharing the same values, ethics and meanings: do you think that the other people in that place share the same values and ethics for that place?

Research sub-question 4 (Cultural Layer)**:** Which cultural identities of a place mainly affect user's decision to use mobile data services?

- **"Norms and rules" influence:**

The place you were in, was Private, public or semi-public? Were there any certain rules of behavior and conventions for the place you were in? eg in the school there are certain rules, cafeteria more relaxed, church strict conventions etc.
Did this place have any special cultural identity? eg museum, opera, Did you feel impressed from that place? Did the presence of other individuals influence your actions within that place? Specify please.

Section 4: Finally I tried to detect areas for further improvement for Service A

- Respondents will be asked to elaborate on the barriers eg. within a place, which constitute counter-motivators for using Service A
- Explore comparative importance among the suggested barriers for using Service A as suggested by respondents
- Invite respondents to propose areas for improvement with regards to the Service A services, to better respond to their personal needs
- and to become more competitive against suggested alternatives per service used by respondents
- Which of the following services, Location based services, Video phone, streaming services as mobile TV / Radio, do they find more useful and why?
- Respondents will be invited to make their closing arguments regarding their overall perception of Service A and their future intensions regarding Service A usage.

Thank respondents and close session.

Appendix D - Coding Examples from the "main phase" interviews

[M:16:high school:high spender]		profile coding
'This is like our code...when something really funny takes place, we instantly share with a MMS that is if you belong in our trust cycle '	[Personal_layer/user's_attributes/age]	classification code
	[sharing]	conceptual code
	[capturing the moment]	conceptual code
	[Acceptance_ participation_ in_ a_ peer_ group/relationship]	pattern code
" I am the "champion" in writing texts in mobile phone. All the others are slower. How do I know that? We have tested our skills in this enough times during breaks in the school. I am proud of that".	[Personal_layer/user's_attributes/age]	classification code
	[pride]	conceptual code
	[differentiation]	conceptual code
	[Individuality and Emancipation]	pattern code

[F:17:high school: medium spender]		profile coding
"time to time we are ringing our friends' mobile phones and wait for reply. If this happens we know that everything is fine. We use to do it when we are out of budget and we can spend more for prepaid cards. If we are in budget and we have enough money to spend for prepaid cards we used to send MMS of emails using service A as a way to communicate with friends. We do that as an everyday task".	[Personal_layer/user's_attributes/age]	classification code
	[sense of belonging]	conceptual code
	[security concern]	pattern code
	[Acceptance_participation_in_a_peer_group/relationship]	classification code
	[Personal_layer/user's_attributes/ socio-economic status]	conceptual code
	[economic efficiency concern]	conceptual code

[F:16:high school:high spender]		profile coding
The 16 year old girl who has been interviewed by me, told me that " I have bought this lovely accessory for my mobile. It fits with the real-tone I am using. They both come from my favourite movie "shrek". My mobile phone is part of me, part of my character".	[Personal_layer/user's_attributes/age]	classification code
	[need for self-expression]	conceptual code
	[differentiation]	conceptual code
	[Individuality and Emancipation]	pattern code
'It is funny how my parents just don't get it ...they don't understand why I spend all this money on my cell phone…they don't understand that everything they would like to know about my life is in there. That's the idea when your phone can do things…you can express yourself anytime you feel like it, you don't need to wait to get home to tell somebody something important'	[Personal_layer/user's_attributes/age]	classification code
	[sense of belonging]	conceptual code
	[capture the moment]	conceptual code
	[Individuality and Emancipation]	pattern code
'My closest friend and I have the same welcome tone…it shows how we feel at the given time period about our boyfriends'	[privacy concern]	conceptual code
	[need for self-expression]	conceptual code
	[sense of belonging]	conceptual code
	[Individuality and Emancipation]	pattern code
	[Acceptance_ participation_ in_ a_ peer_ group/relationship]	pattern code

[M:16:high school: medium spender]		profile coding
'My cell phone allows me to have a private life…You can't have that with the fixed line...it belongs to my parents and they check who I am taking to..It is not cool at all.'	[Personal_layer/user's_attributes/age]	classification code
	[privacy concern]	conceptual code
	[Individuality and Emancipation]	pattern code

[M:32:IT:high spender]		profile coding
"I need to check my emails frequently. I do it in my office. I also like to surf the internet for news. I cannot imagine doing what I am doing outside the office when I finish work…I am fed up with screens…be it the pc or my cell phone...Being with my family or friends out for dinner I usually forget about the Service A. My family is more important than any gadget."	[Personal_layer/user's_attributes/age]	classification code
	[need to communicate with family members]	conceptual code
	[social etiquette of good parent/wife]	conceptual code
	[escapism]	conceptual code
	[Work life balance]	pattern code

[M:38:SME owner:high spender]		profile coding
'Of course it is important to be on line and know what is available technology wise but I think it is also important to use them properly so you don't get hooked so much with gadgets you forget to live. I really can't relate like that to my cell phone… for me it's like a tool no more than that. I am too old to act like some teenagers that communicate through their pc or cell phone to their friends.'	[Personal_layer/user's_attributes/age]	classification code
	[need for fair time allocation between social roles]	conceptual code
	[assignment of practical rather than emotional value to technology]	conceptual code
	[Work life balance]	pattern code

[M:17:high school:high spender]		profile coding
"*I have already downloaded all the applications from www.symbian-freak.com website. These make my mobile a powerful tool. My friends believe I am a "master of mobiles" and I am feeling good with that. My parents don't have a clue of what we are talking about*".	[Personal_layer/user's_attributes/age]	classification code
	[differentiation]	conceptual code
	[Individuality and Emancipation]	pattern code
	[Personal_layer/user's_attributes/gender]	classification code
	[Need for distinction]	pattern code
'You can tell a lot of things by just looking at somebody's cell phone, the wallpaper, the cover, the hanging strap...you can understand if she is emotionally available, what she is into generally…even the ringtone can tell you what kind of music she fancies.'	[Personal_layer/user's_attributes/age]	classification code
	[need for self-expression]	conceptual code
	[Individuality and Emancipation]	pattern code

[F:35:HR manager:high spender]		profile coding
“ I expect more functions, more content, more applications and more fantasy from service A in the near future. As it is now, it reminds me the launch of the windows operating system or the first version of netscape browsing system...It looks kind of primitive.”	[Personal_layer/user’s_attributes/age]	classification code
	[Increased expectations]	pattern code
‘‘I use Service A, a lot at the office but when I leave the office I am just not so eager to use it at home…I am pretty much on a tight schedule…working and taking care of my kid does not leave me much free time…this is why I have to schedule everything… everything I need to know or do is well programmed in my daily routine….’	[Personal_layer/user’s_attributes/gender]	classification code
	[limitation of usage]	conceptual code
	[Stress discourages usage]	conceptual code
	[planning and making time for usage]	conceptual code
	[Life entropy]	pattern code