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Impressing, Placing and Pleasing

Exploring expert recommendation services in geographical bound retailing

A Master Thesis
by
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ABSTRACT

WineGuide is a geographical bound recommendation service for wine and food adapted to mobile phones. The service addresses well-known problems within the area of shopping, by: (1) offering expert recommendations; (2) notifying the user where products are available; (3) distributing information in appropriate situations; (4) letting the user search for products. WineGuide is part of a greater effort to investigate the novel area of geographical bound retailing in conjunction with expert recommendations.

The research was accomplished through the research approach used by Mobile Informatics at the Viktoria Institute. Initially an observational feasibility study was carried out to test the WineGuide context, followed by a design and development phase. Finally, the service was evaluated at the Swedish Rally and at two IT-companies.

The findings of the study showed two different approaches on how expert recommendation services affect geographical bound eCommerce in retailing. *The position adapted approach,* which will affect the logistics with new business conspiracies and distribution models to be able to compete. *The Individual adapted,* which will emphasise a large set of participating retailers, which must continually update the offers of the services to make them attractive.

The research also proved that the full potential of the WineGuide service could only be established through an eCommerce transaction implementation. The mobile phone gets the role of a remote controller, where products are ordered and home delivered through a single press on the bottom. This according to the position adapted approach.

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Sofia Eklund

CONTENTS

1. INTRODUCTION

This thesis is a part of the project e-Mobiz, performed by the research group eBusiness, at the Viktoria Institute. The Swedish Information Technology research Institute (SITI) funded the project. The research group is cooperating with several industrial partners. Those are Adera, FramFab, Information Highway and Ericsson Mobile Data Design. The objective of the project is to explore new applications used for eBusiness in mobile settings. The industrial objective is to create interesting and potentially exploitable applications.

The project of the thesis was introduced at an early stage of the project. The objective of the thesis was to investigate the novel area of geographical bound retailing in conjunction with expert recommendations. This was accomplished through WineGuide, a geographical bound expert recommendation service of food and wine. Concentrations were put on how these new kinds of concepts and devices work out in the new market economy, and if so point out relevant design implications.

The research was carried out according to the research approach used by the research group Mobile Informatics at the Viktoria Institute. The approach focuses exclusively on mobile activities and will be described later in the thesis. Since the research area for the project is very new, almost no technology, hardware and software had reached the market when the project started. The research has therefore been adjusted to fit the thesis and divided into three different method phases focusing on the problem area from different angels. An observational field study initially tried out the WineGuide context, followed by a design and implementation of the WineGuide system. The system was finally evaluated during the Swedish Rally and at two IT-companies in Göteborg.

Two different approaches were identified within geographical bound services, both with different conditions for success. The findings also proved that the WineGuide still needs further development to attract a mass market.

The thesis is written to people within the area of Informatics or with previous experiences of the subject Information Technology. However, the report is also aimed to be of concern for a broader market, for people interesting in the area of mobility.

1.1 Problem area

The information technology has contributed to an explosive growth both in production and consumer sectors of the retail industry within the past decades. Internet, and especially the World Wide Web, has opened new possibilities for people to conduct businesses and shopping through the net. The International Data Corporation (IDC, 2000) has projected the global eCommerce market to be a $200 billion industry by the end of year 2000.

However, shopping malls and downtown shopping areas are still important to reach customers. These areas let people access products and services of great supply. People get reminded on what to buy when walking around in these areas. This is difficult to accomplish on the net. Net trade cannot easily remind people on what to get when browsing the Internet nor deliver the products at the same time as the purchase.

The printed newspaper has proved to be the media that most people rely on when recommendations are given on products and services (Swedish associated press, 2000). However, there are reasons to believe that recommendations in newspapers and magazines are rarely used. First, according to WSL Strategic retail survey (Liebmann, 1998) people are working harder but are still shopping more often and at more types of retail stores. This indicates that consumption often occurs spontaneous and presumably with the magazines left at home. Second, recommendations in magazines often present ideal pictures of assortments. This is not the case in real life. The products can be sold out and customers are never guaranteed to find products in specific stores. The WSL Strategic retail survey found that selection, convenience and price are factors that people prioritise when shopping (Liebmann, 1998).

The new information technologies have brought forward new ways to support people in the buying processes. New services have made it possible to not only support the user as good pieces of advice, but also relate the service to the geographical place and the time for were the user is when the demand arises. Today we are talking about “instant demands”. The services are supposed to help out the user at the places and at the moment when the need arises. People are no longer prepared to wait till better moments to get served.

1.2 Problem definition

Up today, little research has been done within the area of expert recommendation services in geographical bound retailing. This brings forward a need to investigate that area. This is done through WineGuide, a

geographical bound recommendation service of wine and food adapted to mobile phones.

The aim of the thesis is to explore how expert recommendations affect geographical bound eCommerce in retailing. From this main focus another interesting question is asked; what design implications are of significant?

1.3 Disposition

The thesis start by, in chapter 2, describing the method used in the thesis and why it was chosen. The following chapter, chapter 3, brings up the theoretical framework, describing related concepts in the area of eCommerce and mobile IT use. This will introduce the reader to new concepts and hopefully enhance the future reading.

After this, the three following chapters deal with the data collection of the thesis. Chapter 4 describes the observational feasibility study conducted at four different liquor stores in Göteborg. Following this, in chapter 5, the reader is introduced to the WineGuide service through a general explanation of the architecture, the technical details and a user scenario. The service is also discussed in relation to similar system, which all are physical products. Systems discussed are among others TomTom, the Pocket BargainFinder, Shopper's Eyes and ConnectThings.

Chapter 6 discusses the two field evaluations, one initial and one more comprehensive. After this, in chapter 7, the results are discussed and analysed in relation to the objective of the thesis. Chapter 8 finally summarizes the findings of the thesis.

2. METHOD

This chapter describes the method used in the thesis. It first starts with an overall discussion about the underlying philosophical perspective that constitutes the research. After this, the next section focuses on a deeper discussion about the research approach used, inspired from the research group Mobile Informatics at the Viktoria Institute. The research of the thesis has been divided into three phases. They are described, separately, at the end of this chapter.

2.1 Philosophical perspective

In order to conduct and evaluate the research it is important to know what underlying assumption that constitutes a "valid" research and which research methods are most appropriate. Different researchers have different underlying epistemology, which guides the research, i.e., the assumptions about knowledge and how it can be obtained. In literature three classifications of underlying research epistemology are often found (e.g., Orlikowski and Baroudi 1991, Chua 1986). These are positivist, interpretive and critical research.

Positivist research generally assume that reality is objective given and can be described by measurable properties which are independent of the researcher and his/her instruments (Braa and Vidgen, 1999). Positivist studies generally attempt to test theory, in attempt to increase the predictive understanding of phenomena. Good research is legitimated through the virtues of repeatability, reductionism, and refutability (Checkland, 1981). The interpretive approach considers that access to reality is only through social constructions such as language, consciousness and shared meanings (Braa and Vidgen, 1999). Different stakeholders can interpret a situation in different ways. The last research approach, critical research, assumes that social reality is historically constituted and that it is produced and reproduced by people. People's ability to consciously act to change their social and economic circumstances is constrained by various forms of social, cultural and political domination. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory, i.e., help to eliminate the causes of alienation and domination.

This thesis is inspired by the interpretive approach. The aims were to produce an understanding of the context of the WineGuide service, and the process whereby the users influence and are influenced by the context. Through focusing on this, the aims were to find the answers of the thesis.

2.2 Research approach

The research was conducted according to the research approach used by Mobile Informatics (Dahlbom and Ljungberg, 1999), a subset and further development of the "New informatics". Dahlbom (1996, p. 29) describes "the new informatics" as:

> *"…a theory and design oriented study of information technology use, an artificial science with the intertwined complex of people and information technology as its subject matter."*

The main concern of informatics is the use of IT. Mobile Informatics focuses exclusively on mobile activities. It also stresses the importance of commercial values on the new IT. The research must be novel and commercially interesting. Following figure illustrates the approach used in the thesis and by Mobile Informatics. (For a more detailed description of the approach see Ljungberg et al, 1998.)

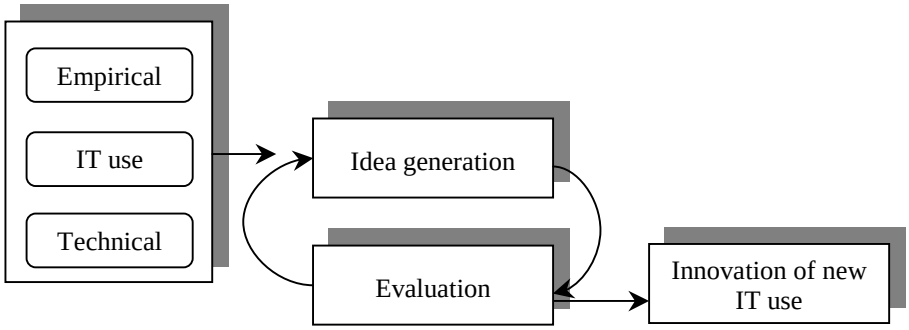

Figure 2.1 The research approach used by Mobile Informatics

The figure illustrates two basic steps in the research, which occurs in an iterative process. The innovation of new IT use is based on the idea generation and evaluation. The "idea generation" starts out from empirical studies and technological possibilities. The first step produces an idea. The idea, i.e., an innovation, is then evaluated in the second step. If the evaluation goes right, it is transferred to the next step in the research and development process. In other cases the concept is reconsidered in the "idea generation" step. The objective of the research is to suggest new ways of IT use in mobile situations by exploiting the potential of technology and conduct empirical research.

Other research methods have also been discussed. However, case study (Walsham, 1995), action research (Checkland, 1981) and action case (Braa and Vidgen, 1999) have not felt as appropriate as the approach described above. Since case studies are more related to observe changes

within organizations, it felt inappropriate. Action research, which relies on that research should lead to a change and collaboration between researcher and researched should exist (Easterby-Smith et al, 1991), is considered to be too time consuming. Finally a hybrid method such as the action case could not benefit from the depth of focus as in the one chosen for the thesis.

2.3 The research phases

The idea of WineGuide grew as a mean to investigate the novel requirements of services adapted to geographical bound retailing in conjunction with expert recommendations. In order to conduct the research, WineGuide has been tested about its accuracy, redesigned and evaluated according to the research approach used by Mobile Informatics. Due to the slow introduction of the new technology on the market at the initial stage of the project, the research was divided into three phases for an easily adaptation to the present conditions on the market at the time being. The three research phases were; (1) an observational feasibility phase of the WineGuide context, (2) a design and development phase, and (3) a filed evaluation phase of the prototype.

The research method used was a qualitative research method. According to Kaplan and Maxwell (1994), the goal of understanding social and institutional context are largely lost when textual data are quantified, which might be the result from using questionnaires, surveys or any other quantitative method. However one quantitative method was used as a complement to the data collection. Log files from the field evaluation where continually worked on. The data was analysed to find special user patterns, and to see which functions that were most frequently used. The data was also compared with the answers from interviews, as a mean to investigate if the users' experiences were the same as in real.

All questionnaires used in the interviews have been translated from Swedish to English. The translation of the questionnaires, found in the appendixes, might have lost some of the original sentiment of the statement. However, there should not be any complications to derive the overall meaning.

2.3.1 Phase 1: Observational feasibility study

The feasibility study observed what people were doing while waiting at the liquor stores. The aims were to see how the WineGuide service maps customers' requirements and to receive design implications to the future prototype.

The idea of observing waiting people is inspired by the work of Harvey Sacks, in whose research agenda the everyday ordinary taken for granted activities is the subject of study (Silverman, 1998a). According to Silverman (1998b) observing occurring naturally situations is superior to, for example, open interviews. Hughes et al (1994) point out that many systems fail due to the fact that their design pays insufficient attention to the social context of work. However, the research focus did not pay any attention to work situations but to shoppers, where no obligations of cooperation between each other existed.

The research was conducted at four different liquor stores in Göteborg, Sweden. In Sweden the liquor stores, called Systembolaget, are government owned. The business is a monopoly, and from the very outset its retailing activities is separated from any private profit. The retail enterprise consists of 403 shops and 580 local agencies. It serves about 2 million customers every week. All through the thesis the concept "liquor store" refers to this constitution. The liquor stores are spread out all over the cities and are open between ten AM to six PM every Monday to Friday. Each liquor store has a specific queuing system, where the customers take queue tickets with numbers on and wait until a big display shows the number.

To see variation in population, two inner-city stores, one store in a shopping mall and one commuter-situated store were selected. The research was also performed on different days and different times during the week. Approximately six hours of observations were conducted. Even though the observation is subjective, the time spent in field is enough for the purpose of informing the WineGuide design. This since the customers' purchases not very often took more than 10 minutes and approximately 100 purchases could be observed.

There are several different ways to perform observations. My role was being an ordinary customer waiting for my turn, like "the fly on the wall" (Blomberg et al, 1993). This means that the observer must stay invisible to the practitioners, so that he/she will not affect the observation. This kind of observation approach seemed to be the most convenient way since there were no difficulties to camouflage myself in the crowds of customers. Field notes were taken continually and transcribed afterwards. The data were analysed and categorised to find special patterns of customers buying behaviours. "The purpose of classifying qualitative data for content analysis is to facilitate the search for patterns and themes within a particular setting or across cases" (Patton, 1990, p. 384).

2.3.2 Phase 2: Design and development phase

The findings from the observational study resulted in some refinements of the ideas of WineGuide.

Phase 2, the design and implementation process, followed Somerville's (1997) throwaway prototyping, which objective *"...is to validate or derive the system requirements"* (Somerville, 1997, p.141). After the evaluation the prototype is discarded and a production-quality system is built.

There are plenty of different development kits for WAP development. The prototype was developed in Nokia WAP toolkit, a development environment for PCs. The choice of using software from Nokia was that their software had reached a further step in the development then other competitors at that time. The Nokia WAP toolkit also includes a lot of documentation helpful for beginners in the field. Decision were taken to only adapt the prototype to Nokia 7110 since there are different WAP standards and Nokia 7110 was the only WAP supported mobile phone accessible on the market at that time.

The design phase resulted in an implementation of a prototype, ready to be evaluated in real use situations.

2.3.3 Phase 3: Field evaluation

The field evaluation was carried out in two steps. An initial evaluation at the Swedish Rally resulted in some refinements of the WineGuide service. There after, a more comprehensive evaluation was conducted at two IT-companies.

The initial field evaluation

An initial evaluation was conducted in cooperation with the IT-company FramFab and the broadcast station Sveriges Radio (SR) during the Swedish Rally (March 2000). The intentions of the initial evaluation were to test the system in real use situations, watch user interaction through log files, deal with occurring complications and test the relevance of the service in relation to the questions of the thesis, rather then to draw any major conclusions of the data to the thesis.

Twenty participants were selected based on interest announcements on the homepage of SR. The basic condition to participate was that the person where going to watch the rally for more than three days. This so each participant could provide relevant data to the field evaluation. The twenty

participants were equipped with Nokia 7110s and had free access to a WAP portal where WineGuide and other services could be found. The evaluation lasted for four days. Log files were, during that time, continually analysed for user statistics. The filed evaluation was followed up by interviews. Due to the circumstances that the participants came from all over the country, email questionnaires became the easiest way to perform the interviews. The answer rate was unfortunately somewhat bad, only 34% answered. Despite this the overall experiences with WineGuide could be discern. The translated English version of the email questionnaire is found in appendix A.

The comprehensive field evaluation

The comprehensive field evaluation was conducted at two IT-companies in Göteborg. Approximately twenty people participated during a three weeks period. The choice of the test groups, consisting of staff from the companies, was based on the very low number of WAP mobile phones owners in Sweden. In Göteborg, at the time when the project was initiated, hardly any Nokia 7110s could be bought from telecom distributors. Only an exclusive selected group of companies had had them imported straight from the fabrics in Finland. One of the IT-companies was one of these. The other WAP mobile phone owners had successfully bought them from telecom distributors. Therefore, the population of WAP mobile phone owners were quite high in those two companies. It felt important to have a large set of participants.

The two groups were introduced to the system in two different ways. One group was informed personally whereas the other group was introduced to the system at a workshop seminary. The seminary was carried out since it was easier to gather a larger group at the same time. The participants at the seminary were given their WAP mobile phones, configuration instructions for the phone, and participated at a smaller workshop scenario testing the WineGuide service. Both group were informed about the limitations of the system and the simulated parts, which they were told to ignore. They did also receive an academic conference paper (included in Appendix B) and a user manual related to the WineGuide service. The two companies have been treated as a homogenous group and no comparison has been done in between them in the analysis.

Five people were picked out for structured interviews. The participants were evenly spread between the two IT-companies. The aim was to receive a varying data collection as possible. Since the research is a matter of a qualitative method, the objective was never to receive any significant relevance data from the interviews (cf., Silverman, 1998b). The recorded interviews lasted between 30 to 60 minutes. Afterwards they were transcribed, analysed and compared to the log files to find corresponding

patterns. The translated English version of the interview questionnaire is found in appendix C.

2.3.4 Literature studies

Great effort has also been carried out for continually searching for literature within the disciplines of mobile informatics, geographical boundness, eCommerce, eBusiness, support systems and etc. Since there is hardly any literature written in the form of books; conference articles, journals and doctor scientist thesis have been the main sources of knowledge. Using these types of information sources have also guaranteed the accuracy. Sites on the Internet have been treated with some reservations due to possible inaccuracy of the sources, although the ACM Digital Library has been of great supply.

3. THEORETICAL FRAMEWORK

This chapter brings up the theoretical framework concerning mobile IT use and geographical bound eCommerce. This is done for an informative purpose, overarching the reader for a deeper understanding for the concept in the area.

3.1 The background of the computer technology use

During the Second World War the rapid development of weapon brought forward a need of more efficient calculators to produce mathematical tables. The first computing machines were constructed during that time, of which ENIAC (Electronic Numerical Integrator and Calculator) might be one of the most famous. At that point computers were simply thought of as automatic versions of mechanical calculating machines. These calculations had long before been computed by people, using calculators. Since the computer machines were claimed to be faster, cheaper and more reliable, they replaced the human beings step by step.

The general view on computers as computing machines continued all through the fifties. Big algorithms were used as input and resulted in large computations. To program a computer, a programmer had to calculate tasks into numerical algorithms that the machine could handle. Very few computer applications existed, most of which were advanced and technical development from the military. Little faith was put in the future and usefulness of the computer technology. The overview was that the computers would never have more than a marginal impact on life and society.

During the sixties, the attention on computers as information systems, handling large sets of data, became the focus (Dahlbom, 1996). This second stage of computer technology use was made possible by the development of memory mechanism. Information systems were introduced in large organisations to automate administrative work. In industry information system controlled and monitored production processes.

The seventies were dominated by the shift from batch to on-line processing. For the first time it was possible to process and receive data at the same time as the computer was working. This decade was also the arrival of databases and mini computers. However, it was still difficult to interact with the data machines. This brought forward a need for easier manipulated interfaces that every person could use, not only the experts.

In the eighties, the real decade of personal computers, PCs, were introduced. Before this, little time had been spent on the interaction between the user and the computer. For the first time, human computer interaction became an exiting domain for designers. New interfaces with menus and buttons were developed. In late eighties the demand for portable computers brought forward pocket versions, network and client server technologies. A new focus on information technology use took place, focused on network development. The combination of political and media attentions to Internet emphasised the already interest in network thinking. Computer technology became a medium of communication, not only for office work, but also for entertainment, education, news, marketing and so on (Dahlbom, 1996). The focus on information technology use shifted to Internet and mobile support.

3.2 Mobile IT use

The shift from the computer technology in the fifties to the mobile information technology in the twenty-first century meant a lot of change on how work and social contexts are carried out. New techniques and devices were developed to support people in mobile situations. The laptops enabled, for the first time, that people suddenly could bring their digital work with them wherever they were going. Gradually smaller and faster devices and operating systems were developed. Personal Digital Assistants (PDA) such as Psion, Palm and Windows CE based palm tops, and operating systems such as WinCE, EPOC and PalmOS have become very popular. New techniques, which enable mobile access, have lately been realised. Better, faster and cheaper technologies are also under development. The Wireless Application Protocol (WAP)[1] is an open, global specification that enables interaction between mobile terminals and Internet services. The Digital Audio Broadcasting (DAB)[2] provides fixed and mobile up linking with dual mono or CD quality stereo. GPRS[3] profoundly alter and improve the end-user experience of mobile data computing, by making it possible and cost-effective to remain constantly connected, as well as to send and receive data at much higher speeds than before. Finally Bluetooth[4] is a high-speed, low-power microwave wireless link technology, designed to connect phones, laptops, PDAs and other portable equipment together with little or no work by the user.

The rapidly use of mobile technologies have quickly changed the conditions of work. The office is not longer the only place were one can perform his or her job. The pace and the geographical boundness of work have increased (Dahlbom and Ljungberg, 1999). New ways of electronic

[1] Further information see http://www.wapforum.com
[2] DAB: http://www.worlddab.org
[3] GPRS: http://www.gprsworld.com
[4] Bluetooth: http://www.bluetooth.com

transactions and organisational formations are more usual than for a couple of years ago. Systems and services for handling information overflows are developed.

According to Dahbom and Ljungberg (1999) there are several different reasons why mobility has increased. First of all, most work in the modern company is cooperative. This leads to increase use of IT that bridges the distance and mobility. Second, services and consultants need to be performed where the customers are. This differs from time to time. Third, the adaptation to mobile phones enables people to be more mobile and more accessible.

This has also had impact on life outside work. More and more services are directed to the consumer market, i.e., for private use in different social contexts. Since people are more mobile even after work, the need for support services has emerged. This has addressed services within areas such as entertainment, education, news and marketing.

Despite the rapid growth of mobile computing, the diffusion of technology, i.e., the transfer of technological innovations to real use situations, is still slow in the area of mobile computing (Dahlbom and Ljungberg, 1999). The split between technological innovations and the real use causes complications. The traditional stationary computing has still strong influences on mobile computing. Despite the limited size of display, the interfaces are still adapted to the stationary computers with large displays. This can clearly be seen on dominating PDAs which all are based on the “desktop metaphor”. This means that mobile devices are still somewhat limited and hard to interact with. According to Dahlbom and Ljungberg (1999) research and development of mobile IT must take its departure in the possibilities of the technology. Focus must be on information technology use, elaborated ideas of their use, and conceptions of how to commercialise these new ways of using information technology (Dahlbom and Ljungberg, 1999).

Research and development of mobile IT have taken place in several fields (Ljungberg et al, 1998). Computer Supported Co-operative Work (CSCW), Human- Computer Interaction and Mobile Computing are some. The grown interest in mobile Internet, i.e., mobile solutions with Internet access, have also resulted in new ways of accomplish new kinds of services and establishing new business solutions and relations.

The focus of this research is within the field of Mobile Computing. WineGuide seek to explore services targeted to the consumption market, but is also bound to a geographical place. That means that the focus of mobile IT use is highly important. Not only the mobile IT use itself, but also

because it is acting in a new area where new transactions models are emerging and new business constellations are shaped.

3.3 Electronic Business and Electronic Commerce

> *"If it should ever turn out that the basic logics of a machine designed for the numerical solution of differential equations coincide with the logics of a machine intended to make bills for a department store, I would regard this as the most amazing coincidence that I have ever encountered."*

Howard Aiken, 1956, physicist at Hardvard and designer of some of the very first computers (quoted in Dalhbom and Mathiassen, 1993, p. 3).

The new focus on the information technologies has resulted in new conspiracies between companies. More and more companies worldwide are being linked together each day in effort to enable cooperation. To support changing customer requirements, firms are setting up new rules within their industries via new technobusiness designs, new interenterprise processes, and integrated operations (Kalakota and Robinson, 1999). This business wide integration of organizational foundations that support business in the Net economy is called electronic business (eBusiness). Thus, old business models are redefined, with the aid of technology, to maximize customer value.

If eBusiness is the overall strategy to accomplish this, electronic commerce (eCommerce) is an extremely important facet of eBusiness. eCommerce describes the process of buying, selling and exchanging products, services and information via computer networks including the Internet (Turban et al, 1999). To adapt eCommerce, companies need to structurally transform their internal foundation to be effective (Kalakota and Robinson, 1999). Applications need to be integrated to eBusiness infrastructure. The figure below illustrates that eCommerce applications are supported by infrastructures and their implementation is dependent on four major areas, i.e., people, public policy, technical standards and protocols, and other organizations. The eCommerce management coordinates the applications, infrastructures and areas.

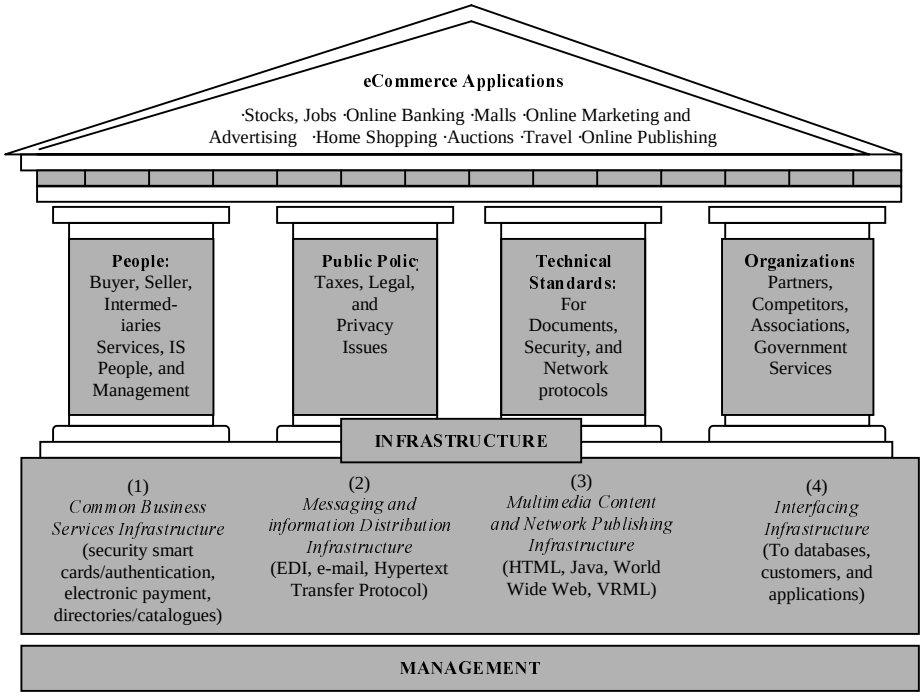

Figure 3.1 A framework for eCommerce *(modified from Turban et al, 1999, p. 6)*

There are several different transaction types within eCommerce, where different businesses and customers cooperate to find new and different markets for better products and services and to reduce costs and transaction time.

Inter Organisational Systems (IOS) are systems that use electronic data interchange (EDI) to link two or more organisations so that they are able to share the electronic information processes (Barett, 1985). The relation between two or more companies relates to the transaction type of *business-to-business*. This kind of relationship has been very common and has existed for quite a long time. The reason to this is that many companies have realised that they can save costs and improve quality of products and services when cooperating with other companies (Barett, 1985). This has urged the way for EDIs and IOS.

New ways to do business have also grown in interest. *Business-to-consumers* might be one of the most common. This transaction type is characterised by retailers, i.e., businesses, who carry out transactions with individual shoppers, i.e., consumers. A lot of different companies have successfully found this market on the Internet, where the book company Amazon[5] and the software supplier Buyonet[6] are among others. These two

[5] Amazon: http://www.amazon.com
[6] Buyonet: http://www.buyonet.com

companies save a lot of money through reaching their customers on the net. Buyonet, which is a software distributor, sends their products in electronic form straight to theirs customers' email inboxes. They do not even have to care about transportation of physical products.

Another transaction type is *consumer-to-consumer*. In the last year this eCommerce model has grown tremendously in interest. As referring to the name, consumer-to-consumer is a transaction model where ordinary people perform business between each other. Examples on consumer-to-consumer transactions are for instance selling residential property and cars. On the Internet several auctions sites, e.g., Amazon.com Auctions[7] and Bidlet[8], let people put up items for auctions.

3.4 Supportive services for retrieving information

The explosive growth of information technology has resulted in drastically changes on information flows. More and more quantities of material are entered into computer systems and people are information overloaded. To deal with these complications different search approaches have grown in interest. This chapter describes different supportive services for retrieving the right information. First an overall view will be given, describing two strategies for information seeking. Then, three different recommendations support is described, which all are put in relation to the WineGuide service. Thereafter, an overall definition of geographical bound services is given.

3.4.1 Information seeking strategies

Information retrieval and information filtering are two information seeking strategies that support the user when searching for information. The approaches can, on a more abstract level, be seen as one (Belkin and Croft, 1992), but there is however one slightly difference.

Both approaches are based on that a user lacks in knowledge within a particularly field. The differences lie in how the user gathers the information. In information retrieval systems, the information is obtained from knowledge sources that help the user in problem management (Belkin and Croft, 1992). Characteristic for retrieval systems are that the users information seeking behaviour is very active. Information filtering, on the other hand, often starts with people with relatively stable, long time goals. Their interests lead to a relatively passive form of information seeking behaviour. This is often accomplished through profiles and queries that can

[7] Amazon.com Auctions: http://s1.amazon.com/exec/varzea/subst/home/home.html
[8] Bidlet: http://www.bidlet.com

be put to the filtering system (Belkin and Croft, 1992). Thus, the users of information retrieval systems are characterized by active information seeking, whereas users of information filtering have long term, passive information seeking goals.

There are several strategies for information retrieval and information filtering. Table 3.1 illustrates these.

Table 3.1 Strategies for information seeking (Adapted from Fagrell, 1999)

	Information Retrieval	**Information Filtering**
Characteristic	Active information seeking.	Long term, passive information seeking.
Example	▪ *Portals*, i.e., manually categorised collections of links (cf., Yahoo!). ▪ *Retrieval agents*, i.e., programs that search the intranet over longer periods based on a predefined user profile.	▪ *Search engines*, e.g., AltaVista, Lycos, which lets the user enter a search queries resulting in a list of links to matching documents. ▪ *Browsing agents*, i.e., programs that act and assists on the users behalf meantime the user is browsing.

3.4.2 Recommendation supports

From a traditional point of view people have listened to shop assistants' recommendations about different products. However, thanks to the new information technologies, new types of recommendation supports have gradually grown in impact to support people in the shopping processes.

One kind of recommendation support is used in the thesis, i.e., an expert recommendation service; a service based on recommendations from an expert within a specific field. In the case of WineGuide, the recommendations of wine and food are based on a famous chef, i.e., Dan Lexö (the chef of the year 1990, Sweden) and a wine expert, Johan Fasth.

Recently, there has been an increase of recommender system solutions. These are systems that link users with similar interests. These systems are often based on profiles, which are derived from the users' purchase history or stated interests (Resnick et al, 1997). Recommender systems automate personalization on the web and enables individual

personalizations for each person (Schafer et al, 1999). WineGuide is not to compare to a recommender system, since it is not based on profiles.

A third recommendation support is called expert system. Expert systems are computer programs designed to simulate the problem-solving behaviour of a human expert in a narrow domain or discipline (Luger et al, 1993). These systems must neither be compared to expert recommendation systems. Experts continually update these services and the recommendations are not simulated by computer programs.

3.4.3 Geographical bound services

In order to conduct this thesis, it is of importance that a definition of geographical bound services is settled. The same overall meaning of the concept has to exist to the reader as within the thesis.

People are more mobile today, and this has brought forward a need for services to be adapted to a specific position. Geographical bound services put the user in focus and adapt their services to the actual position of a user. This can be accomplished through either GPS navigation or through antenna triangulation (which will be discussed later).

One way to perform this is through push technology. A service can position a user and push out information based on where the user is. The user is kept informed what is going one in the particular area he/she is visiting. Other services let the user search on their own for specific information based on its location. These services could for example inform the user about different nearby places, e.g., restaurants, see-worthy places, etc.

3.5 Summary

The development of new information technology has brought forward mobile living and new demands on mobile services. The development of new innovative mobile applications and new possibilities of eBusiness and eCommerce solutions have resulted in new areas of businesses, focused on the consumer market. eBusiness solutions in mobile settings have emerged to support peoples' “instant demands”. New supportive information services have facilitated for people to easier find the information they are looking for and are also supportive to the user at the moment and place when the need arises.

WineGuide is a part of this new development. It addresses mobility, support for “instant demands” and is geographical dependent. Still, there is a

lot of research to carry out within this new field. This since no one knows what impact these new trends will have on people’s lives.

4. THE OBSERVATIONAL FEASIBILITY STUDY

The observational feasibility study was conducted at four different liquor stores, where 100 customers were observed. This section summarizes the results from that study. The analysis is based on the observed customers purchases. Each purchase took between 5 to 30 minutes to complete; i.e. the time spent from the moment the customer entered till the moment the customer was given its products. The purpose of the analysis is to serve as a source from where WineGuide can be elicit on how it maps customers' requirements as a geographical bound service. Another important aspect of the analysis is to receive design implications relevant for the WineGuide system.

The data from the observational study were divided into different groups based on the customers' behaviours during the waiting time in the queues. The aim was to find recurring customer behaviours so that the WineGuide service could receive further design implications. The analysis identified three different categories of customers, all with special needs in the consumption process. These categories were developed for analytic purpose, i.e., to reduce the complexity of the data for presentational purpose. The behaviours of the customers implicated on how WineGuide is able to support them and what other design implications that is relevant for the WineGuide service. The three customer categories are:

- The Planer.
- The Stroller.
- The Searcher.

Filed notes from the study will be used in this section for a deeper understanding for the different customer categories.

4.1 The Planer

In most cases the customers have already planed what to buy before entering the store. This kind of customer approach is called the Planer. The buying process is characterized by a fast and simple execution. The time spent in the queue appears to be something negative since the customers already are aware of what they want.

There are different waiting behaviours characterizing the Planer. Some Planers hold notes in their hands when entering the store. Presumably, they have written down wine recommendations from friends, relatives, magazines or TV shows. Quite often, these people wanders along the

shelves trying to find the wines they are going to buy. When ordering the wine they often shows the note as to make sure that they do not know if the wine is in stock.

> *A man with three children takes a queue-ticket. The man is holding a cutting from a newspaper. He walks around the shelves holding a pen and comparing the cutting with the signs below the wine bottles. He seems to be insecure about what he is going to order but handles the shop assistant his piece of cutting at the fund. He is given some bottles of wine.*

Other Planers just take queue tickets and then sit down. However, the field study showed that it is sometimes problematic for the Planer to proceed its buy. Among other reasons the product they want could be so up to date that the wine has not yet been delivered to the store or it is such a sell success that is already out of stock.

> *A well-dressed man is holding a food and wine magazine in his hand. He is looking through the wine recommendations list while waiting. When it is his turn he shows the magazine for the shop assistant. One of the wine brands seems to not be in stock and a long discussion starts. The shop assistant turns around to his colleague and asks him about the wine, he in turn starts to browse the wine and price lists brochure without any results. The whole procedure takes approximately 10 minutes and ends up with the shop assistant recommending the customer other wines.*

So what kind of support does the Planer need in the buying process? Since the Planer in advance knows what wine he wants, he might want to know if the wine is in stock. This before he takes a queue-ticket and waits ten to twenty minutes for his turn. This request implies that WineGuide needs a search function, where the user enters the name of the wine to find out if the wine exists in the assortment. Two different design implications are to choose from. Either the service automatically search for the wine based on the closets store, or lets the user first select a specific store and then search for the wine. The last alternative is presumably better for people who are commuting into town and who have possibilities to do their shopping at different places. Trough selecting which store they are interesting in, they can make better plans for where to carry out their shopping.

4.2 The Stroller

The Stroller strolls about the wine shelves while waiting for his/her turn. Normally, it seems that the Stroller has already decided what he/she wants but disposes the time through strolling about the store reading newsletters, price information, looking at people and shelves information. The excerpt of the field notes below characterizes the Stroller.

> *A man in his early fifties enters the store with an empty plastic bag. He takes a queue ticket and strolls about in the store for a while. He then sits down and after a few minutes he rises up again. He walks towards the price list stand and starts reading the brochures. After a while he strolls away still waiting for his turn. When it is finally his turn he orders a bottle of white wine.*

However, not all Strollers know what they want in advanced. The fact is, that even though their behaviour are much the same as other Strollers, the strolling in the store seems to be a time consuming process for killing the time. For some Strollers the intentions seem to be to ask the shop assistant for some pieces of advice.

> *A woman in the age of twenty-five strolls around the wine shelves reading on the signs below the bottles. It appears to me that she is trying to while away the time. She strolls about until it is her turn. At that point she does not know what to order. She asks the shop assistant what is most appropriate at a specific occasion. The man behind the fund recommends some bottles of a specific white wine.*

Whatever the Strollers know what they want or not, they can still take a lot of advantage of WineGuide. In the case they do know what to order, they may want to know if the wine is in stock or not. In that case they would need a search function.

If they do not know what to buy, WineGuide could work as a piece of advice. It could give recommendations of food and wine, display ingredients for a recipe and send the whole recipe home. This implicates that WineGuide ought to have different combinations of wine and food recommendations. Tentatively two entrances, e.g., wine and food dishes, of which a user can select any of these and also receive suitable recommendations on either wines or food dishes. The recipes of the dishes should also be accessible for the users. Due to the limited size of display implications indicates, however, that not all information in a recipe should be displayed. Some reservations have to be done. One suggestion is that only the ingredients in the recipe are displayed. A user can then use

WineGuide as a piece of advice, receive combinations of food and wine, view the “shopping list” and for example send the rest of the recipe home. From two entrances they could either chose the wine service or the dish service, browse different recommendations and select the most appropriate.

4.3 The Searcher

Even though the Planers and some of the Strollers often know what they want, there are others that do not. The third aspect of customer is the Searcher. These customers seem not to know what they want before entering the store. The normally behaviour is characterized by walking around gazing on the wine selves very carefully and without any hurry. The Searchers normally take their time to see what there are to offer and seeks information in the information brochures and in the price list. Not very rare the Searchers ask for consultancy from the shop assistant. Below follows some notes taken from the fieldwork at one of the stores.

> *A woman in her late fifties enters the store. She picks up a brochure containing wine and price list information and starts to browse it as she, at the same time, walks around comparing the wine bottles on the shelves. This process takes approximately ten minutes and when she is ready she takes a queue ticket. She waits until her turn holding the brochure in her hand. When it is finally her turn she points in the brochure to the shop assistant. Unfortunately this wine is out of stock, she then points at another wine but this wine is sold out too. At this point the shop assistant helps her out with some recommendations, which the woman agrees upon.*

Normally, all Searchers have not as complex situation as the woman above.

> *A man strolls about around the wine shelves reading the information about the wines. He takes some information brochures and sits down waiting; meanwhile he keeps on reading the information. When it is his turn he points at the brochure and order the wine.*

The Searchers do not very often know what to buy. Obviously, the Searchers would benefit from a recommendation system as a support in the decision processes. As it appeared in the field study the wine is not always in stock, which causes problems to the Searcher when they finally have made up their mind. The implications are that wine and food entrances ought to be relevant for this approach. This, since they could either receive wine recommendations based on what food the are going to cook or just

receive some expert recommendations of wines, which are guaranteed to be in stock at the specific store they are visiting. In that way, WineGuide succeeds in supporting the Searchers.

4.4 Validity and reliability of the data collection

The correctness to validate empirical informed design can be difficult since it is partly dependent on the design creativity. In the case of WineGuide there might, for example, be doubts about the definitive characterization of the customer categories. However, observing occurring naturally situations are of most importance and a preferable method to others since it takes the everyday rational into account (Silverman, 1998a).

The time interval for the field study might as well be questioned. Since all observations took place on different days and at different places, no recurring patterns could be observed in that sense that a specific customer behaviour aspect occurred on special days and others did not. For example that most Planers did their shopping on Mondays, whereas the Searchers waited till the end of the week. However, this was not the aim of the field study. The objective was to find out how WineGuide maps the needs of the customers. In that case three different aspects of behaviour were found, all with different requirements of the use of WineGuide.

WineGuide is supposed to help the user to a better choice of wine and at the right place. The service also seeks to explore the new area of mobile eBusiness, from where a buy is initiated on a mobile phone to a complete business transaction. The aim is to support users in mobile settings, not only inside the liquor stores as exemplified trough the categorisations of the three customer groups. Desirable would be that the users did not even have to enter the store. Instead they could carry out their order, for example in the car when waiting at a red traffic light and have it home delivered.

What has been pointed out in this chapter is that people have problems in finding their products and in some case not even able to know what they are looking for. WineGuide has not only the functionality to support them in this, but also addresses a broader model where products and services are transferred to different places and arises new business models in a macro perspective. WineGuide has the potential for a complete eCommerce implementation. This would mean that people no longer need to go to the stores. The mobile phone gets the role of a remote controller and services are conducted through pressing the buttons both for ordering and for home delivery.

Up to day, just some of the functionalities of the WineGuide service can be implemented. This due to the Swedish alcohol law, which among other things says that the liquor stores are not aloud to act in the interests of profit (cf., Alkoholinspektionen, 2000). However, in the future there might be possible to order the wine and food through WineGuide. It might even be possible to have it home delivered. The next section describes the design and development parts of the WineGuide service. Those parts which were possible to implement at the moment.

5. THE WINEGUIDE SERVICE

The main objectives of WineGuide are to enhance the choice of wine and save time by notifying the users in advance what is in assortment at a specific liquor store. The service supports the user in mobile settings and makes it convenient to shop. With a complete buying support (cf., previous chapter), where products could be ordered through the mobile phone and home delivered, the time spent at liquor stores could be reduced to almost none. Since the stores are closed on weekends the queues at the liquor stores is today a huge problem, especially on Friday afternoons. Apparently, this is another area for where WineGuide could be of great supply. Both for supporting customers indoors, i.e., any of the three customer groups, and for those who do not even want to enter the stores.

The idea of WineGuide relies on the law of monopoly of alcohol in Sweden. Due to that, these products must be bought in special stores. However, WineGuide is also applicable to other international retail stores, such as Marks & Spencer[9] and Karstadt[10], both with considerable high sales of wine.

The concept is not technical dependent but the implementation is adapted to mobile phones. The reason for mobile phones is that the solution makes it easier to reach a mass-market since no extra hardware or software is required.

The WineGuide system supports three functions. These are wine recommendations based on:

- Wine categories, e.g., red, white.
- Food recipes, e.g., meat, pork, fish.
- Search function, e.g., search on article number.

The wine entrance lets the user browse different wine hierarchies, i.e. red wine, white wine, fruit wine etc., and gives suitable recommendations on selected category. At this instance WineGuide also recommend appropriate dishes for the wine. The user can select any of the dishes and receive a short description and a shopping list of the dish on the display. The whole recipe is sent home to the user either by email or fax. This kind of information layering means that different information is shown in appropriate situations and considerations are taken to the limited size of the display.

[9] Marks & Spencer: http://www.marks-and-spencer.co.uk
[10] Karstadt: http://www.karstadt.com

The recipe entrance is based on different food ingredients, i.e. meat, vegetarian, fish, seafood etc. Through browsing down the food hierarchies the user can receive a more specific match of dish he/she is interested in. The selected dish matches recommendations of appropriate wines. Here too, the user have the opportunity to select different dishes, browse the shopping list and send the whole recipe home.

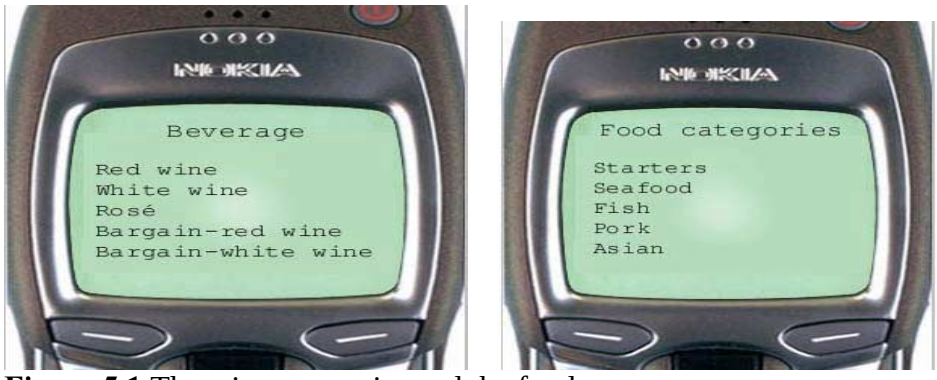

Figure 5.1 The wine categories and the food entrance.

The last entrance lets the user search for specific wines. The user enters the name or the article number of the wine and receives information whether or not the wine is in stock, based on the assortment of the closest store. The user can also select other liquor stores and receive search results from those stores.

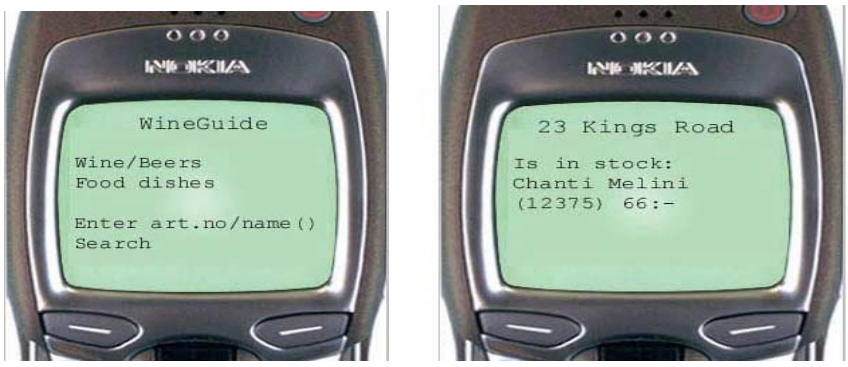

Figure 5.2 The search display, and the result.

For a better overview of the system, more images of the system are found in appendix D.

WineGuide is a geographical bound service. The recommendations of the system are based on a chef's expertise of food in combination with a wine expert's recommendation of wine, stored in a database. Through retrieving information about a user's location, WineGuide synchronizes the experts' recommendations with the assortment of the closest store. This is accomplished through the online web service of the liquor stores. It finds

out which wine brands that are not in stock. The list presented on the user's display contains only the wines that matched the chef's and wine expert's recommendations and those in stock.

5.1 Technical Details

The WineGuide system has a client server architecture. The communication with the client is done with the Wireless Application Protocol (WAP), which enables interaction between mobile terminals and Internet services. The current implementation is in Perl with a SQL-compatible database running on a Sun Solaris server with Internet connection. The client-side hardware is a WAP mobile phone, i.e., Nokia 7110.

The Mobile Positioning System (MPS) is a new released service, offered by a few telecom operators in Sweden. The MPS points out the user's position through Global System for Mobile communication (GSM) antenna triangulation with the accuracy of about 300 meters. Unlike positioning via satellite, MPS does not require any modifications to standard GSM phones and works both indoors and outdoors. The GSM has 220 million subscribers (GSM World, 2000). This makes it the largest digital wireless communications standard in the world.

Since the service is newly released the price is still very high for using the service. At the time of the implementation of the WineGuide system, the telecom operators focused also only on larger companies with a high rate of mobile users. Then the service was not released for public use. The MPS service in WineGuide has therefore been simulated.

The expert recommendations of WineGuide are easily updated through a web interface and the synchronization with the assortments at the liquor stores is performed through query-strings to the on-line web service.

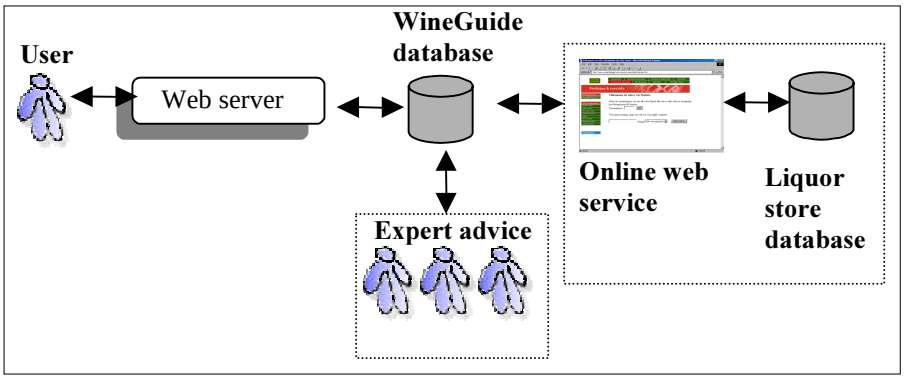

Figure 5.4 The WineGuide architecture.

1. Send MPS code to web server containing user position.
2. Retrieve requested information from database.
3. Synchronize data with the database of the liquor stores, through the online web service.
4. Present wine list to the user.
5. A web-based interface keeps the database easily updated.

5.2 A user scenario

The following section describes a scenario where the complete eCommerce approach is illustrated by a user's interaction with WineGuide.

Nils Andersson is working as a seller, which means that he spends a lot of time out of office walking between different places. It is Thursday afternoon, and Nils is just about to return back from a customer into town. On the way Nils calls his wife at work to check who is going to shop the food for the weekend and drop by the liquor store. She has to work late and they decide that Nils will do the errands before the stores close at 6.00 PM.

At a red light stop, Nils picks up the mobile phone and connects to the WineGuide service. Automatically the system finds out Nils' location. The welcome page offers him three services; recommendations based on either wine or food and a search function. Nils does not know what he is going to cook, but he does know that they have some fillet of beef at home, which they could use. He enters the food service and selects the beef alternative. WineGuide now displays a lot of food recipes based on beef (figure 5.5). Nils sticks to the *Boeuf en Daube*. He views the recommended wines suitable to the dish and notices at the same time that the liquor store on King Street is closets, which has a very good wine assortment. He selects his choice of wine, enters the address and sends away the order to the liquor store before he disconnect from service and the traffic light turns green.

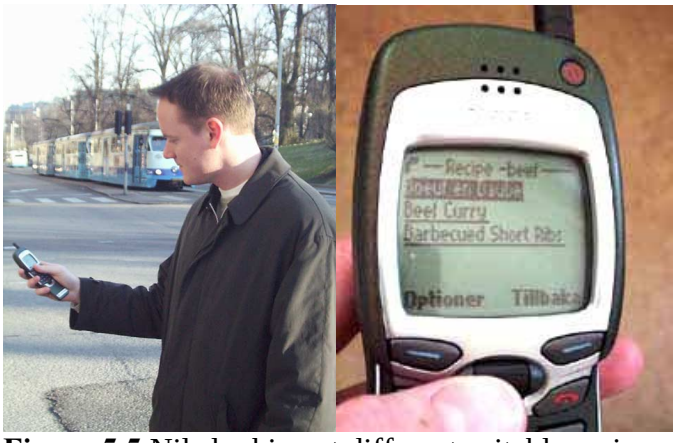

Figure 5.5 Nils looking at different suitable recipes on WineGuide.

At the next red light stop he picks up the phone again and connects to the WineGuide service to view the shopping list (figure 5.6). Since it is the end of the working week the queues might be quite long. Furthermore the food bags usually get quite heavy to carry home on the own. Nils decide instead to send the shopping list straight to the supermarket and email the whole recipe home. When it is done Nils looks up to the bright blue sky and enjoys the sun tickling his eyes. *"Pooh! It's hard work doing the housekeeping…" Nils thinks when finally home*.

Figure 5.6 Nils viewing the shopping list on the mobile phone.

5.3 Similar systems

Some related research has previously been done in the setting of eCommerce in retailing. This chapter discusses these products and their relations to WineGuide. Limitations have been carried out to only focus on physical products.

5.3.1 TomTom

TomTom[11] is a newly invented product by Palmtop Software[12]. The service let users access personalised travel information through using a mobile phone or wireless information devices. It plans the users travel routes and gives information about the location and nearby places of interest. The service is based on detailed maps, which are presented to the users. TomTom uses GSM Network Operators, GPS as positioning system and Internet providers. It supports all existing Symbian mobile devices, WinCE devices, Palms, WAP phones and PCs with web browsers.

[11] TomTom: http://www.tomtom.com
[12] Palmtop: http://www.palmtop.nl

TomTom has many similarities with WineGuide. Both are geographical bound services in conjunction with eCommerce. Both are also based on the same techniques, however WineGuide uses MPS whereas TomTom uses GPS. TomTom is also profiled based which is not the case of WineGuide.

5.3.2 Shopper's Eye

The Shopper's Eye (Fano, 1998) is a system focused on augmented commerce based on the users' shopping profiles. The system requires the user to create a profile that includes items he/she wishes to purchase. The profile gets available to merchants via a PDA and a wireless modem (GPS). The system is implemented to fit in a physically proximate area, e.g., a shopping mall. The merchants create special packaged offers based on the users' profiles, which are transmitted to the user as they pass by.

Shopper's Eye provides information to a user in a mobile situation, just as WineGuide does. The primary differences lie in that Shopper's Eye is profile based. The service is also dependent on different merchants that have to continually update the system with package offers. This is not the case of WineGuide since it relies on the online web-service of the liquor stores. A further difference is that WineGuide is neither limited of the use of outdoors settings nor extra hardware, which is the case for a system relied on GPS.

5.3.3 Pocket BargainFinder

A further development of mobile recommendation services is the Pocket BargainFinder (Brody and Gottsman, 1999). This service is focused on hand-held devices that compare prices between different retailers. Through scanning the barcode of a physically product the system finds out the lowest price of an item on the Internet. The intention is to bridges the gap between electronic and traditional commerce and receive the best price of performance.

The biggest difference between WineGuide and Pocket BargainFinder is that the products are delivered at different times of the purchase. WineGuide at the same time whereas users of the Pocket BargainFinder has to wait for their products to be shipped. Another difference deals with retrieving information about the products. WineGuide informs the user where to find the products and guarantees that they will be in stock. The Pocket BargainFinder, on the other hand, requires the user to scan the barcode of a physically product before receiving information about how much and where it can be found (cf., information retrieval system in chapter 3.4.1).

5.3.4 YachtPosition

The Swedish YachtPosition system[13] is a GPS-based positioning system for boat owners. YachtPosition retrieves information about the bearing and distance to the closest fuel docks, anchorages, marinas, shops and gives information about the local weather forecast, wind directions etc. All information is displayed on a map with the longitude and latitude values of the position.

The main difference between WineGuide and YachtPosition is the hardware. The first uses a GPS-watch as navigation tool and as hardware. WineGuide, on the other hand, is based on a WAP-phone and the user is neither dependent on extra hardware nor software from the positioning service.

5.3.5 ConnectThings

ConnectThings[14] is a web-based information system of wine. Through scanning the barcode of a wine bottle, a user receives price information, descriptions and suitable food menus for the wine on a web page. The system is still under development, and is yet limited to manual interaction through the web page.

The ConnectThings system is only for stationary use and needs extra hardware and shareware. The information given on the web page can also be found on several other web pages, which might not make the system very unique. The service does, however, implicate the demand on the market for expert recommendations of food and wine.

[13] YachtPosition: http://www.yachtPosition.com
[14] ConnectThings: http://www.connectthings.se

6. THE FIELD EVALUATIONS

The WineGuide service was evaluated at two different occasions, first one initial field evaluation during the Swedish Rally and later one comprehensive at two IT-companies.

6.1 The initial field evaluation

Opportunity where given to conduct an initial field evaluation in cooperation with the IT-company FramFab and the broadcast station Sveriges Radio (SR) during the Swedish Rally. The WineGuide system was reprogrammed to suit the liquor stores at the location for the rally and participants were selected based on the criteria's settled by the collaborators.

Email questionnaires were sent out to the participants after the rally. The answer rate was unfortunately quite low and a more general judgement has been taken on the initial evaluation. In spite of this, the interviews have been very useful since it gave the research a deeper understanding for the opinion about geographical bound services.

The initial evaluation showed that most participants were positive to the WineGuide service and that it gave good support when buying wine. No one thought that the connection times for the services took too long and everyone thought that the interface had an understandable and appropriate layout. A majority mentioned that they in advance made up their mind about what to buy. Normally, they did not ask the staff about suitable recommendations for specific occasion, even though the choice of wine usually relied on the occasions of consumption for most of the participants. This does not correspond to what the staffs at the liquor stores experience. According to them, approximately fifty percent of the customers have not made up their mind when their turns (personal communication with staff assistant 2000-02-27).

There were also a quite wide spread interest in wine and food. Some of the participants were subscribed to wine or food magazines whereas others were not even interested in wine at all. This also emphasises the different reasons way they tried the service, some because of the interest in wine and food recommendations and others due to technical interests. Different opinions about transaction models reached from charge each time of the use of WineGuide (ca1 euro) till monthly debit (ca 18 euros).

The user statistic from the log file showed 25 interaction occasions with WineGuide. Half of these just entered the index page and the rest of

them continued to use the service, even spread between the three functions; wine, food and the search function. Since the service is neither profile based nor demands any log in routines, no separations could be made between different users. The intention failed in comparing interview answers with log file statistics. This was a valuable design implication for the comprehensive field evaluation.

The Swedish Rally evaluation resulted also in some other smaller modifications of the WineGuide system. Trough analysing the log files it was possible to check users interferences with WineGuide, how they used different input fields and how data were sent. It appeared that the users sometimes misinterpreted the situations where the service had other intentions. The modifications done with the system were in the spirit to help future users for better understanding of the service.

6.2 The comprehensive field evaluation

The comprehensive field evaluation lasted for three weeks. During that time the participants had free access to try the WineGuide service. The trial period were followed up by five recorded interviews. The evaluation resulted in further information about the overall opinion about geographical bound services, expert recommendations, WAP services, buying behaviour, mobility, etc.

One of major results from the initial field evaluation was the log in routine at the welcome page. All users had to enter their initials each time they requested the service. The initials were matched with the log file to see the users' interactions. Later they were also analysed and compared to the answers given at the interviews.

During the test period 426 user interferences occurred with the WineGuide service. The user statistics proved that none of the three entrances were prioritised. As in the case of the Swedish Rally the user interaction were even spread in between them. This proves that none of the entrances is to be prioritised before the others.

Below follows different sections discussing relevant areas of the thesis based on the interviews and log file statistics.

6.2.1 Mobile- and WAP use

All interviewees had at any time used different WAP services. The use and access of WAP services differed from two weeks up to six-seven months. Still, the overview of using these kind of services were more due to

technical curiosity and the charm of novelty, rather then the actual necessity or the benefit from it. The average use of WAP services were therefore approximately twice a week. However, all agreed that they would use them more often if the functionalities were better and if the services were more attractive.

6.2.2 Shopping behaviour

They all thought that the most reliable source of recommendations come from friends and other people with same interests. Adverts on TV, radio and the press have minor impact on the social life even though they were affected of those channels too. WAP as a medium for commercial was however not seen as an alternative. The lack of colours, animations, user integration and the limited size of display were some factors due to that. Some ideas arose however about using profile based push technology to inform people about shops products when a user passes by. This was also the only alternative the interviewees could see the potential in having geographical bound services. (These kinds of services corresponds to the service Shopper's Eye, chapter 5.3.2) Otherwise the idea seemed not very efficient since they did not very often travel in work and are situated at the same place during the whole week. A good segment group would then be travellers, i.e., tourist, sell persons, lorry drivers, who often are on the move and who have very bad local knowledge and might want to know different location in cities.

Since friends were the experts in giving recommendations, the choice of wine often referred to what the friends had recommended. The interviewees seemed neither particularly interested in wines nor food recipes, even though they enjoyed a good dinner with a nice bottle of wine. They did not seek for the latest news. They either bought wines recommended by a friend or wines they recognised from the shelves in the liquor stores. All of them mentioned that they made up their mind on what to buy when they entered the liquor store. Often the queues are so long that there is plenty of time to do that. This corresponds to one of the classifications in the observational study - the Searcher, who has not decided what he/she wants and disposes the time through searching on the selves. If the wine were out of stock at one liquor store they rather buy something else then find it elsewhere.

6.2.3 Pricing

When asking about the price for using similar services to WineGuide, no one were prepared to pay for it as long as the service did not address the complete transaction chain. Money is already spent on telecom

operator fees. Adverts on the WAP service were not an alternative for getting it free. However, several thought that if they came across a really functional service, which addressed time save and convenience, they were prepared to pay for it. For instance, that the WineGuide service could send the shopping list straight to the supermarket who gathered the products and delivered them home. The same function could also be able at the liquor stores. There are, however, some limitations due to the alcohol law and the policies of the liquor stores. Today, neither of the interviewees had found a service addressing convenience nor saved time.

6.2.4 Mobile services

The overall opinion about the future of mobile Internet, mobile technology and the mobile IT use were very optimistic. Everyone thought it will have strong influences in all working areas, spare time and entertainment. Some compared it to the IT revolution in the nineties with the successful adaptation to PCs, Internet and mobile phones. They believed that Mobile Internet would be a part of everyone's life.

6.2.5 Log file statistics

The log file statistics showed 426 user requests to the WineGuide service. These were exclusively the image requests. It proved that the requests had been carried out by 78 user sessions from 16 different hosts. The requests often increased the day before a person was going to be interviewed. When asking about this at the interview, the normal answer was that the interviewee wanted to be prepared before the interview.

The test period lasted unfortunately not long enough to find recurring patterns on user interactions. The people participating in the evaluation rather tried the WineGuide service for the charm of novelty, then to satisfy their needs.

Figure 6.1 illustrates the information given from the log file. The first column contains the IP-numbers. From some hosts these are dynamically given, which means that two different users can have the same IP-number at different occasions. The second column contains the date and the Greenwich Meridian Time. The third column informs about the requested page and contains variable data, i.e., information about liquor store position, user initials, etc.

```
157.125.4.28 - - [02/Mar/2000:16:03:47 +0100] "GET /~eklund/WineGuide/index.cgi
157.125.4.28 - - [02/Mar/2000:16:08:48 +0100] "GET /~eklund/WineGuide/search.cgi?artnr=coto&pos=1403
157.125.4.28 - - [03/Mar/2000:13:01:21 +0100] "GET /~eklund/WineGuide/index.cgi?
157.125.4.28 - - [03/Mar/2000:13:01:35 +0100] "GET /~eklund/WineGuide/foodcat.cgi?pos=1403
157.125.4.28 - - [03/Mar/2000:13:01:41 +0100] "GET /~eklund/WineGuide/fdish.cgi?pos=1403&foodid=1
157.125.4.28 - - [03/Mar/2000:13:02:00 +0100] "GET /~eklund/WineGuide/fmatch.cgi?pos=1403&foodid=1
157.125.4.28 - - [03/Mar/2000:13:02:17 +0100] "GET /~eklund/WineGuide/fdish.cgi?pos=1403&foodid=13
157.125.4.28 - - [03/Mar/2000:13:02:24 +0100] "GET /~eklund/WineGuide/fdish.cgi?pos=1403&foodid=3
157.125.4.28 - - [03/Mar/2000:13:02:42 +0100] "GET /~eklund/WineGuide/fmatch.cgi?pos=1403&foodid=3
157.125.4.28 - - [03/Mar/2000:13:02:48 +0100] "GET /~eklund/WineGuide/shoplist.cgi?foodid=3&back=1
157.125.4.28 - - [03/Mar/2000:13:03:30 +0100] "GET /~eklund/WineGuide/winecat.cgi?pos=1403
157.125.4.28 - - [03/Mar/2000:13:03:55 +0100] "GET /~eklund/WineGuide/wmatch.cgi?winecat=2&pos=1403
157.125.4.28 - - [03/Mar/2000:13:04:00 +0100] "GET /~eklund/WineGuide/shoplist.cgi?foodid=12&back=1
192.165.99.217 - - [04/Mar/2000:13:34:10 +0100] "GET /~eklund/WineGuide/index.cgi
```

Figure 6.1 An excerpt of the log file.

6.3 Validity and reliability of the data collection

The initial field evaluation of the WineGuide prototype at the Swedish Rally was carried out during four days, Thursday to Sunday. The liquor stores were closed on two days during that period. The event was also geographical situated in the forests of the middle of Sweden. There are quite few towns in that area and there are only one to two liquor stores at most, in each town. The relevance of a geographical bound service might be discussed in that context, so can the combination of rally and the use of wine recommendations. However, the initial field evaluation was a good opportunity to try out the system in real user situation and to test the relevance of the service in relation to the questions of the thesis.

Even though the main idea of the WineGuide context could not be justified, the evaluation of WineGuide still gave good impression on how users interact with the systems and gave feedback on further design implications. The evaluation also resulted in good knowledge in how to introduce the prototype to the test group in the comprehensive field evaluation.

The findings from the comprehensive field evaluation, on the other hand, gave good results for the thesis. Not at least the thoroughly introduction of the service to the participants, which gave them good insight of the service, the functionality and those parts that were simulated.

The face-to-face interviews proved to have more impact then the questionnaire forms sent out on the initial field evaluation. This time, all interviewees gave detailed answers on all questions, which was not the case the first time.

Still, the full potential of the system could not be evaluated since some parts were simulated and the complete eCommerce transaction parts

were not implemented. However, some questions on the interview dealt with these complications and the overall view on these things have been discerned.

7. DISCUSSION AND CONCLUSION

The comprehensive field evaluation showed to have one of the major impacts for the results of the thesis. The combination of a field evaluation, where the users statistics were logged, followed up by interviews proved to be a good source of knowledge. However, the good result of the evaluation was also the result from the earlier method steps in the thesis.

7.1 The WineGuide service

The thesis seeks to explore how expert recommendations affect geographical bound eCommerce in retailing. It has showed several different user occasions with the WineGuide service, both for indoors settings at the liquor stores and for mobile situations outside. However, the full potential of the service can only be established trough a full implementation of a complete eCommerce transaction part. Thus, food and wine could be ordered and paid for from the phone, packed together and home delivered. All through a single push on a button on the phone.

As proved from the interviews, there is a call for more functionality before services, such as WineGuide, really become powerful. People have less time today, so recommendation services should save time and make it convenient to shop. That was also the intentions with the WineGuide service. However, as the service work today, people are not prepared to first use the service, for later be forced to walk to the store to get what they want anyway. If the complete WineGuide service had been possible, there is a large call for services like WineGuide.

Figure 3.1 in chapter 3.3 illustrates that WineGuide is dependent on three different interests to make it useable, i.e., public policies, technical standards and organizations. Due to the Swedish alcohol law (Alkoholinspektionen, 2000-03-15), there might be some constrain for the interests of WineGuide. The public policies concern among other things the sales of alcoholic beverages, e.g., the liquor stores are not allowed to be commerced for the aim of profit. However, the WineGuide service will probably not give rise to higher sales profit. It will rather work as a better source of knowledge for finding, combining and enhance the local knowledge of gourmet food and wine. That will not work against the public policies.

The second and third interests, i.e., technical standards and organisations, relates to trends and development in the new IT society. For a company it is very important to renew and adapt oneself to new technology,

technical standards and business constellations to facilitate for customers and business partners. The liquor store ought to have more interests to renew them self especially after the entrance to the European Community, EC. This has brought forward new competitors and threats to the Swedish alcohol monopoly. If the liquor stores are neither prepared to adapted them self to new commercial interests nor to new technical standards, they will probably have big problems to beat there competitors.

7.2 Geographical bound services

An interesting detail at the comprehensive field evaluation pointed at two approaches of geographical bound services. The first definition puts the user in focus, whereas the other focuses on the actual geographical position of the requested service.

7.2.1 Individual adapted geographical bound services

The first kind of geographical bound service focuses on the individual. These kinds of services address the user's geographical position. This means that recommendations and other information requested by a user is based on where the user is, i.e., through pushing out information to the user.

7.2.2 Position adapted geographical bound services

The second definition of geographical bound services is the position adapted. These services forces the users to adapt them self to the system. The service has more an informative purpose. The user can select what place he/she is interesting in and receive information about that place or find out the nearest place for something based on its location. WineGuide has proved to be a position adapted service.

7.2.3 Individual vs. Position adapted services

People do not want to be adapted to services. The services are supposed to exist were the users are and not opposite. This proves that people are more focused on individual then to position adapted geographical bound services.

Table 7.1 compares individual adapted to position adapted geographical bound services. As illustrated most characteristic for the two kinds of services is the way in how information is received. For position

adapted, this is dominated by an active information seeking behaviour, where the user has to initiate the process. This is automatically performed for individual adapted services, which therefore is characterised by a passive information seeking behaviour.

Table 7.1 Comparison between individual and position adapted.

	Position adapted	**Individual adapted**
Characteristic	▪ Active information seeking behaviour ▪ Position adapted ▪ None-/ profile based	▪ Passive information seeking behaviour ▪ Individual adapted ▪ Profile based
Conditions	▪ Time save ▪ Convenience ▪ Complete eCommerce transactions ▪ Product uniqueness	▪ Call for user interest ▪ Large set of retailers' participation
Advantages	▪ Easy to find products/places	▪ User gets notified ▪ Services adapted to the user
Disadvantages	▪ User forced to adapt them self to the services	▪ Difficult to find specific products ▪ Retailers dependent
Example of services	▪ WineGuide ▪ TomTom ▪ Pocket BargainFinder	▪ Shopper's Eye

There are also different conditions for the services to succeed. For position adapted services time, convince and complete eCommerce transactions are factors that have already been discussed. But also the uniqueness of a product is of major importance. Thus how difficult it is to find a product at a specific place. The more a product is unique on the market, the harder will it probably be to find it. The correlation between time saved and convince prove to have a major impact on this last factor of condition. For the individual adapted services, on the other hand, a large set of participating retailers is of most importance if the services are to succeed. This since a user probably want a number of alternatives from different retailers when he/she is using a service. This also so that the service is usable all over, for example, a shopping mall, a larger shopping area or in a whole city.

Both position- and individual adapted geographical bound services have several advantages and disadvantages. Position adapted services inform the users were products, services and places can be found. That is not the case with individual adapted services. This might be one of the major disadvantages with these kinds of services. One way to come around

that problem is to have plenty of surrounding retailers contributing with special service offers. This makes it easier for the users to find the products or services they have registered they are interested in. However, individual adapted services actively support the users, which is not the case for position adapted services. For individual adapted services, the users get notified when passing by specific places and leave it up to the service to do the information seeking.

As pointed out, WineGuide is a position adapted geographical bound service. This means, in other words, that the user is adapted to the service in order to carry out the result of the service. However, a full scale implementation of the WineGuide system might have consequences on the system as a geographical bound service. This, since a full scale implementation would mean that people must not go to the stores any longer. In that case the positioning system would be irrelevant. Instead a complete new logistics for transportation and distribution network would be necessary. However, the liquor stores could still offer manual service. WineGuide would then work as a mean to fasten up buy- and decision processes for a better and faster service. It could also be possible to make orders via WineGuide straight to the liquor store, where the products are brought together and later picked up. This would mean faster business transactions.

7.3 Trends and important design aspects

The interest of Mobile IT use is very high and the future directions points at an explosive expansive area. The number of subscribers with Internet access, is for instance, in Japan approximately 5,9 million (Eurotechnology, 2000). The interviewees had also very optimistic views on its future.

Figure 7.1 illustrates the mobile Internet revolution. Since 1996, the number of mobile phone subscribers have increased from 0.2 billion subscribers to 0.8 billion. The approximated number subscribers 2003, estimates to be 1.4 billion. The PC use with Internet access has had a relative stable increase since 1997. However, the most impressive increase is the curve for mobile phones with Internet access. According to the figure the use of mobile phones with Internet access expects to completely explode in the next couple of years. From almost none existence, year 2000, to approximately 0.8 billion users in the year of 2003.

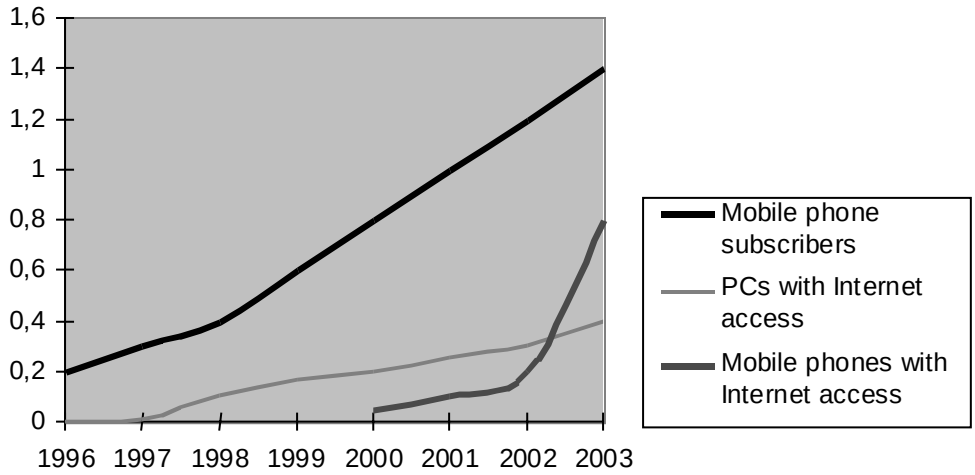

Figure 7.1 The Mobile Internet revolution (Source Nokia, 2000)

Obviously, we are in the beginning of a new epoch, where mobile IT use will be a part of the everyday. Still, there are some problems in finding the real "killer app", which will ban the way for new mobile IT use. Even though the figure above gives an optimistic view of the future, the interviews proved that people are not satisfied with already existing applications. They can neither support the user's demand nor substitute the functionality of a stationary computer. Two important design implications proved to be time save and convenience.

The next step towards eCommerce services in mobile settings on the Swedish market will be through the third generation mobile communications system (3G), i.e., Universal Mobile Telecommunications System (UMTS)[15], and GPRS. The access times will be faster and the user will only pay for the data transferred. This means that it will probably be cheaper to use these kinds of services and it will address more users in the long run. Probably it will not take long until eCommerce goes mCommerce.

7.4 Summary

This thesis illustrated the WineGuide service and its capacity for moving the research of geographical bound retailing in conjunction of experts' recommendations into another level. The illustration of the system must not be seen as limited to the Swedish market. The concept is applicable to other branches in the retail industry outside Sweden.

[15] UMTS will deliver low-cost, high-capacity mobile communications offering data rates up to 2Mbit/sec with global roaming and other advanced capabilities. Launched commercially from 2001. Further information http://www.umts-forum.org/

WineGuide addresses, as proved, several consumption problems such as convenience, comfort and selection. Still, the full potential of the service can only be established through a full-scale implementation of the eCommerce transaction parts. This since people does not see any advantages to first use the service and then still forced to pass the liquor store.

There are still some areas that have to be further explored with the WineGuide service. To date the implementation of MPS is simulated, but the full functionality can be integrated any moment since the telecom operators have realised the service for public use. The pricing for the service is another subject for experimentation. How much are people prepared to pay for the service or should advertising revenue cover the expenses?

If the complete transaction parts were about to be implemented, WineGuide would work as a mean to control product flows as a remote controller. This would mean that physical products need a complete new logistics. Retail chains have to cooperate and shape new conspiracies to be able to compete on the new market where mobility and "instant demands" are parts of the everyday.

The thesis has also identified two different approaches on how expert recommendation services affect geographical bound eCommerce in retailing. These perspectives were established through the observational study and the field evaluation. The approaches are:

- *The position adapted*, which affect the complete logistics with new business conspiracies and distribution models to be able to compete. However, services with no complete eCommerce transactions have proved to work in particular areas, for example in informative purposes, e.g., TomTom (in chapter 5.3.1).

- *The Individual adapted*, which are adapted to the users actual position. These services emphasises a large set of participating retailers to make the services effective and who keep products and services updated.

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APPENDIX A. INTERVIEW SWEDISH RALLY

The main objectives of WineGuide are to support people in mobile buying processes, guarantee that products are in the assortments before entering the stores and as a consequence of these things save time and make it convenient to shop. The concept is not technical dependent but the implementation is adapted on mobile phones.

The system supports three functions. These are wine recommendations based on:

- Wine categories, e.g., red, white.
- Food recipes, e.g., meat, pork, fish.
- Search function, e.g., search on article number.

WineGuide is based on a chef's (i.e., the chef of the year 1990, Dan Lexö) expertise on food in combination with a wine expert's expertise on wine. Through retrieving information about a user's location, the service gives recommendations based on the assortment of the closest store of wine and spirits. Unfortunately this was not possible to implement in the forests of Värmland, the user had to, on there own, chose the store he was interesting in. The products that were not in stock were removed before the wine list was presented on the display on the mobile phone.

For further information see:
http://www.viktoria.informatik.gu.se/~eklund/WineGuide.pdf

Interview questions:

Instructions: Write down Your answer on the line "Answer". Send the filled in questionnaire to eklund@viktoria.informatik.gu.se. Thank You!

Personal data

1. Name?
   Answer:

2. A. Did You test WineGuide during the rally?
   Answer:

   B. If "yes" on question 3A:
   For what purpose did You try it? (E.g., to test the functions of WineGuide, to receive different dishes for the dinner, to see where to find a specific wine..)

Answer:

C. If ”no” on question 3A:
Why did You not try the service? *(E.g., food and wine did not feel relevant out in the bush, I did not understand its functions, and the service did not attract me...)*
Answer:

Buyer behaviour

3. Are You subscribed to any food- or wine magazine? If “yes”, which ones?
Answer:

4. Do You make up You mind on what to buy before entering the store of wine and spirits
Answer:

5. Does it happen recurring that You do not know what to buy?
Answer:

6. Does it happen that the wine You are going to buy is out of stock?
Answer:

7. Does it happen recurring that the shop assistance gives You recommendations on what wines You should buy?
Answer:

8. What are the crucial important factors when buying wine? *(Price, quality, the dish, etc)*
Answer:

9. Do You follow wine recommendations from friends, cooking programs, and food magazines?
Answer:

WineGuide functionality

10. Do You think it was easy to start using the WineGuide service?
Answer:

11. Do You think the titles and the system had an all right overview
Answer:

12. Do You think the connection times for the WAP connections were acceptable?
    Answer:

13. What function do You find usable? *(E.g., dish advice, wine recommendations, fax/email the recipes, the search function...)*
    Answer:

14. What functions do You miss?
    Answer:

15. What functions could be removed?
    Answer:

16. Do You find the service as a good support for shopping wine and food?
    Answer:

17. Do You think there is an interest in receiving recommendations about different bargain wines?
    Answer:

Remaining questions

18. Do you think there is an interest in similar services in other areas? If "yes", in which areas?
    Answer:

19. Would You mind paying fore the service? If "yes", which payment model is to prefer;

    - Paying each time of use (ca 1 euro/time)
    - Paying each quarter (ca 19 euros/quarter)

    Answer:

Thank You for taking time, best regards Sofia Eklund

WineGuide:
An expert recommendation service in geographical bound retailing

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Abstract

WineGuide is a geographical bound recommendation service for wine and food adapted to mobile phones. The service addresses well-known problems within the area of shopping, by: (1) offering expert recommendations; (2) notifying the user where products are available; (3) distributing information in appropriate situations; (4) letting the user search for products. WineGuide is a part of a greater project to investigate the novel area of geographical bound retailing in conjunction with expert recommendations. The question in the paper is; how does the WineGuide service map customers' requirements? The empirical data is obtained through an observational study of waiting customers at the liquor stores. Three different categories of customer were identified, all with special needs that are supported by WineGuide.

Keyword: geographical bound services, mobility, recommendations

Introduction

The information technology has contributed to an explosive growth both in production and consumer sectors of the retail industry within the past decades. Internet, and especially the World Wide Web, has opened new possibilities for people to conduct businesses and shopping through the net. The International Data Corporation (IDC) has projected the global eCommerce market to be a $200 billion industry by the end of year 2000.

However, shopping malls and downtown shopping areas are still important to reach customers. These areas let people access products and services of great supply. People get reminded on what to buy when walking around in these areas. This is difficult to accomplish on the net. Net trade cannot easily remind people on what to get when browsing the Internet nor deliver the products at the same time as the purchase.

The printed newspaper is the media that most people rely on when recommendations are given on products and services (Swedish associated

press). However, there are reasons to believe that recommendations in newspapers and magazines are rarely used. First, according to WSL Strategic retail survey (Liebmann, 1998) people are working harder but are still shopping more often and at more types of retail stores. This indicates that consumption often occurs spontaneous and presumably with the magazines left at home. Second, recommendations in magazines often present ideal pictures of assortments. This is not the case in real life. The products can be sold out and customers are never guaranteed to find products in specific stores. The WSL Strategic retail survey found that selection, convenience and price are factors that people prioritise when shopping (Liebmann 1998).

This research addresses the novel requirements of systems adapted to geographical bound retailing in conjunction with expert recommendations. A research setting that has been overlooked earlier in the area of eCommerce. In the research agenda of eCommerce in the Scandinavian Journal of Information Systems (SJIS), set by Saarinen and Tuunainen (1998), it is not even mentioned. The research of this paper is accomplished through WineGuide, a geographical bound recommendation service of wine and food adapted to mobile phones. The paper seeks to explore how the WineGuide service maps customers' requirements.

Recently, there has been an increase of recommender system solutions. These are systems that link users with similar interests. These systems are often based on profiles, which are derived from the users' purchase history or stated interests (Resnick et al, 1997). The implementation of WineGuide, however, does not depend on profiles. This does not mean that WineGuide is an expert system, since they are designed to simulate the problem-solving behaviour of a human expert in a narrow domain or discipline (Luger et al, 1993). Instead, the recommendations of WineGuide system originate from a famous chef and a wine expert.

The system addressing the area of eCommerce and mobility in the literature are the Bargain PocketFinder (Brody and Gottsman, 1999), TomTom (PalmTop Software) and the Shopper's Eye (Fano, 1998). Yet, the Bargain PocketFinder relies on that customers can wait for their products to be delivered, whereas the Shopper's Eye is based on profiles that are matched with the retailers offers. TomTom is very similar to WineGuide but does however use GPS as positioning system and is profiled based.

The research was conducted according to the research approach of Mobile Informatics (Dahlbom and Ljungberg, 1999), a subset and further development of the "New informatics". Dahlbom (1996, p. 29) describes "the new informatics" as "…a theory and design oriented study of information technology use, an artificial science with the intertwined complex of people and information technology as its subject matter." Mobile Informatics focuses exclusively on mobile activities. It also stresses the importance of commercial values on the new IT. The research must be novel and commercially interesting.

The rest of the paper is structured as followed. The next section describes the architecture of WineGuide followed by the technical details. A section with research background is presented in section 3. In section 4, the result of the empirical studies is presented. After this, the result is analysed, discussed and put in relation to previous work in the area of geographical bound retail in conjunction with expert recommendation in section 6. The final section sums up the paper and gives future directions.

The WineGuide system

The main objective of WineGuide is to support people in mobile buying processes; guarantee that products are in the assortments before entering the stores and as a consequence of this save time and make it convenient to shop. The concept is not technical dependent but the implementation is adapted to mobile phones. The reason for mobile phones is that the solution makes it easier to reach a mass-market since no extra hardware or software is required.

The idea of WineGuide relies on the law of monopoly of alcohol in Sweden. Due to that, these products must be bought in special stores. However, WineGuide is also applicable to other international retail stores, such as Marks & Spencer (www.marks-and-spencer.co.uk) and Karstadt (www.karstadt.com), both with considerable high sales of wine.

The WineGuide system supports three functions. These are wine recommendations based on:

- Wine categories, e.g., red, white.
- Food recipes, e.g., meat, pork, fish.
- Search function, e.g., search on article number.

The wine entrance lets the user browse different wine hierarchies, i.e. red wine, white wine, fruit wine etc., and gives suitable recommendations on selected category. At this instance WineGuide also recommend appropriate dishes for the wine. The user can select any of the dishes and receive a short description and a shopping list of the dish on the display. The whole recipe is sent home to the user either by email or fax. This kind of information layering means that different information is shown in appropriate situations and considerations are taken to the limited size of the display.

Figure 1: The wine categories, the wine match and the recommendations of dishes

The recipe entrance is based on different food ingredients, i.e. meat, vegetarian, fish, seafood etc. Through browsing down the food hierarchies the user can receive a more specific match of dish he or she is interested in. The selected dish matches recommendations of appropriate wines. Here too, the user have the opportunity to select different dishes, browse the shopping list and send the whole recipe home.

Figure 2: The food entrance, browsing options for a dish, fax/email recipe.

The last entrance lets the user search for specific wines. The user enters the name or the article number of the wine and receives information whether or not the wine is in stock, based on the assortment of the closest store. The user can also select other liquor stores and receive search results from the stores.

Figure 3: The search display, and the result

The recommendations of the system are based on a chef's expertise of food in combination with a wine expert's recommendation of wine, stored in a database. Through retrieving information about a user's location, WineGuide synchronizes the experts' recommendations with the assortment of the closest store. This is accomplished through the online web service of the liquor stores. It finds out which wine brands that are not in stock. The list presented on the user's display contains only the wines that matched the chef's and wine expert's recommendations and those in stock.

Figure 4: A user scenario. A user can in advanced plan his shopping trip through using the different entrances of the WineGuide service. This is also easily carried out in mobile situations.

Technical Details

The WineGuide system has a client server architecture. The communication with the client is done with the Wireless Application Protocol (WAP), which enables interaction between mobile terminals and Internet services (further information see Wap Forum). The current implementation is in Perl with a SQL-compatible database running on a Sun Solaris server with Internet connection. The client-side hardware is a WAP mobile phone, i.e., Nokia 7110.

The Mobile Positioning System (MPS) is a new released service, offered by a few telecom operators in Sweden. The MPS points out the user's position through Global System for Mobile communication (GSM) antenna triangulation with the accuracy of about 300 meters. Unlike positioning via satellite, MPS does not require any modifications to standard GSM phones and works both indoors and outdoors. The GSM has 220 million subscribers (GSM World), which makes it the largest digital wireless communications standard in the world.

The expert recommendations of WineGuide are easily updated through a web interface and the synchronization with the assortments at the liquor stores is performed through query-strings to the on-line web service.

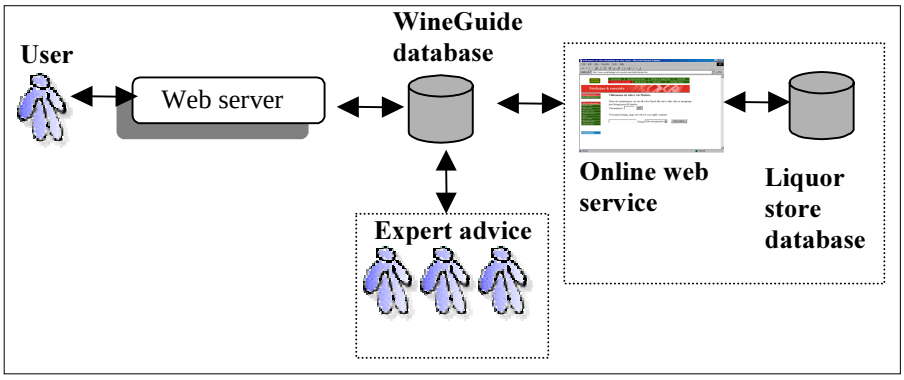

Figure 5: The WineGuide architecture.

1. Send MPS code to web server containing user position.
2. Retrieve requested information from database.
3. Synchronize data with online web service.
4. Present wine list for the user.
5. A web-based interface keeps the database easily updated.

Research site and method

The research was conducted at four different liquor stores in Gothenburg, Sweden. These stores are spread out all over the cities and are open between ten AM to six PM every Monday to Friday. Each liquor store has a specific queuing system, where the customers take queue tickets with numbers on and wait until a big display shows the number. The aims of the research were to observe what people were doing while waiting during that time and hopefully also receive some design implications for the WineGuide system. The idea of observing waiting people is inspired by the work of Harvey Sacks, in whose research agenda the everyday ordinary taken for granted activities is the subject of study (Silverman, 1998a). According to Silverman (1998b) observing occurring naturally situations is superior to, for example, open interviews.

Hughes et al (1994) point out that many systems fails due to the fact that their design pays insufficient attention to the social context of work. However, the research focus did not pay any attention to work situations but to shoppers, where no obligations of cooperation between each other existed.

To see variation in population, two inner-city stores, one store in a shopping mall and one commuter-situated store were selected. The research was also performed on different days and different times during the week. Approximately six hours of observations were conducted. Even though the observation is subjective, the time spent in field is enough for the purpose of informing the WineGuide design. This since the customers' purchases not very often took more than 10 minutes and approximately 100 purchases could be observed.

Field notes were taken continually and transcribed afterwards. The data were analysed and categorized to find special patterns of customers buying behaviours (Patton, 1990).

Results

This section summarizes the results of the observational study. The observed purchases took between 5 to 30 minutes to complete; i.e. the time spent from the moment the customer entered the store till the moment the customer was given its products.

The purpose of the analysis is to serve as sources from where I can elicit how the WineGuide service maps customers' requirements. Three important aspects are identified in which people carries out their buying procedures. These are;

- The Planer.
- The Stroller.
- The Seeker.

Filed notes from the study will be used in this section for a deeper understanding for the different aspects.

The Planer

In most cases the customers have already planed what to buy before entering the store. This kind of customer approach is called the Planer. The buying process is characterized by a fast and simple execution. The time spent in the queue appears to be something negative since the customers already are aware of what they want.

There are different waiting behaviours characterizing the Planer. Some Planers hold notes in their hands when entering the store. Presumably, they have written down wine recommendations from friends, relatives, magazines or TV shows. Quite often, these people wanders along the shelves trying to find the wines they are going to buy. When ordering the wine they often shows the note as to make sure that they do not know if the wine is in stock.

> A man with three children takes a queue-ticket. The man is holding a cutting from a newspaper. He is walking around the shelves holding a pen and comparing the cutting with the signs below the wine bottles. He seems to be insecure about what he is going to order but handles the shop assistant his piece of cutting at the fund. He is given some bottles of wine.

Other Planers just take queue tickets and then sit down. However, the field study showed that it is sometimes problematic for the Planer to proceed its buy. Among other reasons the product they want could be so up to date that the wine has not yet been delivered to the store or it is such a sell success that is already out of stock.

> A well-dressed man is holding a food and wine magazine in his hand. He is looking through the wine recommendations list while waiting. When it is his turn he shows the magazine for the shop assistant. One of the wine brands seems to not be in stock and a long discussion starts. The shop assistant turns

round to his colleague and asks him about the wine, he in turn starts to browse the wine and price lists brochure without any results. The whole procedure takes approximately 10 minutes and ends up with the shop assistant recommending the customer other wines.

So what kind of support does the Planer need in the buying process? Since the Planer in advance knows what wine he wants, he might want to know if the wine is in stock. This before he takes a queue-ticket and waits ten minutes for his turn. This request is supported in WineGuide by the search function, where the user enters the name of the wine to find out if the wine exists in the assortment.

The Stroller

The Stroller strolls about the wine shelves while waiting for its turn. Normally, it seems that the Stroller has already decided what he wants but disposes the time through strolling about the store reading newsletters, price information, looking at people and shelves information. The excerpt of the field notes below characterizes the Stroller.

A man in his early fifties enters the store with an empty plastic bag. He takes a queue ticket and strolls about in the store for a while. He then sits down and after a few minutes he rises up again. He walks towards the price list stand and starts reading the brochures. After a while he strolls away still waiting for his turn. When it is finally is his turn he orders a bottle of white wine.

However, not all Strollers know what they want in advanced. The fact is, that even though their behaviour are much the same as other Strollers, the strolling in the store seems to be a time consuming process for killing the time. For some Strollers the intentions seem to be to ask the shop assistant for some pieces of advice.

A woman in the age of twenty-five strolls about around the wine shelves reading on the signs below the bottles. It appears to me that she is trying to while away the time. She strolls about until it is her turn. At that point she does not know what to order. She asks the shop assistant what is most appropriately for a specific occasion. The man behind the fund gives her recommendations.

Whatever the Strollers know what they want or not, they can still take a lot of advantage of WineGuide. In the case they do know what to order, they may want to know if the wine is in stock or not. In that case they would use the search function. In the case they do not know what to order or which wine is most suitable for a specific occasion they could use WineGuide as a piece of advice. From two entrances they could either chose

the wine service or the dish service, browse different recommendations and select the most appropriate.

The Seeker

Even though the Planers and some of the Strollers often know what they want, there are others that do not. The second aspect of customer is the Seeker. These customers seem not to know what they want before entering the store. The normally behaviour is characterized by walking around gazing on the wine selves very carefully and without any hurry. The Seekers normally take their time to see what there are to offer and seeks information in the information brochures and price list. Not very rare the Seeker asks for consultancy from the shop assistant. Below follows some notes taken from the fieldwork at one of the stores.

> A woman in her late fifties enters the store. She picks up a brochure containing wine and price list information and starts to browse it as she, at the same time, walks around comparing the wine bottles on the shelves. This process takes approximately ten minutes and when she is ready she takes a queue ticket. She waits until her turn holding the brochure in her hand. When finally it is her turn she points in the brochure to the shop assistant. Unfortunately this wine is out of stock, she then points at another wine but this wine is sold out too. At this point the shop assistant helps her out with some recommendations, which the woman agrees upon.

Normally, all Seekers have not as complex behaviour as the woman above.

> A man strolls about around the wine shelves reading the information about the wines. He takes some information brochures and sits down waiting; meanwhile he keeps on reading the information. When it is his turn he points at the brochure and order the wine.

The Seekers do not very often know what to buy. It is clear that the Seekers would benefit from a recommendation system as a support in the decision processes. As it appeared in the field study the wine is not always in stock, which causes problems to the Seeker, when they finally have made up their mind. The implications are that the wine and food entrances ought to be relevant for this approach. This, since they could either receive wine recommendations based on what food the are going to cook or just receive some expert recommendations of wines, which are guaranteed to be in stock in the specific store they are visiting. WineGuide would then work as a piece of advice, give recommendations of food and wine, display the shopping list and send the whole recipe home. In that way, WineGuide succeeds in supporting the Seekers.

Discussion

The correctness to validate empirical informed design can be difficult since it is partly dependent on the design creativity. In the case of WineGuide there might, for example, be doubts about the definitive characterization of the customer categories. However, observing occurring naturally situations are of most importance and a preferable method to others since it takes the everyday rational into account (Silverman, 1998).

The time interval for the field study might as well be questioned. Since all observations took place on different days and at different places, no recurring patterns could be observed in that sense that a specific behaviour aspect occurred on special days and others didn't, for example that most Planers did their shopping on Mondays, whereas the Seekers waited till the end of the week. However, this was not the aim of my field study. The objective was to find out how WineGuide maps the needs of the customers. In that case three different aspects of behaviour were found, all with different requirements of the use of WineGuide.

Related systems

Some related research has previously been done in the setting of geographical bound expert recommendations. TomTom (Palmtop Software) is a service that plans the users travel routes and gives information about the location and nearby places of interest. The service is based on detailed maps, and uses GSM Network Operators and GPS as positioning system. TomTom has many similarities with WineGuide. Both are based on the same concepts of a mobile user who requests geographical bound services in conjunction with eCommerce. Both are also based on the same techniques, however WineGuide uses MPS whereas TomTom uses GPS. TomTom is also profiled based which is not the case of WineGuide.

The Shopper's Eye (Fano, 1998) is a system focused on augmented commerce based on the users' shopping profiles. The technologies used are PDAs and the Global Positioning System (GPS). Shopper's Eye is very much based on profiles, which is not the case of WineGuide. It is neither dependent on different retailers nor limited of the use of outdoors settings or extra hardware.

A further development of mobile recommendation services is the Pocket BargainFinder (Brody and Gottsman, 1999). This service is focused on hand-held devices that compare prices between different retailers. The system is intended to bridges the gap between electronic and traditional commerce. However, the Pocket BargainFinder doesn't involve recommendations situated at specific locations. WineGuide informs the user where to find the products and guarantees that they will be in stock. The products are also delivered at the same time as the purchase, which is not the case with the Pocket BargainFinder.

To end up the discussion, the last invention is a web-based information system of wine (ConnectThings). The system is a not geographical bound, but is after all based on experts' recommendations. The

user scans the barcode of the bottle and receives price information, descriptions and suitable food menus for the wine on a web page. The system is still under development, and is yet limited to manual interaction with the web page. Comparing to WineGuide, the system is only for stationary use and needs extra hardware and software.

Conclusions and future work

This paper adds to the existing body of research by identify three customer approaches, all with special requirements supported by the WineGuide service. These categories were established through the one hundred buying events observed. The users are:

- *The Planer,* who mainly requires the search function of WineGuide. This due to the fact that he/she in advance knows what wine he wants. The Planer is therefore much in the need of a geographic bound service. However, this aspect of behaviour also implies that the wine service of WineGuide is of interest. This service gives information about the latest news combined with food suggestions.
- *The Stroller,* whose needs corresponds to all of the functions of WineGuide, i.e., the search-, wine- and food entrances. This since some Strollers knows what to buy and could use the search function as a piece of search instrument whereas others need the expert recommendation of different food and wine combinations.
- *The Seeker,* who needs support in the decision process. This to inform what is most suitable for special occasions or what brands are new in the store. This also to inform the Seeker in advance what is and isn't in stock.

WineGuide addresses several consumption problems, such as convenience, comfort, selection and timesaving, which are valuable parameters in the consumption society of today. The illustration of the service must not be seen as limited to the Swedish market. The concept is applicable to other branches in the retail industry outside Sweden. Yet, there are still some areas that have to be further explored. To date the implementation of MPS is simulated, but the full functionality will be integrated in the end of April 2000. The pricing for the service is another subject for experimentation. How much are people prepared to pay for the service or should advertising revenue cover the expenses?

The full potential of the system can only be established through a full-scale evaluation of the system and several of use experience. The next step in the project will be to evaluate WineGuide in real life situations. Twenty people will participate during a three-week period, evaluating the application.

Acknowledgment

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APPENDIX C. INTERVIEW IT COMPANIES

Mobile- and WAP use

1. How do you use your mobile phone? *(On spare time, at work, SMS services)*

2. What is WAP? Could you tell me what you know?

3. For how long have you had access to WAP?

4. How much have you used WAP during the time you have had access to it? *(Once a week, a couple of times each day)*

5. What kind of services have you tried and how do you think they have worked?

6. The new services that came with WAP (such as weather news, stock market, information services), is that something you would like to use continually? Why/why not?

Shopping behaviour

7. Which, do you think, is the best way to receive information-/recommendation about products? Could WAP be a compliment?

8. When do you shop different products? *(Does it happen spontaneous or more planed)*

9. How do you find information about wine and food dishes? *(Magazines, TV, friends)*

10. What is/are the winning factors for the choice of wine? *(Price, quality, food dishes, etc)*

11. When do you make up your mind about what wine you would like to have? *(Home, in the store)*

12. How do you find the products you are looking for? *(E.g., advertisement, recommendations from friends, coincident…)*

13. Does it happen recurring that the wine you would like is out of stock? What do you do?

14. Does the shop assistant recommend wines to you?

Geographical bound expert services

15. How important is it that a service is geographical bound?

16. Is there any interest in having similar services to WineGuide *(a geographical bound service)* in other areas? Which areas, in that case?

17. How would the design of these kinds of services look like?

18. It costs 2.30 Swedish kronor to send a SMS message. What would you pay for the WineGuide service?

19. Are any of the transaction models below to prefer?
    - Charge each time (approximately 1 euro)
    - Charge each quarter (approximately 19 euros)
    - Free charge, with advertising

The functions of WineGuide

20. Did you try WineGuide during the test period? Why/why not? *(E.g., to try the functions of WineGuide, to receive recommendations to the dinner, to find out where a wine was… food and wine din not feel relevant to me, I did not understand its functionality, the service did not attract me)*

21. How was it to start using the service?

22. What was your first impression of the service?

23. How did you find the interface?

24. Did you succeed in performing what you wanted to do when using the service?

25. How do you think the access times were?

26. Was it any function that was specific useful?*(E.g., food suggestion, wine recommendation, fax/email recipes…)*

27. Did you miss any function?

28. Are there any functions you think should be removed?

29. If you think the WAP service should be designed in a different way, how would it then look? *(Different platform, functions, constellations)*

Mobile services

30. Lately, there has been an explosive development of mobile and adapted technologies, such as WAP, DAB, Bluetooth, GPRS. What is you opinion about the development of mobile services? *(Just a transitional period to new technology, the future…)*

31. Would accesses to Internet be of major importance?

Personal data

32. Name?

33. Sex?

34. Age?

35. Title?

36. Phone number or email address?

Thank you for your cooperation!

APPENDIX D. IMAGES OF THE WINEGUIDE SYSTEM

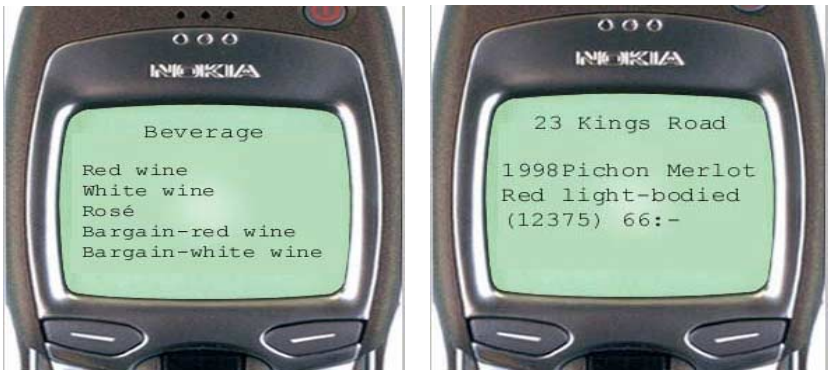

Figure 1. The wine categories and the wine match.

Figure 2. Dishes recommendations.

Figure 3. The food entrance and browsing options for a dish.

Figure 4. Fax or email recipe.

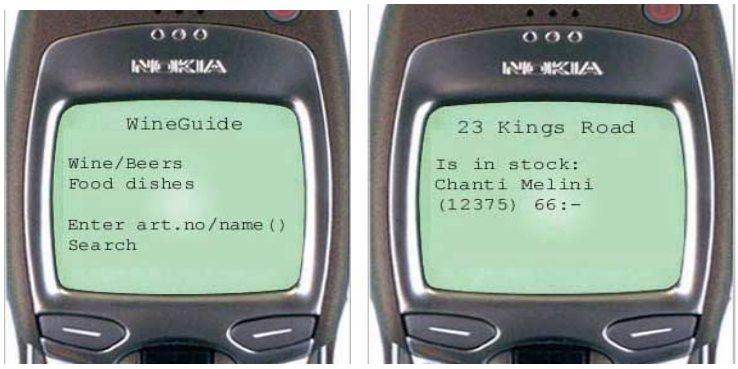

Figure 5. The search display and the result.