

Chapter 1

Introduction

“Every organization has PCs on every desktop. The problem is that electronic data still is going to the field on paper. The greatest potential for efficiency improvements and return on investment lies in mobilizing this data.’ One way to do this is via location-based services (LBS) [...]” (Bruce, 2002, p 32)

Location-based services allow you to track your dog while hunting in Finland, locate your friends while shopping in the US, identify and navigate to nearby tourist attractions while traveling in Italy, get local directions if you are lost in Denmark, or electronically hail a taxi cab in England. In the near future, your mobile phone may notify you of current discounts while walking through shopping districts. However, to what extent such services will diffuse, and whether their rate of adoption will vary among countries, remains to be explored.

Location-based services (LBSs) offer the opportunity to locate an individual and provide ‘data on the go’ – data specific to a handheld user’s geographic location. Increasingly accurate mobile location technology makes it possible for you to be located by your mobile phone (Adams *et al.*, 2003; D’Roza and Bilchev, 2003; Millar, 2003), and potentially tracked. Already available LBSs can help you to find a restaurant based on your current geographical position (Anonymous, 2001a), to locate friends in your vicinity (Anonymous, 2002a), or even track your child as she walks to school (Spatial News, 2003b). Future developments may include direct marketing to your mobile phone, making your private life public.

This may sound like a scene from *Minority Report* (2002), but could become a reality over the next few years (LaGesse, 2003). Almost every move you make leaves a trail of data – “You have zero privacy anyway. Get over it,” Scott McNealy, chief executive officer of Sun Microsystems, famously told reporters (Sprenger, 1999). So whether you are paying for gasoline with a credit card, logging onto the Internet through an Internet service provider (ISP), or being watched by a surveillance camera while entering a department store, your personal information may be recorded and stored.

We are currently at the dawn of retail-oriented location-based services (retail LBS). These services utilize stored personal information (e.g. buying habits) to direct market products and services to you on a handheld device, such as a mobile phone. Yet, the diffusion and adoption of such services will likely not be the same in all places. As will be shown, societal context (including privacy policies) will affect how rapidly and in what manner LBSs diffuse into society. Particularly in the case of retail LBS, governmental and corporate policies protecting an individual’s right to privacy will either

promote or present a barrier to the diffusion of the technology. As retail LBS is in its early stages of development, it is appropriate to use retail LBS as a case study in the analysis of the impacts differing societal contexts have on a technological innovation's diffusion and adoption.

While the issue of privacy has often been discussed and debated in the context of technology (Cantos *et al.*, 2001; Dobson and Fisher, 2003; Goodchild, 2001; Markkula, 2003; Ward, 2000), little academic research has looked at how this important issue may affect the diffusion of a technology dependent on geography. This thesis looks at the differences between two Western, but nevertheless different, societal contexts and their possible impacts on the diffusion of retail LBS.

Problem Statement

Location-based services (LBSs) are already available. Whether it is the OnStar vehicle location service, street finder service, or child tracking service, examples of LBSs in everyday use are diverse, if not yet ubiquitous (Williams, 2003). As mobile technology develops and advances, there is a market demand for applications and services to keep pace (Blau, 2003). Capitalist competition encourages technological innovation (Kirsch, 1995). Better mobile technology, more mobile users, and more services increases potential profits, encouraging the provision of LBSs. But to what extent are these services likely to be hindered by different socio-political contexts? Will LBSs diffuse into societies where regulations restrict use of an individual's personal information, so that a person's privacy is strictly protected? Or, perhaps the opposite is true: will technologies utilizing personal information diffuse in societies where businesses self-regulate and no clear-cut guidelines are fashioned by the government?

This thesis will address these questions by focusing on the role of different privacy regulations in the potential diffusion of retail LBS. This case study compares how governmental privacy policies may act either as barriers or promoters to the diffusion of retail LBS in the United States and Germany. The differing political policies in these two societies will serve to demonstrate the potential impact of societal context on retail LBS trends at the global scale. While statistical prediction and forecasting of retail

LBS are beyond the scope of this project, this research therefore aims to shed light on future trends and potential technological diffusion differences in the US and Germany.

Theoretical Framework

Several theoretical perspectives will form the foundation for the present analysis of retail LBS diffusion. First, concepts from social informatics will be used. Social informatics (SI) is a relatively recent perspective that claims technology is more than just a tool (Kling, 1999). SI examines the design and use of information and communication technologies (ICTs) and addresses the context in which they are found (Kling, 1999), including social, cultural, and organizational factors affecting the meanings and roles of ICTs (Sawyer and Rosenbaum, 2000). In particular, the social informatics framework suggests that technologies are not neutral, so that they create winners and losers (Sawyer and Rosenbaum, 2000). Proponents of social informatics argue that understanding the social context – which encompasses the political system – is crucial to comprehending the varying impacts of technologies in different contexts (Kling, 1999; Sawyer and Rosenbaum, 2000; Sawyer and Tapia, 2002). It is imperative that technology is viewed as an integral part of a social system in order to understand the effects it will have within a society (Kling, 1999, 2001). Context therefore is crucial to understanding the potential diffusion and adoption rates of retail LBS applications in the unique settings of the US and Germany.

Complementing the social informatics perspective, William Ogburn's cultural lag theory also frames this thesis. Cultural lag theory views technology as central to human society. The theory notes that different aspects of society – technology, industry, government, and social norms – change at different rates thereby causing an adjustment period (Ogburn, 1964), so that the effects of technology may become apparent in certain areas of a social system long after its introduction (Fischer and Wright, 2001). In particular, Ogburn suggests that governmental policies often lag behind the introduction of a new technology in the industrial sector (Ogburn, 1964). As will be shown, this aligns well with the diffusion of retail LBS given differences in how the US and

Germany regulate new technologies. Cultural lag theory may therefore help to explain why diffusion of retail LBS may be faster in one country than another.

Theories of diffusion also frame this research. Diffusion will be discussed drawing on the classic work of Torsten Hägerstrand in Sweden (Hägerstrand, 1967). More recent work will also be examined, mindful of developments in transportation, how borders are slowly disappearing, and how diffusion processes operate at various scales (Adams, 1992; Gould, 1969; Kirsch, 1995; Kling, 1999). Lawrence Brown (1981) presents a staged picture of diffusion in his research, focusing on the preconditions for diffusion, the diffusion process, and impacts of diffusion. Examination of Brown's work, along with the adoption perspective (Rogers, 1995), shows how new technologies, whether adopted or rejected, can instigate social change. Consideration of this work again shows how the social system is of particular relevance to the study of retail LBS. Without an understanding of how the diffusion process works from a variety of perspectives, it would be difficult or impossible to understand the potential diffusion and adoption rates of retail LBS.

Conclusion and Outline of Thesis

Retail LBS applications are a new and exciting development within the technology sector. But their development is accompanied by concerns that may hamper the eventual diffusion and adoption of this technology pending geography and societal context. This thesis provides a comparative case study illustrating how privacy policies will act as potential barriers and promoters to the diffusion of retail LBS in the US and Germany. In a broader sense, the analysis of these new mobile technologies, particularly retail LBS, is illustrative of the role that geographic location and socio-political policy plays in technology's development, diffusion, and adoption.

This thesis seeks to demonstrate that societal context, specifically privacy policies, play a role in the diffusion and adoption of retail LBS. In order to understand the diffusion behavior of retail LBS, one must first understand the context of LBS. The next chapter therefore provides an overview of the technological elements necessary for LBSs, with particular emphasis on different location technologies. In addition, the

origins of LBS applications are explained both for the US and EU. Chapter 3 situates LBS technology within the frameworks of social informatics and diffusion. While social aspects of technology are often ignored, the social informatics perspective explains that LBS and other technologies must be considered in this way. Considering the social aspects will help to illuminate what barriers or promoters might affect the diffusion of retail LBS. In this chapter diffusion theories are also discussed, particularly those contemporary theories focusing on technological diffusion. Chapter 4 summarizes the methods employed in this case study, particularly statistical data analysis, policy study, surveys, and interviews. This chapter also addresses some limitations of the current study. Chapter 5 relates the discussion of diffusion to the particular case of the mobile phone, seen as the vector of diffusion in retail LBS. The growth and adoption of mobile phones is quantitatively analyzed and compared between the US and Germany using statistical data. Identifying mobile phone proliferation in each country demonstrates the potential of retail LBS. Chapter 6 outlines differences in political regulations between the US and the EU, including Germany, that are likely to affect the diffusion and adoption of retail LBS. Certain policies can be viewed as potential barriers while others may act as promoters of retail LBS. Throughout Chapters 5 and 6, I draw on results from a survey and interviews conducted specifically for this research. Having reviewed the vectors and landscapes of retail LBS diffusion present in both the US and Germany, the final chapter synthesizes the statistics and documents to draw conclusions concerning the problem statement: how will societal context, particularly privacy regulations, affect the diffusion of retail LBS in the US and Germany.