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Creating Customer Value in the

Mobile Information Industry

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How to estimate the success of new mobile services

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1 Introduction of Mobile Information Services

"Venturesome souls have risked personal freedom savings, reputation, even life and limb to create and distribute information. In the present generation, when technology has merged the computer and other connective media … opportunities have arisen that find their closest comparison in the fifteenth century, when printing began in Europe and old limits crumbled", (Fang 1997, p. XV).

Computers were once static boxes not connected to the rest of the world. Telephones were connected but lacked functionality other than peer-to-peer speech. Internet technology combined the two worlds, and simultaneously created a new market for digitized information. Mobile telephony systems take this development further, since they are capable of delivering services to people anywhere and anytime, allowing for mobility of users and ubiquity of services.

1.1 Time and Place from Obstacles to Resources?

With limited possibilities for storing and transporting provisions, supply was, in past times, dependent on local weather conditions and time of year. With industrialization and the expansion of the railroads, shipping goods over longer distances became possible. The printing press and the telegraph made market information available faster to a greater number of people, leading to larger markets with similarity in prices for equivalent goods. The more perfect a market is, the stronger is the tendency for the same price to be paid for the same thing at the same time in all parts of the market. But, as Marshall noticed more than 100 years ago, if the market is large, allowance must be made for the expense of delivering the goods to different purchasers (Marshall 1890).

Prices for goods distant from central production areas were, a century ago, adjusted to cover the extra costs of transportation. Today the market is more complex. Prices reflect supply and demand in both the short and long term. Transportation cost has, due to technological and organizational innovations, decreased for most consumer goods. Transportation of physical goods to overcome the distribution of their customer base in time and space will, on the other hand, always be a fact companies need to pay attention to. Most exchanges of physical goods continue to take place within geographically limited areas (Leamer and Storper 2001). When a good has sold out, it is not available until new goods have been transported to the marketplace.

Time and place are obstacles that companies had to cope with regardless, more or less, of what they were offering the customer. With new information and communication technology (ICT),

this has changed. Consumers are now demanding, buying, and using digitized information goods that do not suffer the same physical constraints as brick and mortar products. Information about consumers' locations when using or requesting such a service can now be a resource to improve the very same service in ways that were not possible previously.

Mobility is arguably the single most defining attribute of wireless, (Strategy Analytics 2001, Kliger and Ascari 2000). Location and change of location therefore become critical aspects of the industry's trying to exploit the possibilities offered by mobile ICT. Possibly as important as location are the other parts of mobility: the freedom of using a service whenever it suits the consumer best, (Keen and Mackintosh 2001) and the ubiquitous possibilities for many kinds of interactivity, (Mundorf and Bryant 2002, Tsalgatidou and Pitoura 2001).

Solving the mobility and ubiquity constraints makes it possible for companies, on a large scale, to offer situation-dependent services. New information and communication technology, ICT, has enabled new mass-market information services that can take customer location into consideration when producing the actual service. Regardless of where the customer is located, his location could become an input, among other inputs, to produce an information good. One could claim that a customer's location has changed from primarily being a distance from the production facility that needs to be overcome, to a resource, among others, that can improve the actual good.

Given the ubiquity of these kinds of goods and the wealth of constantly available information, one might even speak about a market discontinuity with the potential to also change other industries. This evolving industry, which relies on innovative use of mobile ICT to produce and deliver customer value to a mobile customer, will, in this thesis, be called the mobile information industry. The goods that this industry offers will be called mobile information goods.

1.2 Forecasting Successful Business Ideas

During the latter part of the 1990's and during the first years of the new millennium, new mobile data services directed to the general public were introduced. Many, if not most, were already terminated by 2003. Several of these services had no possibility to ever make money and should, if the investors had had more market knowledge, never have been introduced.

There are many things that can determine whether or not a service will be profitable for a company. Commercials, branding, pricing, management, technology and even luck might be deciding factors. It is hard to evaluate whether or not a business idea will be successful. According to Robertson (1971), it takes about sixty ideas to result in one commercially successful prod-

uct. Similarly, Minnesota Mining and Manufacturing, one of the more innovative companies around, approximates that from 100 laboratory starts, on average 33 technical successes emerge, and only 3 of them become commercially successful (Weiner 1964).

The Mobile information industry has to live with a technical environment that is generally changing very fast. But from the perspective of a single service provider, the technology or market is often not developing fast enough in the niche in which they are active. Additionally, the products and services often display considerable network effects, or positive demand side economies of scale. That is, the customer value of the good increases with the number of users that adopt the good (Katz and Shapiro1985). According to Lee and O'Connor (2003 p. 241) "the existing literature offers little decision-making guidance to managers on how to successfully introduce a product that exhibits network effects".

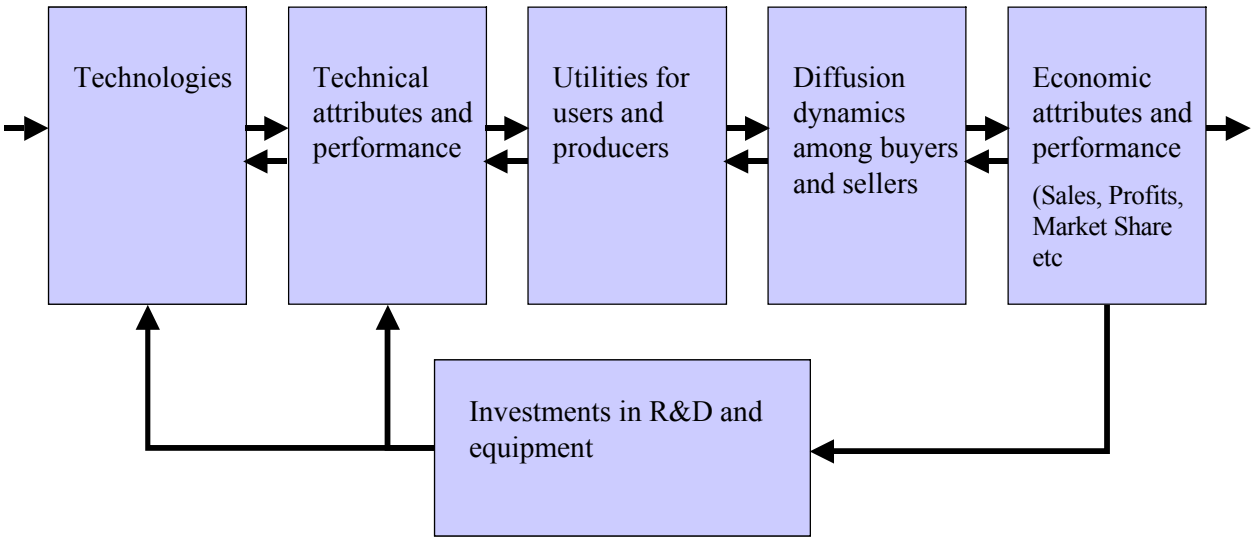

Figure 1: A framework for techno-economic analysis (Source: Granstrand 1994).

Since the technologies on which the mobile information industry is dependent are often developed by other companies, one can expect a continued technology push where service providers are stimulated to a sort of "trial and error" use of available technologies (Bray 2002 p. 295). Because of that it, is necessary to learn to "develop mobile solutions that get to the heart of the user's needs… [rather than to] …the technological constraints" (Barnes 2002 p. 98). Introducing a customer focused methodology to evaluate business ideas would reduce the need for this hit or miss process (Kudyba and Diwan 2002).

1.3 Problem Description

This thesis will mainly be concerned about how product and service ideas in the mobile information industry can be evaluated. There will be a focus on creating customer-value and, from

this value, also creating value for the firm, sometimes referred to as use-value and exchange value (Bowman and Ambrosini 2000).

In this sub-chapter, the research question, some important definitions, and the limitations will be outlined.

1.3.1 Research Question and Research Area

In order to increase productivity in the emerging industry, it is important to, at a low cost and in an early stage of the development of a new good, judge which, out of many ideas, in which one should invest. The research question consequently reads:

> RQ; **How can a potentially successful new mobile information good, early in the development process, be identified and differentiated from those which are not likely to be successful?**

Successful information goods, both in the classical industries as well as the mobile information industry, depend on an array of different factors. The word "successful", in itself, can mean different things to different companies: turnover, profitability, growth etc. In this thesis, a "successful service" is a simply a service that generates value for the company offering the service.

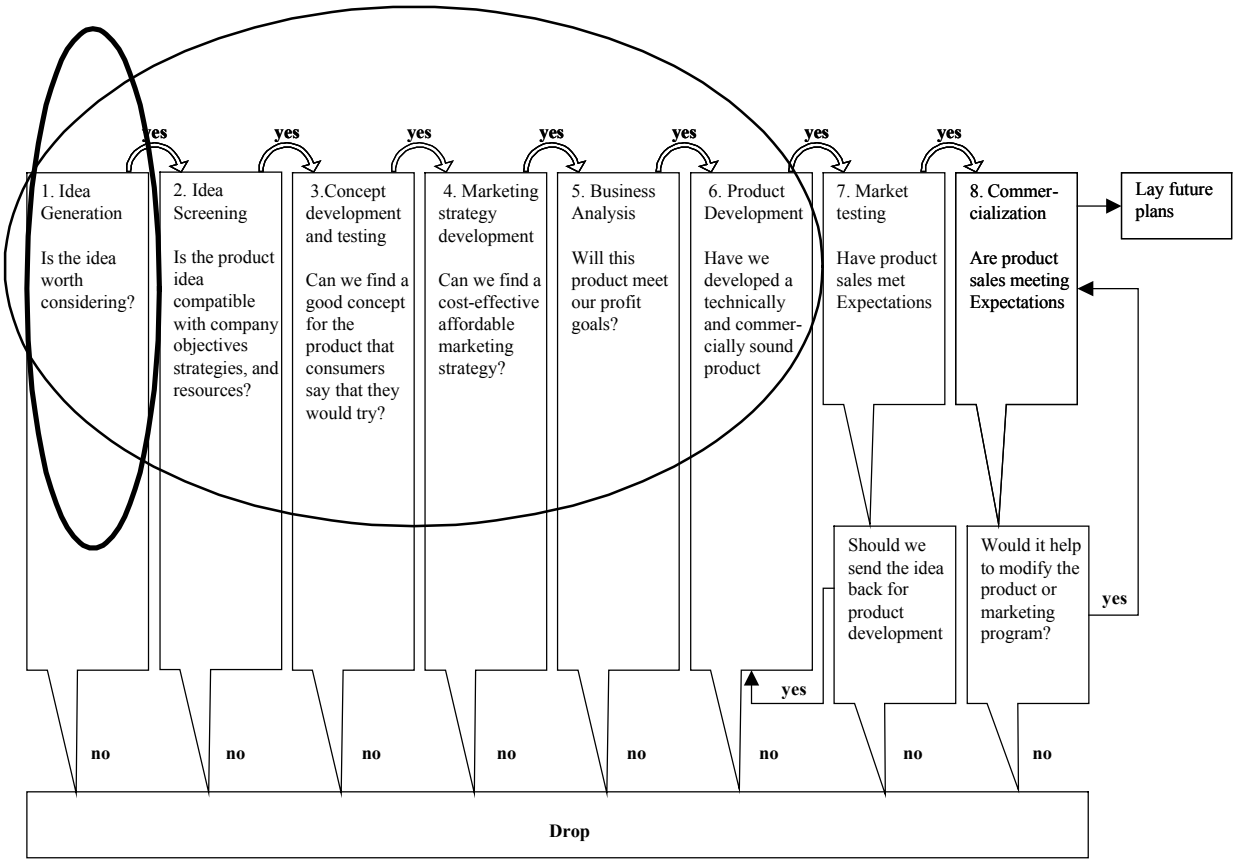

Figure 2: The new product development process. The scope of the thesis marked (Source: Kotler 2001).

One way to describe the researched field is to study where in the different steps of the product development process the research is located. If the development process begins with the generation of an idea and ends with commercialization and future plans (Kotler 2001), then the result of this thesis should be fully able to answer question nr. 1 in Fig. 2 “Is the idea worth considering?” It shall also to a great extent support the ability to give an answer to the questions 2-6 in Fig. 2.

A different way of seeing what is researched is to position the research with regards to its purpose.

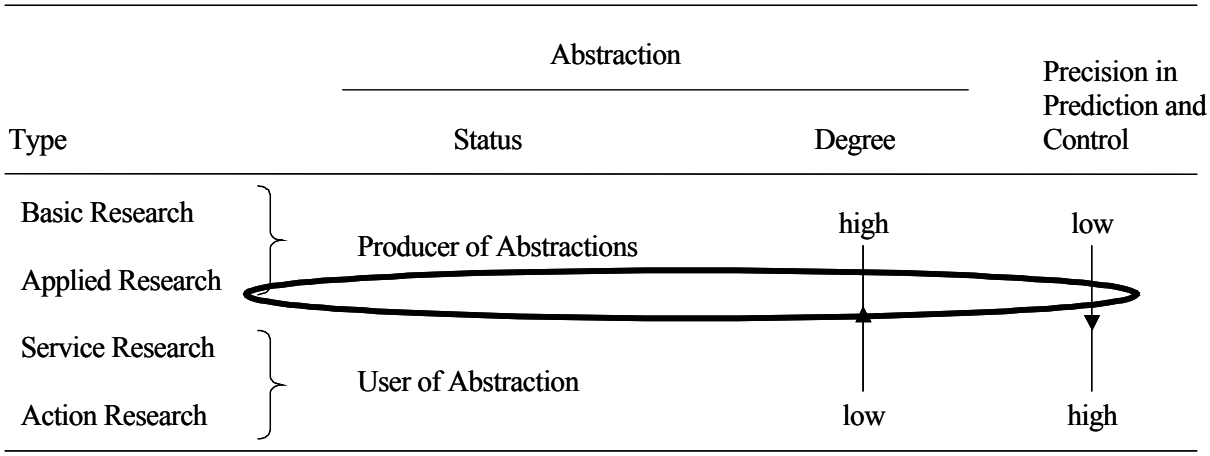

Table 1: Research according to purpose. The thesis placement marked. (Source: Ryan 1986).

The aim is to produce abstractions of the mobile information industry that can be used with such precision that they are truly useful in predicting the possibility that a service will be successful. This research lies in the applied field, but it also touches the service research, in which a practitioner typically tries to solve a specific problem.

1.3.2 Definitions, Important Expressions and Borders

Below are some important definitions and expressions that can have numerous meanings. Some technical expressions are also explained in Appendix 1

New Mobile Information Good

According to Robertson (1971), four criteria defining a new product have been frequently used: newness from existing products, newness in time, newness in terms of sales penetration levels and newness in terms of customer perception. A new information product will exhibit newness from existing products that is a new development of something that does not already exist in a similar shape.

Early in the development process

"Early", here, means before major investments for the company need to take place regardless of whether it is in market research or product development.

Services are, according to the OECD (2000 p. 7), "a diverse group of economic activities not directly associated with the manufacture of goods, mining or agriculture … They typically involve the provision of human value added in the form of labour, advice, managerial skill, enter-

tainment, training, intermediation and the like". This definition fits very well for mobile information goods.

Kotler et al. (1999 p. 650) distinguish services from products by the perishability of services. Technically speaking, with such a definition, mobile information goods are not services but are instead products. From a customer/user perspective, the value of the good often perishes after use. For example, directions to where a consumer wants to go have no value after the consumer gets there, regardless of whether he hired a guide to take him there or he got a digitized (and storable) map that included the directions.

Kotler et al. (1999 p. 646) define services as "any activity or benefit that one party can offer another which is essentially intangible and does not result in the ownership of anything". That reflects the mobile information pretty well, but not perfectly, because of the fact that copies of information are often of the same quality as the original and can therefore be considered a "new original". I will, because of this, in this thesis, make no major distinction between a service and a product. Most often I will refer to the output of the industry as information goods, but will sometimes call it a service or even a product. Neither the methodological approach nor the results will be affected by the classification of information goods as services or products.

Ziamou and Ratneshwar (2003) touch a related problem. Are mobile information goods really goods, or are they just new functions of the terminal used to receive them? According to Ziamou and Ratneshwar (2003), instant messaging is a new function of Microsoft Network. SMS gives, if we disregard mobility for a moment, almost the same customer value as instant messaging. Is this a good, a service, or merely a function? For the following reasons, SMS and other similar mobile information goods/functions, will be treated as information goods rather than functions:

1) They are considerably different from prior functions of the classical phone -- e.g. speech communication.
2) The information content of an SMS message can be the actual service, instead of the delivery of the information.
3) There is the possibility for independent companies to deliver an SMS message without any coordination. For example, a network provider (Vodafone) can deliver content from a content provider (e.g. Financial Times) to a customer's SonyEricsson mobile phone via an SMS message.

Mobile Information Industry

Information goods can be any kind of information that can be digitized -- e.g. software, entertainment, news or a combination of these categories. Mobile information goods are in principle any information good *primarily* intended to be marketed over a mobile network, with two exceptions: software that is mainly intended to upgrade the mobile network and software that is mainly intended to increase the functionality of the terminal. Whether the network, as such, is Internet over GSM, or UMTS, or wireless LAN or anything else that allows customer mobility does not matter.

If there is no mobility component in the service, be it location or timeliness, it will most likely not be successful, since it would be cheaper to market it over fixed line Internet or some other supply channel.

Companies that mainly sell or deliver hardware do not belong to the industry, but rather are suppliers to it. Companies that do not try to capitalize on the services offered are not considered to belong to the industry. To be able to capitalize, in this thesis, means that it is possible for a company, which is not also a mobile operator, to introduce services which have the potential to be profitable on their own. Mobile phone operators that mainly want to increase traffic in their networks are not primarily studied, although, what applies for stand-alone services can also be used by services offered by operators.

This definition of the mobile information industry does not claim that there are no other useful services that rely on mobile information systems. Nor does it say that this field necessarily will become the biggest. It is only a definition of what will primarily be researched in this thesis.

Customers

Customers are all the users of mobile information goods. They are defined in a very broad sense as the ones who benefit from the good. For practical reasons I will substitute “customers” every now and then with “consumers” or with the pronoun “he”. It goes without saying that this could just as well have been “she”. When, and if, there is a matter where the sex of a person does make a difference, this will be clearly stated.

Customer Value

The use, and also the variety of meaning, of “value” and “customer-value” is immense in the business literature. Value at its core “is a judgment of ‘good/bad,’ ‘better/worse than,’ and ‘good/bad for’” (Oliver p. 44). Kotler, in 1999, defined total customer value as”...all of the product, services, personnel and image values that a customer receives...” (Kotler 1999 p.

1010), but he has more recently taken a more pre-purchase view. In 2001, he defined total customer value as "the bundle of benefits that customers expect from a given product or service" (Kotler 2001 p.20).

A different approach, which, according to Oliver (1999), is used by many practitioners, is to define customer value on an "aggregated level". The mathematical representation of such a definition would be that VALUE = ***f*** (RECEIPTS/SACRIFICES). Where customer value is a ratio between the "good" and the "bad". This can be compared with Kotler's definition which only focuses on the "Receipts".

Customers choose between different products and services and they often have to make comparisons of what to sacrifice to get the desired product or service, which could be a payment, personal information, etc. Because of this, customer-value must be relativistic (Holbrook 1999, Wagner 1999). Customer value also depends upon the context in which the evaluative judgment is made -- e.g. within a particular time-scale or location (Bevan and Murphy 2001). It also has to be experienced, which means that value rests, not in the product or service, but rather in the customer experience (Holbrook 1999, Holbrook and Hirschman 1982) or expected experience (Kotler 2001). Naturally, customer value is also dependent on the individual since different customers value things differently.

Companies that create customer value can then capture a part of the created value as exchange value. This value is normally lower than the total customer value created (Bowman and Ambrosini 2000).

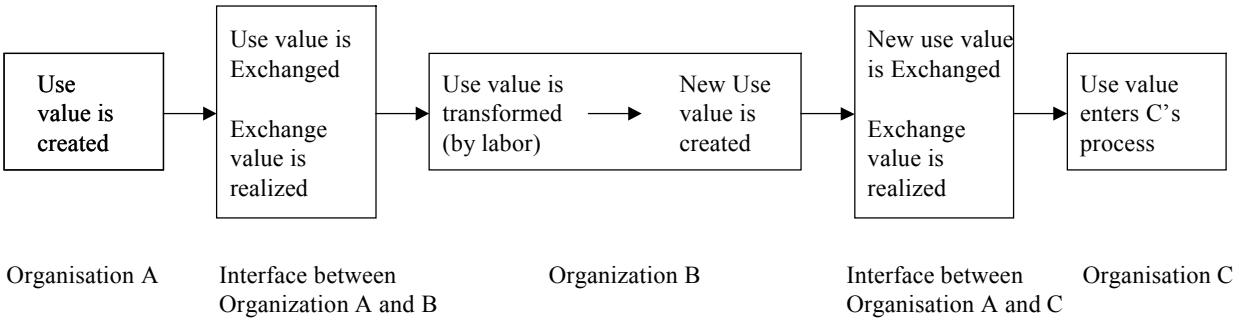

Figure 3: Use-value can be transformed to exchange-value (Source: Bowman and Ambrosini 2000).

Because of the need to experience a good (or expectations of it), the satisfaction of a greater need creates more customer value than the satisfaction of a not so great need. For example,

customer value is higher for a battery when it is used in a pacemaker compared to when used in a toy. There is more about different kinds of value in Chapter 3 of this thesis.

1.3.3 Limitations

There is limited quantitative data[1] available on success factors for mobile information. Therefore it is not possible to identify all details that are important in order to be able to launch a successful information good. Furthermore, creating quantitative data is problematic. According to Rogers (1986 p.121), "a control group cannot often be provided for the comparison with users of a new medium, so it is impossible to remove the effects of other variables on use of the communication technology". Rogers (1986) further states that existing users of a new media are not representative of the population of future users. Customers also have greater uncertainty about the usefulness of a really new product than incrementally developed products that cannot be captured by standard measurement techniques such as conjoint (Hoeffler 2003).

Since the evolving industry will be rather heterogeneous it is not useful here to analyze company specific factors such as marketing, pricing, service level, etc. The analysis needs to focus instead on generic aspects that are identical or at least similar for all companies in the industry.

Some information goods will display network externalities while others will not. Some goods will be characterized by high-tech while others by low-tech. Srinivasan et al. (2004) found that network externalities are negatively correlated with pioneer survival for low-tech goods and positively correlated for radical and high tech innovations. Despite being a highly interesting matter that a firm introducing a new good probably needs to consider, this is excluded here.

New product introduction processes are, according to Tennant and Roberts (2003), often implemented in a common audit. Senior managers or suppliers are seldom present. That might lead to decreased organizational learning (Tennant and Roberts 2003). Although management support of introduction processes affects the likelihood of a success, this thesis will stop short of the implementation process, as already shown above in Figure 2.

Concentrating on a whole industry and trying to find common denominators for such diverse activities as playing games, fleet management of a logistics company, or reading the horoscope of the day means that emphasis needs to be placed on finding structural similarities, if they ex-

[1] Data on available services are available but not on which ones are profitable and no analysis is available on why one is profitable and another is not.

ist, and coming up with general advice applicable for the whole industry. Advice that is only directed to parts of the industry is virtually excluded from this thesis.

The evolving industry, which I call the mobile information industry, is still in its infancy. Explaining exactly, and in detail, how it will develop is, at this time, not possible. It is still hard to find relevant theory and reliable information about the mobile Internet, primarily because of the newness, but also because of the over-optimism of the late nineties that caused analysts to write unrealistic articles and reports. It is even, according to Steele (2002 p. 91), hard to predict the technological development of the mobile Internet, which in turn affects the marketing environment.

Durlacher (2001 p. 8) sums it up by noting that there "are few areas where the words written on one day have not been superseded within days by further market developments." The definition of the present industry has deliberately been made broad enough to accommodate future changes, but stringent enough for the reader and author to have the same understanding of what has been researched.

Kauffman and Walden (2001) separate the research about fixed line electronic business into five categories; technology, new product characteristics, business processes within the firm, the firm in a market context, and macroeconomic impacts. This thesis will deal with new product characteristics, with respect to mobility and the limited technical capabilities of the terminal, as well as the firm in a market context. Technological development, business processes within the firm, and macroeconomic aspects will generally be excluded. The thesis will not consider process innovations inside a company unless the process innovation itself can be successfully marketed as a mobile information good.

When the information good is only a part of a system (i.e. service or a good), it has to be separable to be considered a mobile information good. If it is separable, then it can be dealt with as a complete service or an add-on entity, which can be marketed successfully. That means that the pure functionality of a mobile phone is not incorporated, but the increased or decreased customer value of an information good that depends on the terminal must be incorporated.

Goods and services that are not mobile information goods will be researched only when this is useful in explaining phenomena inside the mobile information industry. Often examples are taken from outside the mobile information industry, since it is so immature. The reason for this is simply that it is easier to understand an existing good than a future good that neither the

author nor the reader has experienced. The perception of an existing good is more likely to be identical between reader and author.

1.4 Thesis at One Glance

This chapter is devoted to what the thesis includes, why this is included, and also a graphical overview of the disposition.

1.4.1 Methodology, Theories, and Frameworks

Williams et al. (1988 p. 15) consider possible research methods for new media mainly as extensions of existing methods. Despite that, they "propose that the new media researcher should consider alternative methods or even multiple methods, and to attempt a triangulation of methods."

There is one particular aspect of the mobile information industry which makes the industry hard to study with traditional market research tools. Although it is clearly a separate industry, it is very dependent on complementary products, or the rest of the "product ecosystem" as Frels et al. (2003 p. 29) put it. Without a network that delivers mobile information goods and a mobile terminal that displays[2] them, the goods as such are not usable.

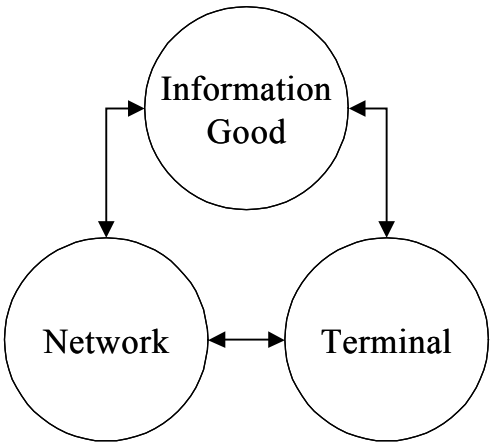

Figure 4: Technical and market wise interdependence between networks, terminals and mobile information services.

As figure 4 suggests, prices of terminals affect the usage of mobile information goods, and technical development in one area of the industrial system enables services in another. This means that a customer's decision to adopt a good is often influenced by factors other than the value inherent in the mobile information good itself (Frels et al. 2003).

[2] Display here is short for any way to access the requested service, be it sound, multimedia text or anything else.

Acceptance of a system or a good depends on whether it creates customer value. According to Nielsen (in Yom 2001), this value (and associated costs) creation can be seen in different levels.

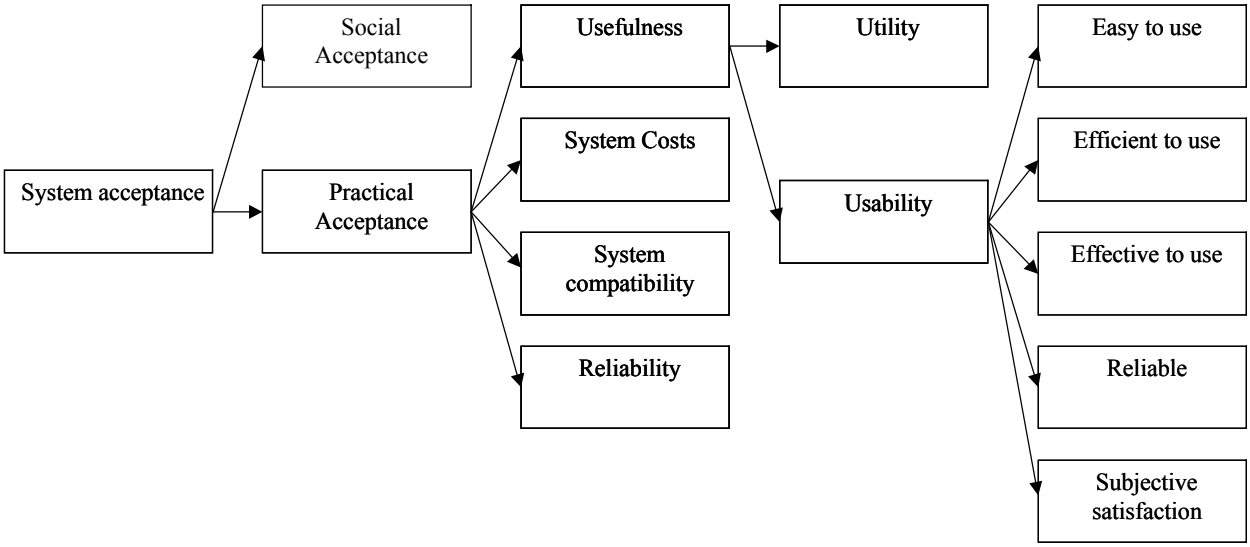

Figure 5: Acceptance of a new technical system (Source: Nielsen 1993 in Yom 2001).

Roberts and Morrison (2002) investigated a similar problem when evaluating different interfaces for information goods. TV and Computers are two interfaces that can display information goods. However, where Roberts and Morrison (2002) come to the logical conclusion that the functionality of the interfaces are converging, one must, in the mobile information industry, live with the complex industrial system of several entities affecting customer value and acceptance.

There are a few research areas which come directly to mind when assessing which literature could provide help in deciding whether a new information good is likely to be used. If one focuses on the good, there is the diffusion of innovations literature, and if one instead concentrates on the customer there is the utility theory and, in marketing, the customer-value literature.

There are a few reasons why this work is mainly concentrated on the latter. In order to estimate the size of the market is important to predict adoption-diffusion and use-diffusion. Using, for example, Shih and Venkatesh (2004) typology, the adoption-diffusion population can be divided into innovators, early adopters, early majority, late majority, and conservatives. Others have proposed different wording, but they all have in common a more or less “S-shaped” curve with an introduction phase, a growth phase, and a maturity phase. Predicting the diffusion

curve for a new good would be a step towards predicting the total market, but still not enough and it is questionable whether or not it is doable considering the diversity in the industry.

That customers try a new service is a prerequisite for an entrepreneur to be able to make a profit. Much of the diffusion literature is also focused on the "trying" rather than the whole process from trying to heavy use. The adoption process in this literature is also often about how an innovation is spread from one to many. An innovation is usually the same as a technical innovation. Rogers (1983 p. 12) for example "often use 'innovation' and 'technology' as synonyms". This makes part of the literature less suitable for dealing with the adoption process of new information goods, which can have a very limited innovation height, especially what technology concerns. Also, repetitive use of a few customers can be more important than acquiring new customers.

Usage of mobile information goods technical diffusion models is often not enough. For example, quality uncertainty, social contagion, and demand reversal (e.g. when too many are using a cultural good such that it no longer appeals to the market, i.e. it is no longer cool) would be the prime factors affecting usage of a cultural good, according to Molteni and Ordanini (2003). The simple use-diffusion model (Shih and Venkatesh 2004) differerntiates between "intense" users, "specialized" users, "non-specialized" users, and "limited" users -- see figure 6.

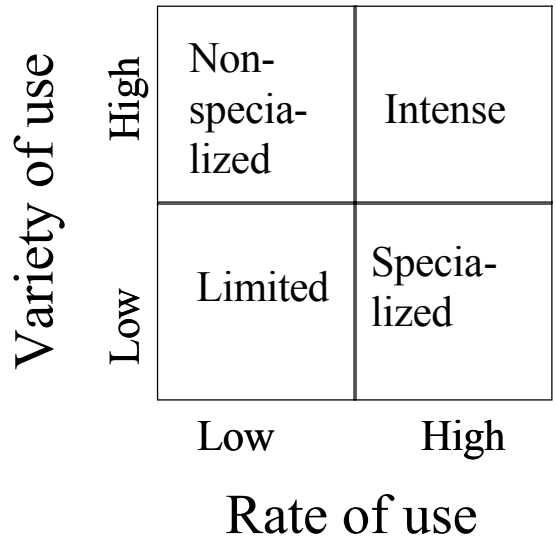

Figure 6: Usage adoption model (Source: Shih and Venkatesh 2004).

This usage adoption model can, of course, be used to describe a market, but is, on the other hand, not very useful in predicting one.

Rogers (1983) claims that there are nine major traditional areas of diffusion study: anthropology, early sociology, rural sociology, education medical sociology, communication, marketing, geography, and general sociology. The actual innovation diffusion literature can, according to Rogers (1983), be divided into 8 areas:

1. Earliness of knowing about an innovation.
2. Rate of adoption of different innovations in a social system.
3. Innovativeness.
4. Opinion leadership.
5. Who interacts with whom in diffusion networks?
6. Rate of adoption in different social systems.
7. Communication channel use.
8. Consequence of innovation.

Given the areas, the research traditions, and the weaknesses stated above, one must conclude that a lot of this literature will not help in predicting a new mobile information good's success chances. To avoid discrepancy, the major work will be on the smallest possible common denominator, namely the ability to create customer value and the trade-off from a customer's point of view to get this value. See figures 5 and 7.

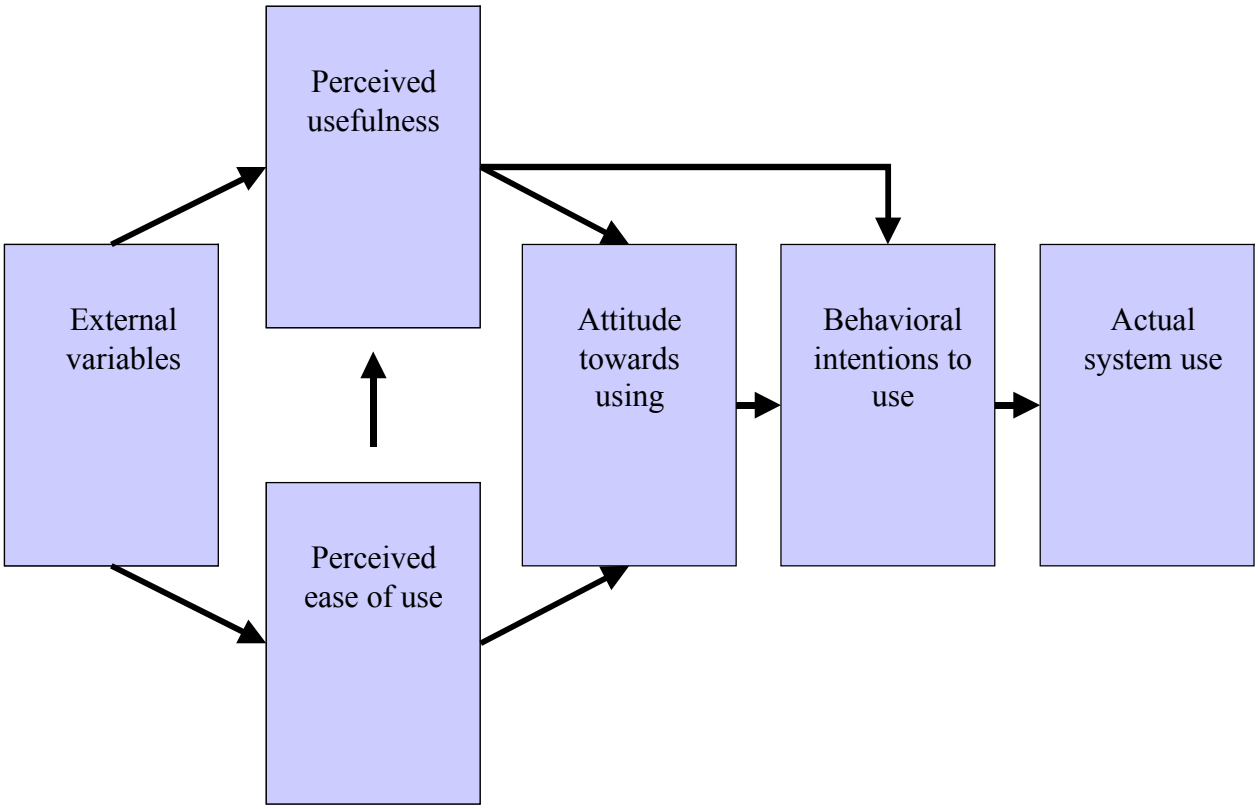

Figure 7: Technology acceptance model (TAM) (Source: Davis et. al. 1989, in Malhotra and Galletta 1999).

The "Perceived usefulness", closely linked to customer value, directly affects the actual use of a service or system, according to the Technology Acceptance Model. It is the degree to which a person believes that using a particular system would enhance his performance. Perceived ease of use is the degree to which a person believes that using a particular system would be free of effort. The lack of ease-of-use can be seen as the trade-off or the "costs" that customers are willing (or expect) to "pay" to get the value wanted. Transaction cost analysis can shed light on these "costs".

The TAM model is verified for user acceptance of a knowledge management information system (Money and Turner 2004), and provides a good basis for explaining the use of mobile payment solutions, according to Dahlberg et al. (2003), who additionally propos that a new construct, trust, should be included in the model. Lu et al. (2003) conclude that the use of mobile information goods in China is related to its perceived usefulness, perceived ease of use, and trust, but also consider social influences. That is also seen as important by Malhotra and Galletta (1999). The "socio-network effects" (Molteni and Ordanini 2003 p. 391) explain why tastes for cultural goods are essentially group-based. While it is important to recognize and allow for social influence, how social dynamics work is, for this thesis, not relevant.

That willingness to try an information good is dependent on expected customer value surplus (Bowman and Ambrosini 2000) is also dependent on perceived risk and social influence will be taken into account by this thesis. The willingness to continue to use an information good is dependent on the perceived customer value surplus after first use.

The research question, "How can a potentially successful new mobile information good, early in the development process, be identified and differentiated from those which are not likely to be successful?", will be broken down into two "process" questions focusing on the two main players -- the customer and the producer of a specific information good:

1) Does the new information good bring customer value?
2) If the answer to question one is "yes", are enough customers willing to pay, and willing to pay enough, for this value that an entrepreneur can make a profit?

In order to make a first prediction of whether or not customers will adopt a specific good, customer value and perceived customer value is evaluated (e.g. Sabat 2002, Kotler 2001, Hirschman and Holbrook 1986). Perceived customer value is one of the most important factors when creating a company strategy (Desarbo et al. 2001), since it has been found to be a powerful predictor of purchase intentions (Chen and Dubinsky 2003, Frels et al. 2003), and because it determines whether or not there will be demand for the good. (Slater 1997).

Customer utility is also already being used by some authors to predict customers' and buyers' intrinsic utility function, in order to predict future buying preferences for similar products in the mobile commerce field and adjust offers accordingly (Tewarie et al. 2002 p. 130).

How value is created and how this is anticipated by consumers is not only useful for predicting customer intentions toward buying a good, but is also vital to understanding the industry as a whole (Barzel 1971/1995 p. 665). According to Reichwald and Piller (2002), modern information and communication technology, paired with new production capabilities and organizational development, forms new ways to create industrial value. If we in the mobile information industry only focus on information goods deviance from a classical value chain is even greater. How value is created in the industry must first be made clear.

The two "main actors" in this thesis will be consumers and companies. For consumers it is important to understand what brings value and compare this value with existing ways of satisfying their needs. But it is not only customer value that decides whether or not it is possible to make money. The industry structure can be such that a dominant player can capture a majority

of the value created by all involved companies. How value is created in the industry, whether in value chains, value webs, or value networks, is analyzed, partly using the terminology of Stabell & Fjeldstad (1998), and leads to a framework of value creation in the mobile information industry.

For companies, the market forces need to be explained in order to examine whether or not the companies are able to capitalize on the customer value they create and if they are also able to create company value. Total customer payments will be divided among several parties-- e.g. a mobile operator and a terminal manufacturer in addition to the one offering a mobile information good. Depending on the company's market strength, a company offering information goods will be able to recapture a greater or smaller part of the total. To estimate their strengths and weaknesses, the market forces, as described by Porter (1980), are analyzed. The validity of this approach is not compromised by having different goals, such as simultaneously trying to predict both customer utility and companies' ability to make a profit, as long as the goals do not contradict one another (Yammarino 2003).

This thesis builds, clearly, on a multi-theoretical approach and has a very broad scope. To be able to explain such a complex thing as customer value of a good and the chance of successfully launching a mobile information good, it is necessary to not concentrate solely on a single theory, but to also incorporate others that can shed light on the problem. A consequence of this is that the aim of this thesis is not to develop each of these single theories further, but instead to combine them in a novel way to better understand a developing industry.

Organization and Strategy

The major theory used in this thesis lies in the organization and strategy field. Although they are mainly concerned with the fixed line electronic information industry, Singh and Kundu (2002 p. 685) claim that transaction cost analysis, a resource based view on the firm, together with network analysis, can explain companies' likelihood of growth in the information industry. These theories will also be used in this thesis. I will additionally seek support in the customer-value literature, for the reasons mentioned above.

Transaction Cost Theory

Transaction cost economics has become one of the most influential theoretical perspectives in organizational and strategy research, especially in the arena of studying firm boundaries (Zajac 1997 p. 581). Important to this thesis are the assessment of possible market pressures for horizontal and/or vertical integration and the ability to be able to create a market for information goods. Additionally, search cost as well as other costs associated with the purchase/trial of an

information good need to be investigated since they are on the negative side of the trade off when discussing the customer value an information good can bring (Mohamed et al. 2003)

Asset specificity, as defined by Williamson (1973, 1975, 1981), will also be analyzed, especially what Malone et al. (1987 p. 486) call "time specificity", in order to estimate risks and costs of marketing information goods and to judge if transaction cost theory would predict any greater hindrance to the industry's forming.

Becker's methodological approach of seeing users of a product not only as consumers but also as producers of utility (Becker 1965) gives consumers a firm-like role and Alchian and Demsetz claim that a firm is a "privately owned market" [3] (Alchian and Demsetz 1972 p. 793). I will allow myself to not limit transaction cost theories to the firm, but to include the customers of mobile information goods.

Product development in fast changing technology environment

A primary determinant of a new product's success is the extent to which the product is different from competing alternatives in a way that is appreciated by customers (Sethi et. al. 2001). Two common dimensions of an innovation exist (Sorescu et. al. 2003); the extent to which a product incorporates new technology and to which the product fulfills customer needs better than existing products.

[3] "Telling an employee to type this letter rather than to file that document is like telling my grocer to sell me this brand of tuna rather than that brand of bread. I have no contract to continue to purchase from the grocer and neither the employer nor the employee is bound by any contractual obligations to continue their relationship". (Alchian and Demsetz 1972 p. 777)

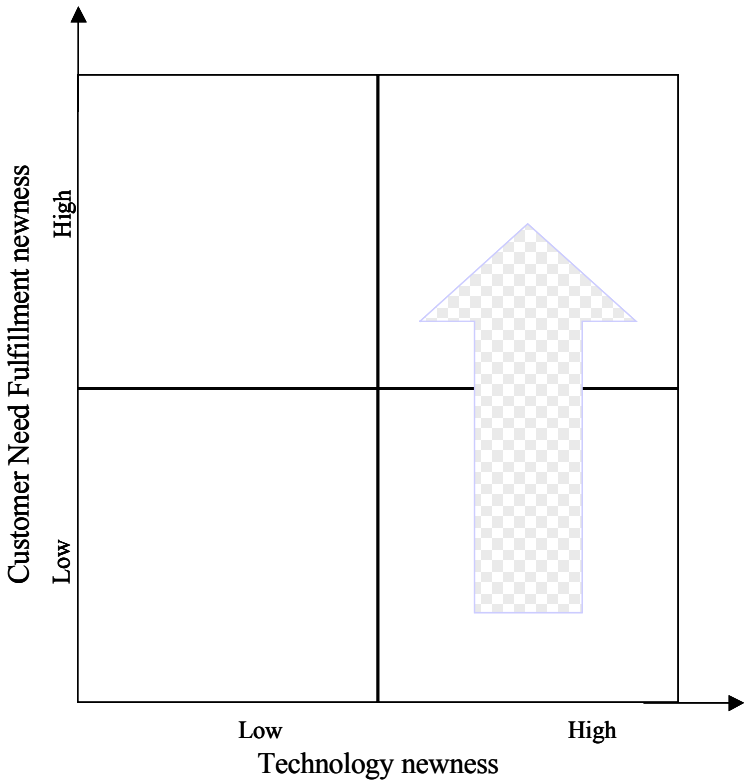

Figure 8: What is a new good? (Source: Sorescu et. al. 2003).

In a way all mobile information goods are innovations since the technology is reasonably new. That, however, is not enough. If the technology newness is high but the customer need fulfillment is low, the mobile information good needs to more efficiently, to a higher degree, or more cheaply fulfill customer needs. Or, put differently, it needs to show "meaningful uniqueness" (Sethi et. al. 2001 p. 74).

Technology-intensive markets, such as e-commerce, remain under-researched and "most of the research on organizational adoption have involved innovation that have limited impact on the firm's business strategy" (Srinivasan et. al. 2002:47-48). According to Neuvo et al. (2001 p14), stability in fast changing technology environments is built on gradually evolving platforms like values, core competencies, processes, creation of product or services excellence, and customer satisfaction.

Marketing

The second, larger building block is marketing. At an early stage it was clear that a conventional, quantitative market research approach would not be the way of choice. Given the variety in the industry there are practical problems regarding scope, resources and time. The indus-

try as such is not yet very developed, and this fact could, for example, negatively affect the validity of a survey, due to responders' lack of knowledge.

"Only customer-centered companies are adept at building customers, not just products. They are skilled in market engineering not just product engineering" (Kotler 2001 p. 19). Researchers have suggested measuring the total multidimensional value of a new product to capture the overall performance (Kotler 2001, Griffin and Page 1996). Given the fact that several different substitutes, that can satisfy the same need, can exist and that network effects can give products with inferior product characteristics higher customer value (Lee and O'Connor 2003), the multidimensional product value has been backwardly derived by focusing on the satisfaction of basic customer needs and total customer value.

Additional reasons to focus on perceived customer value and utility rather than objective product characteristics are that perception of product characteristics can be skewed by brand and distribution (Desai and Ratneshwar 2003), and by the demograpics of the consumers who choose a good (Im et. al. 2003).

Information as a good

Information has specific properties that make it better or less suited to be traded on a market. Alternative theories and paradigms for understanding communication have come about. According to Williams et al. (1988), four basic methodological processes underlie the interpretivist paradigm that fits the complex analysis of the information flow in the mobile information industry:

1. Consciously critique the theoretical assumptions through an emphasis on revealing contradictions and questioning the forms of power that are taken for granted.
2. Describe the phenomenon of interest so that it is understandable and then re-describe it revealing economic contexts and relations involved.
3. Make explicit links between micro and macro analysis.
4. Direct the research towards knowledge that can contribute to positive social change.

The fourth point from Williams et al. (1988) is, in this thesis, interpreted simply to make it possible for practitioners to be able to use the research in order to improve their business development.

1.4.2 Disposition

This thesis is divided into six chapters. To an extent, the chapters and their order reflect the logical research steps. The content is also structured so that the reader can follow a thread and can be spared from having to re-read sections already read. To achieve these two goals, it is necessary to have some referrals between the different chapters but they have been kept to a minimum.

Chapter one introduces the research and provides some minimal background information. Chapter two gives the necessary background information with regards to the products being sold and the evolving industry. In chapter three, a framework for value creation in the mobile information industry is developed. Chapters four and five use this framework to assess whether or not a customer is likely to use a good and, if so, whether or not a company has the possibility to make a profit marketing it. Finally, chapter six shows, in an abbreviated way, how the two tools could be used.

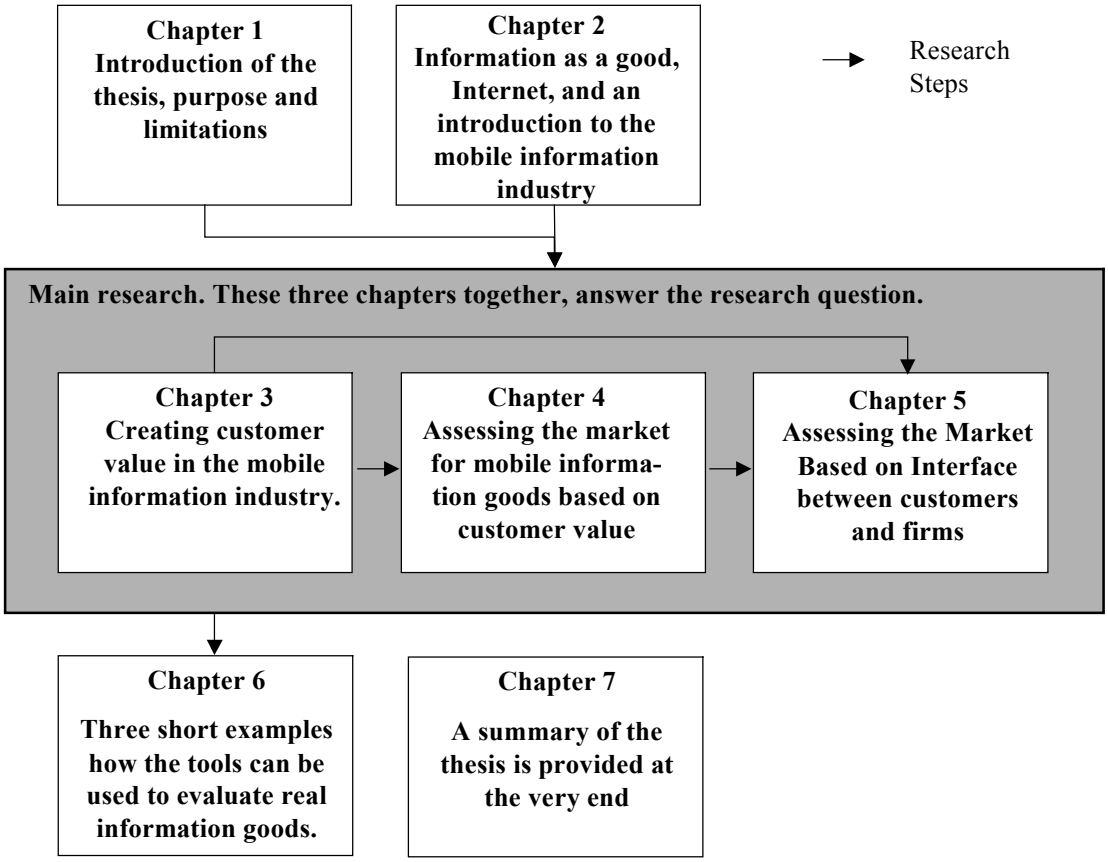

Figure 9: Structure of the thesis.

Chapter 1 introduces the thesis and also states its purpose, limitations, and methodology.

Chapter 2 is the "background chapter", reviewing the topics of "information as a good", the Internet, the existing mobile industry, and an example of an older information industry. It suggests a segmentation of the mobile information industry based on core competencies to better be able to assess competition. Briefly, suppliers, new entrants, and regulation are reviewed in order to put the reader and the author on the same page with regard to the existing market.

Chapter 3 investigates customer value. It tries to answer the questions: "Can time and place create customer value in and of themselves?" and "How is a customer's value of a good dependent on time and place?" Chapter three tries to shed some light on these questions and ends by presenting a framework for how customer value is created in the industry.

Chapter 4 analyzes how customer value can be created based on the actual information good and customer situational aspects. A tool that is able to assess market size for a good and identify substitutes and competitors is presented.

Chapter 5 introduces a tool that depicts the industry. By doing so it is possible to analyze how the interface creates value in the industry. The trade-off for customers and companies to receive and deliver value is made obvious. The tool is also useful for assessing the market strengths of different companies.

Chapter 6 gives three examples on how to use the tools.

The best way to read this thesis is page by page and chapter by chapter, but in order to perform the research, one has to constantly shift focus between the theoretical and practical parts as well as between customer value theory and industry structure. In order to be able to develop the framework, customer value theory has been paired with existing industry structure (as described in chapter two) and the research steps reflect this pairing. The resulting tools depend mainly on the framework presented in chapter three, but also include a "sanity check" based on what is presented in chapter two.

1.4.3 Results of the Thesis

The thesis concentrates on building value in the mobile information industry. It shows how, early in the development process, potentially successful new mobile information goods can be identified and differentiated from those not likely to be successful.

Customer value in the mobile information industry is dependent on two “semi-fixed” factors, the mobile phone (interface) and the network. They will be considered fixed since customers have at any given point normally one phone and one network to choose from. Customer value is also dependent on two “marginal”, or variable factors, the information good itself and the customers’ situation when using it. This explains how value is created in the industry better than existing, so called information value chains, where often unrelated activities are connected without possibilities for iteration in chain from some kind of production to consumption.

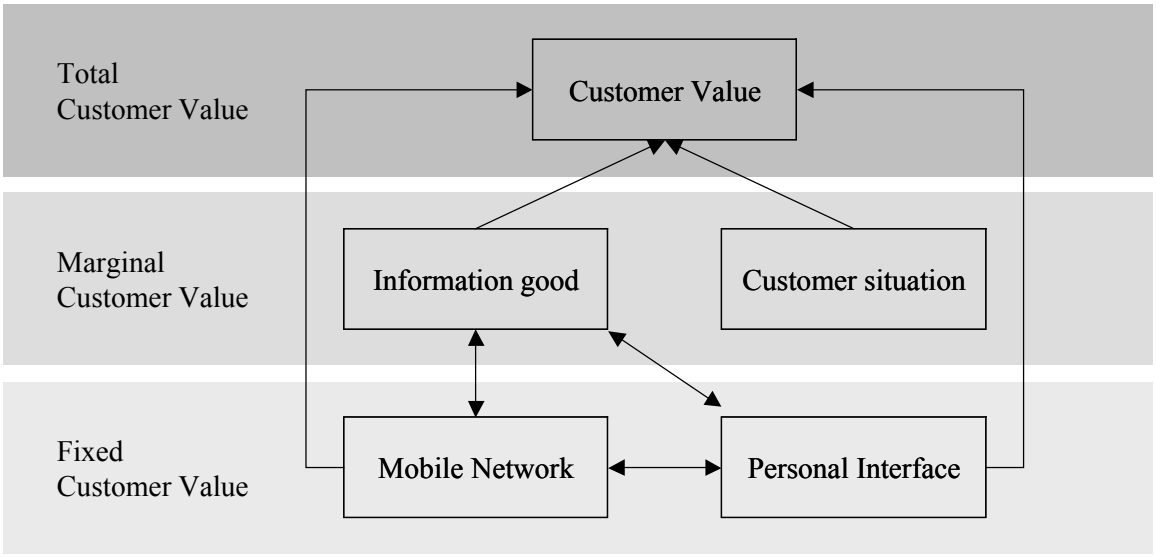

Figure 10: Framework for customer value creation in the mobile information industry.

When the framework of how value is created is known, then it is possible to develop tools that can, in a practical manner, help a company to judge whether or not it is delivering customer value and if it is possible for the company to expropriate some of this value from the market. Two powerful tools for business development are presented in chapters four and five.

The first tool analyzes how well a service can bring customer utility. It is closely related to the marginal customer value level of the customer value framework. It is mainly concerned about how well a service can satisfy customer needs in certain situations.

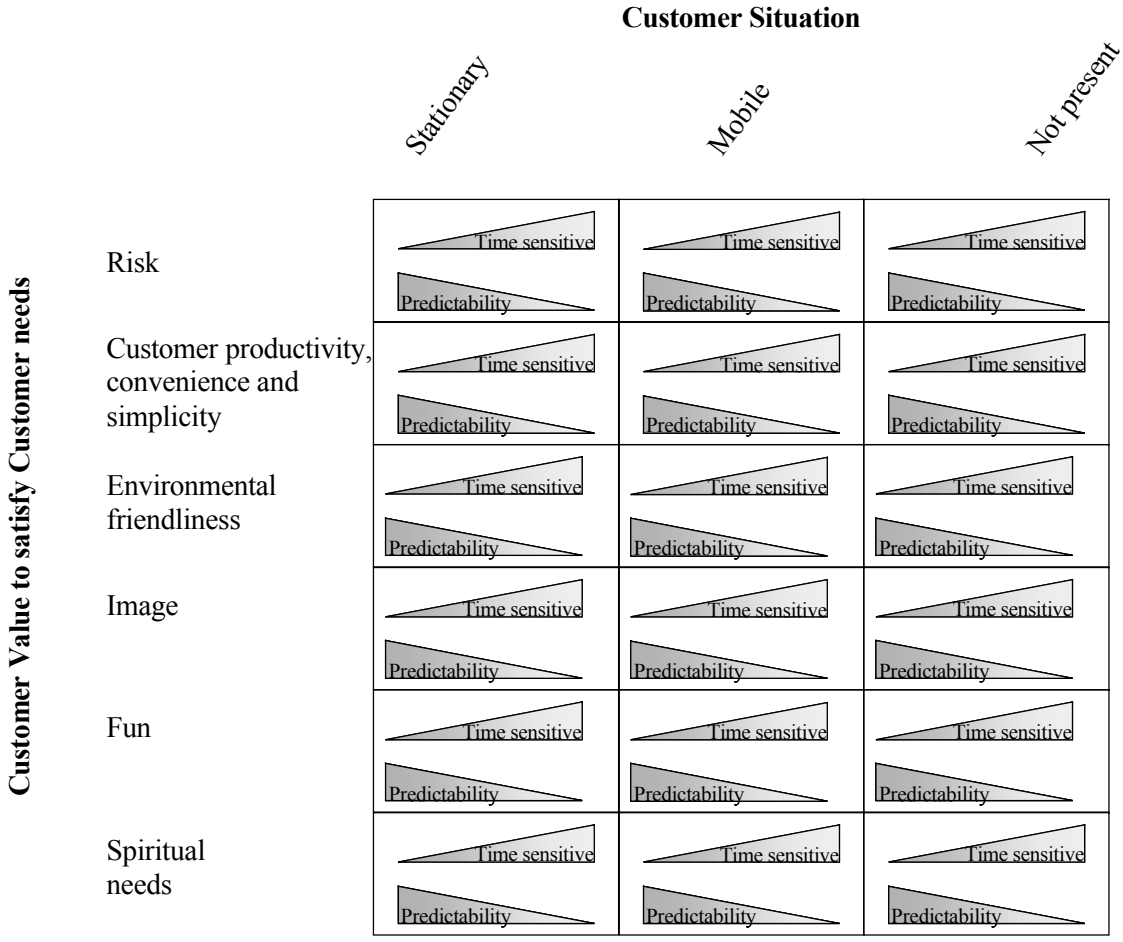

Figure 11: Customer value matrix for mobile information goods.

Once it is known where an information good brings customer value, it is possible to estimate the size of the market; and its competitive position as compared with different substitutes.

The second tool depicts the industry visually, to better be able to understand the competitive pressures coming from inside as well as outside the industry. It is closely related to the fixed customer value level of the customer value framework. It is mainly concerned about how value is created in the interface between customers and firms, and how market power from other stakeholders affects the ability of a company to seize part of the value it has created.

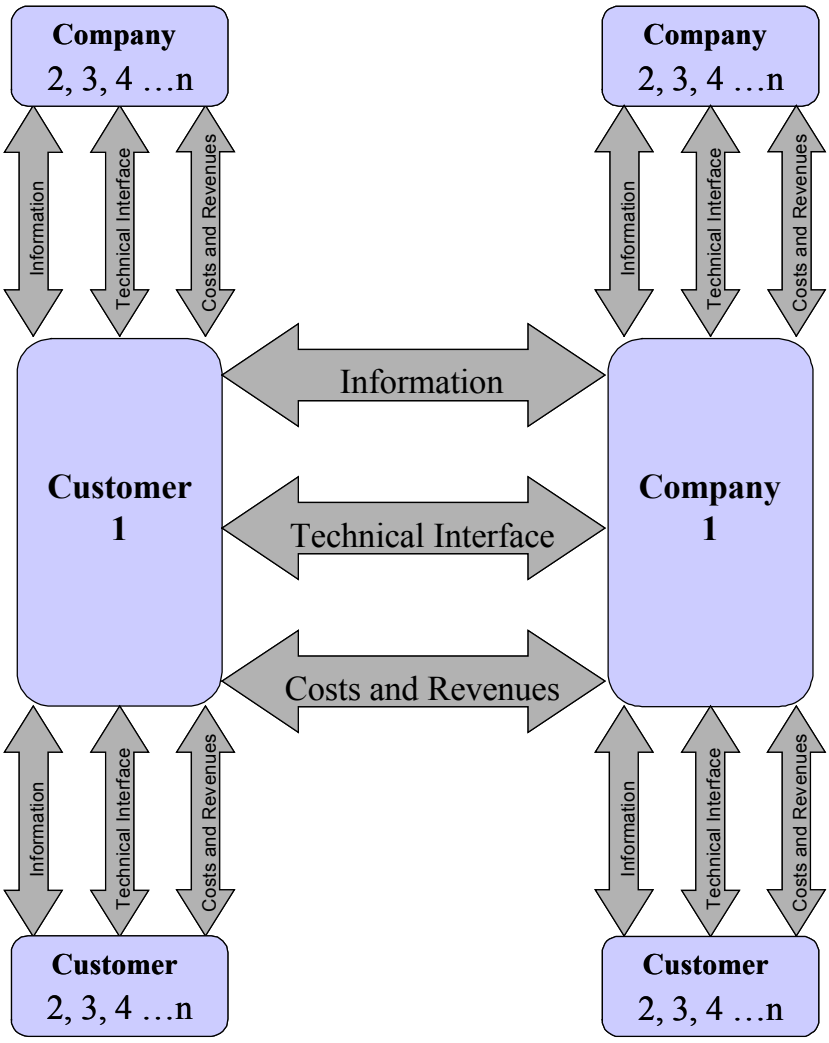

Figure 12: The mobile information industry depicted.

The tool can also estimate the importance of network effects and market power inside the industry. It is possible to depict both value chains and value webs and it also allows for iterations.

Together, the framework and the two tools are capable of cost-efficiently identifying and differentiating potentially successful new mobile information goods from those with little likelihood of success. It is simple and quick enough to be used by practitioners.

It is the firm belief of the author that the framework of value creation in the mobile information industry can also be used to inspire similar frameworks in other industries where customer value is highly dependent on inputs from several currently separate industries.

2 The Mobile Information Industry

The difference between what I call the mobile information industry and nearly all other industries, is that if a stochastic event occurs which triggers a demand, and this demand can be satisfied by an information product, the demand can, at least theoretically, immediately be satisfied. This chapter will investigate the structure of the mobile information industry to give the industry knowledge necessary for the following chapters.

It covers some fundamental properties of information, the good being marketed in the industry. Included is also a closer look on the Internet and mobile information industry. In order to better understand the developing mobile information industry, it is compared to a mature information market, the moving picture industry. Finally different segmentations will be suggested to be able to estimate the competition.

2.1 Information Markets

The arguably single most characterizing attribute of the mobile information industry compared to the brick and mortar world is that it only consists of information. That gives an information good completely other characteristics compared to brick and mortar goods.

2.1.1 Information as a Market Good

With modern information and communication technology, ICT, it is possible to adapt information goods not only to time and place but also to the individual. This leads to a new market where only initial research has been made. Information becomes more available and physical distances to the service provider decrease in importance[4]. Even the economy could be moving closer to the classical models of perfect competition (Blinder 2000). At least it is more efficient than the existing brick and mortar economy (Slywotzky 2000). Market inefficiencies are lower, (Malone et al. 1987, Wigand et al. 1997) and transparency is higher, (Lindbeck and Wikström 1999) in the information industry.

[4] The notion that distance decreases in importance does not necessarily mean that the importance of location decreases as well. From being an obstacle that need to be overcome in order bring the good from the producer to the user, user location can be used as an input in the production process and enhance customer value of a location, or to create utility in itself one way or another.

There are problems related to create a market for information also. According to Varian (1998) there are three main properties of information that makes information difficult to handle in a marketplace:

- Information is an experience good. The customer needs to experience or in some other way be aware of the content before he/she can evaluate the exact value. For cultural information goods, for example music, their quality may not be learned or measured objectively even after consumption, since there are no suitable parameters to measure quality (Molteni and Ordanini 2003).
- Information usually has huge return to scale. The first copy of a film or a book can cost millions up to billion dollars to produce and the second copy has a marginal cost of a few cents.
- Information is typically non rival and sometimes non excludable. I.e. one person's consumption doesn't diminish the amount available to other people, and as in the case for a pure public good, one cannot hinder other persons from using the same information. Pure public goods as defined by Samuelson (1954) have the unique characteristics of non-excludability and non-rivalry in consumption.

Due to the many differences to physical goods, it is difficult to analyze information goods in the same way as tangible goods. The costs to produce information goods are mainly fixed and both the marginal production costs and the transportation costs to the customer can often in absolute terms be considered low.

The uncertainty of the customer benefit of a new developed mobile information good can be very high, because of problems in evaluating information. Most of the mobile information services, when the customer shall use it for the first time[5], fall inside the so-called information paradox. It is not possible for the customer to fully evaluate the utility of any information before he knows what information he will get, but if he knows the information offered he might no longer need it. The good however, is irreversibly traded (Muto 1986).

For physical goods more is generally better. If there is a surplus in one place, a physical good can often be moved and sold where there is a deficit. With information products it is not necessarily so. More information about something is not necessary better information. And once

[5] A new information good that does not resemble an existing one, and for which there exist no market is always going to be new for the customer.

produced, customers receive copies of the original information, theoretically making it impossible to "run out" of a specific information good. Together with the fact that one often has huge fixed cost and low marginal cost, this is also going to put focus on marginal revenues.

2.1.2 Towards an Information Market

The market for information or for ideas, as Coase (1974) slightly misleadingly called it, is different to the ones for traditional goods and services due to the differences among other things the physical properties of information.

Information and transaction flows, differ considerably between the electronic market place and the traditional market. New innovations in information and communication technology will continue to improve the supply chain also for physical goods (Friend & Walker 2001), but they will never have the chance to be distributed as smoothly as information goods. According to Lindbeck and Wikström (1999) there are two general differences in the logistics:

- In the electronic market place the entire transaction flow for intangibles can be handled over the Internet, that is information, payment and delivery of the good can all be done using the Internet.
- The information flows will, to a considerable extent, change direction. In traditional markets, the sender largely holds the information initiative. On the Internet, customers often take the initiative.

Intermediaries add value for physical goods as well as in the information economy. For most goods we have a distribution system which creates value for the customer in making the goods more accessible with greater choice, saving time and money for the customers when they purchase it. For the mobile information industry the distribution as such as well creates value, search engines, connection speed, and user interface are only some examples.

Other on-line information characteristics are according to Lindbeck and Wikström (1999).

- Information can be made available when you need it, and the entire accumulated stock of relevant information is available all the time, not just new offerings.
- Information can be constantly updated at little extra cost.
- Information can be interactive without capacity constraints. Customers can ask questions and get individualized computer-mediated answers.
- ICT provides efficient channels for after-sales interaction. Seller support at the consumption stage can be of decisive importance for the full use of product qualities.

- Customers can select and use just that part of the extensive information load that suits them. This leads to the paradoxical concept of individualized mass communication, the information industry's answer to mass customization. Information flows can easily be individualized, (Reichwald & Goecke 2000), possibly leading to a slight shift of market power away from the company towards the customer, (Dussart 2001).

Not only prices, but also the actual good, can technically change depending on demand, time, location, or basically any predefined variable with menu costs approaching zero. Transportation cost, can in the information industry be kept low, and it is reasonably independent on distance as well as on time.

When evaluating the costs of mobile information services, it is important to focus not only on the transportation or production costs but on all costs and perceived customer sacrifices including search costs, uncertainty costs etc. The pure transportation cost for digital information can sometimes be disregarded, and at other times be a major barrier to usage.

An interesting notion is that information technology increases transparency for goods and thus makes the markets for goods closer to the ideal market economy models. The market for information as a good is at the same time getting further away from the classical models. When an overwhelming part of the total cost for a company to produce an information good is fixed, there is a risk for price erosion if companies use marginal cost pricing. In such cases none of the companies make a profit since the marginal cost is only a fraction of the total cost. That would probably lead to oligopolies or even local monopolies. Another reason for the globalization of information product markets is that information tends to disseminate. The original market for this information will disappear when the information has reached enough people on the potential market to make it obsolete (Muto 1986).

Looking at the existing structure of the information industry confirms the risk of local or in some cases even global monopolies. Media companies, such as German Bertelsmann and Swedish Kinnevik, control production delivery and assortment functions. They own production studios, football teams, as well as cable and satellite distribution systems, and they have several TV and radio stations distributing the selected content to the end customer. Also in film and music production there has been a consolidation to a market mostly characterized by an oligopoly between multinational companies.

2.1.3 The Moving Picture Industry an Older Information Market

From a market-maturity perspective older existing information markets can provide interesting differences with markets for physical products and give us some hints on how the future may develop.

According to Samuelson and Scotchmer (2002), copyright industries have for many years derived the bulk of their revenues from the sale of physical products, such as books and videocassettes, in the mass market. For example the recording industry makes money because it controls the distribution channels and the marketing channels of popular music, Varian (2000). This is getting increasingly difficult when it is possible to make perfect digital copies of the original content.

In the motion picture industry, a mature industry of information goods, approximately 70% of all films will make a loss according to Miller and Shamsie (2001). They have also noticed that a studio CEOs' lifecycle could be divided in three parts. In the learning stage, the CEOs experimented heavily and often made uneven financial results. In the harvest stage experimentation was reduced and fewer films failed, thus increasing profit. In the decline phase experimentation was reduced even more, leading to the worst financial performance, since fewer films were really successful.

The strategy therefore is to minimizing the amounts of loss making films and at the same time not compromise on innovation. Additionally maximizing blockbusters revenues of all different kinds seem to be vital in the moving picture industry.

Interesting for the mobile information industry is that the film industry is, used to price discrimination, both depending on time and location. First, the film is available on the movie theatre, and then comes video, premium pay TV and finally commercial and public broadcasted TV channels. The process usually starts earlier in the US than in Europe or in Asia. Prices are as well different on different markets. So far this price discrimination has been manageable since the information goods have been bound to a physical bearer that did not easily enable reproduction without quality derogation. New technology makes the sustainability of this strategy questionable for several cultural industries[6] (Molteni and Ordanini 2003).

[6] The Moving picture Industry has managed to sell DVDs as a premium products complementing the films already seen on the movie theatres. That strategy combined with the relatively large data files needed for a film has given them an easier position than the music industry. Will that be sustainable with the increase of DSL and other fast connections within housholds?

The movie studios' pricing of the actual movie theatres is reflecting the differences between information, and brick and mortar goods. The total price for a film consists of a fixed and a variable part), and the more visitors the film has the higher percentage must the owner of the theatre pay the film distributor (Canterbery and Marvast 2001). Contrary to most brick and mortar products where a store gets lower prices the more it sells in movie theatres it becomes more expensive! This pricing is also reflected when it comes to sales to TV cannels, a more successful film is more expensive than a less successful. Looking at it from another perspective it becomes evident that this is natural since the TV channels can expect a higher sale of commercials. One could as well see this price differences as a market evaluation of quality; a "better" film is therefore a more expensive one.

Pascale (1999) believes it is important to apply relativity theory in information markets, reflecting on the danger of treating the existing as something ever-lasting. Pascale (1999) believes companies are not adopting their business fast enough to abrupt environment changes. He uses the term "complex adaptive systems" when focusing on the danger of striving to keeping an equilibrium, which the rest of the industrial system seeks to destroy.

The market for information is in this case interesting. A customer can copy a digital copy of a film, or a song, and the resulting copy is once again a new, although perhaps not quite legal, "original" without quality derogations (i.e. Muto 1986). Instead of by all means try to hinder the development of new technologies like peer-to-peer exchange or copying of CDs, it is of course also necessary to study the viability of the existing business[7]. After all, there are other industries, for example the pharmaceutical, that manage to cope with huge fixed costs and small variable ones. Clearly information technology has the potential to revolutionize some industries, some business ideas will thrive and other will be proven obsolete.

2.2 Internet

Internet widens the information choices for customers and companies, by reducing the cost of information exchange. Internet can reduce information asymmetries and increase transparency. Internet also provides the mobile phone networks with the technological infrastructure.

[7] Compare with the "sailing effect". The development and performance in sailing ships increased drastically when motorized ships entered the market for freight.

Internet is therefore certainly about more than buying and selling products and services electronically. It entails the strategic use of information and communication technology, ICT, to interact with customers and partners through multiple communication and distribution channels (Dussart 2001).

2.2.1 Flexible Internet Technology

Internet has evolved gradually over decades. Reach and technological sophistication has constantly been growing. When Internet reached critical mass, it became a medium no industry can afford to neglect.

The individualization of demand is according to Meyer (2001) increasing in many markets. The mobile information industry is better suited than most other industries to take advantage of that. To satisfy an individual demand one needs also to find out what an individual is demanding. When being connected to the Internet we leave trails behind us. A company can easily see how long each of their Internet pages has been viewed, which customers have been purchasing, and at what page the customer is leaving etc, etc. Companies track customer behavior in order to improve their offers and researchers to be able to explain more about customer behavior on the Internet (Sultan 2002). Collecting and using this information becomes strategically important. It could even be that "information about consumers' behavior becomes a strategic resource with which to anticipate competitors and improve the fit between supply and demand" (Molteni and Ordanini 2003 p. 389).

If we have once left our name with a supplier or information provider online, we can be greeted with a personalized page next time we go there. Due to the fact that the amount of market information positively affects innovation and new product performance, the gathering of customer data becomes more important (Troy et al. 2001), and the ease of which it can be done with Internet technology makes the industry likely to stay innovative. All customer data but credit card number, were for example earlier saved and automatically displayed at Amazon.

Personalization and mass-customization can actually be considered the same thing but seen from different perspectives. The former is often an expression from the Internet industry and the latter comes from the production industry. Sometimes an increased information exchange between customers and companies is included in the personalization term (Tseng and Piller 2003, Riemer and Totz 2003).

Equally important to Internet's ability to store information is the possibility to communicate. Internet has several different communication protocols: http, ftp, pop/SMPT, to mention only a

few, and more will come. Chats and newsgroups give us a possibility to test ideas on other people with similar interests and asking questions about companies and products. E-mail keeps us updated about business and private matters.

We can conclude that Internet offers the ability to cost-efficiently store information, and handle communication between humans and machines. Internet is also flexible in the sense that many protocols can be enhanced by innovations and it is possible to combine open and proprietary standards.

2.2.2 Internet Technology's Transparency and Efficiency

Internet has not only increased market transparency for goods traded directly over the Internet (Lee et al. 2003) but also for the ones traded traditionally or for hybrid versions of on and off-line trade, such as on-line order and off-line delivery.

Customers become more aware what the costs are to produce and to deliver a product or a service. When customers have a greater knowledge of the companies' costs they will not be willing to pay premium prices anymore. This has led to price erosion on the Internet markets. The strategy for companies to overcome this is not trivial, but according to Sinha (2000) the solution is the same as for many other problems, flexibility and an ability to innovate.

The risk companies offering information products are facing with greater cost transparency is that their services become a commodity. If cheaper competitors offer similar products there is a risk that lower market prices forces the company with the better information product to lower its prices. When lowering its costs to stay competitive, the company runs the risk of also making a worse product. The different vendors will then have products more similar to each other, in effect making it a commodity that is hard to price at all over its production costs, or worse, - its marginal production cost.

Sinha (2000) mentions that this is what has happened in stock trading for example. Shapiro and Varian (1999) noticed that for Microsoft's Encarta and Encyclopedia Britannica the total market grew so much when the prices where lowered that there is still room for a premium quality product, but at a considerably lower price than originally. Shapiro and Varian (1999) believe that versioning is the strongest weapon against this price erosion. Porter (2001) suggests diversifying from the competition by offering truly exceptional products.

The decreasing prices of computing power and memory have introduced ICT into more areas of business, and have enabled the mobile information industry. Still, it is not possible from the

official productivity statistics to notice an increased productivity. As work on this question progresses, it is becoming clear that the paradox is unlikely to have a single solution. Jonscher (1984 p. 95) proposes that two prerequisites must be fulfilled to at all be able to measure productivity in the information-sector. First we need to build theoretical models connecting information activity with productivity, and second these models need to be empirically verified. In chapter four creation of customer value in the mobile information industry will be investigated. Here economics plays a lesser role, instead the focus is on how value is created in the industry.

The productivity paradox has therefore a practical aspect. Many aspects of the mobile information industry are totally dependent on whether ICT can be more productive than older technological "product solutions". Consider a non German-speaking tourist who just arrived at the central station in Munich. He has three hours between two trains and would like to make as much as possible out of the stay. Let us assume that he is most interested to see the "Frauenkirche"[8] and later drink a beer in the "Hofbräuhaus"[9]. The costs of finding a navigation service, in a language that he understands and that fits to his mobile device and then to stay on line during the 15 minute walk would probably be several times as expensive financially and take longer time then buying a paper tourist-map in the closest newspaper stand or tourist information booth.

The information cost of the map is the approximately the same for the paper version and the electronic version. Possibly the costs would be slightly higher in the electronic version since it needs to be vectorized to be able to be used effectively in an electronic form, but let us disregard that. If so, the conclusion must be that the transaction costs in this example are the ones that really differ. In the mobile information industry, solving the productivity paradox means succeeding on the market. The lower the cost of the exchange, the higher the productivity of the whole industry, Coase (1998).

2.2.3 Customer Value of Internet Technologies and Market Growth

Many of the astonishing torrents of ideas and business plans unleashed by the Internet will turn out to be junk. But others will transform communications, commerce, and companies. Never in history have so many entrepreneurs attempted, in so short a time, to develop uses for an innovation (Cairncross 2001b).

[8] A famous Munich church.
[9] Hofbräuhaus is Munich's most visited tourist attraction. It is a very Bavarian pub, serving beer and traditional southern German food.

Before the Internet industry can be considered being a mature industry, and before it can live up to the potential of completely changing the information industry, it must, according to Cairncross (2001b), combine the quality of service of the telephone with the fun of television, at prices that rival those of both. Above all, until people cease to be aware of it as something special and complicated, it will not have found its fortune (Cairncross 2001b). This way of seeing the Internet neglects many business applications and erroneously gives the Internet a role as a pure entertaining technology. Making things easier, quicker and more intuitive to handle and thereby improving the trade-off a customer is doing when using the good have importance in close to all industries.

Traditional companies are still in head to head competition with new entrance start-ups, and it is in many cases unclear who, if any, will be the dominant player. Amazon and Barnes and Noble sell books over the Internet and for Barnes and Noble as well in shops. This is a good example of an industry where both newcomers and established companies compete. E-bay, recently a small start-up, on the other hand is already dominating on-line auctions, and is increasingly investing also in traditional auction houses. The old media houses are continuously dominating the news (and entertainment) segment.

Hardly any new companies have been successful in entering the news market because of the Internet. Of course there has been several starts up offering Internet services, but none can really claim that they rival their older competitors such as CNN, Reuters, Bertelsmann or similar news conglomerates. Food has had a hard time to at all be successfully and profitable sold over the Internet.

Greunz and Stanoevska-Slabeva (2002 p. 1) claim that the “high speed at which new businesses are developed can to a large extent be attributed to their ability to flexibly combine existing services into an integrated business platform.” That would be to overestimate the importance of information handling and company efficiency and neglect several other important aspects that create customer value.

Other attempts have been done to quickly achieve high sales and be able to gain economies of scale. Given the evidence of the company growth in the picture below, and knowing that some of them are today out of business also this, as a sole success factor, seems to be questionable.

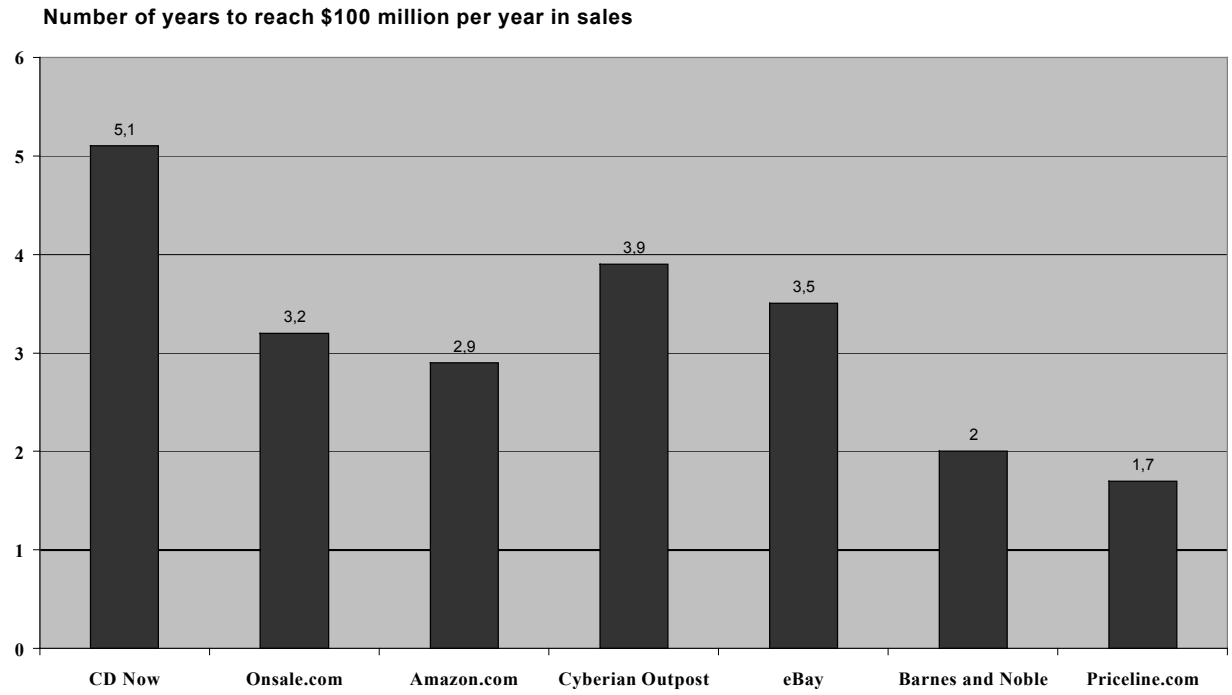

Figure 13: Number of years to reach $ 100 million per year in sales for some on-line companies (Source: Securities and Exchange Commission filings; McKinsey Analysis, Building digital brands 2000).

Even though none of the services above are in the mobile information industry, the different models presented above can explain why the industries have developed the way they have.

For auctions it is evident that the potential technical market reach benefits the customer both on the selling side as well as on the buying side by providing both liquidity on the market and a big amount of customers. The differential aspect in the auction business is the technical interface which permits a lot larger crowd coupled with the demand side economies of scale of e-bay's customers, associated with that bigger crowd[10].

On-line bookstores create customer value by increasing their productivity. It goes quicker to find and order book. The time before a customer can access an order book is on the other hand greater than if he would have bought it in a bookstore. Mail order and Internet bookstores therefore create less value than their brick and mortar counterparts when customers need to wait for their goods, instead of as in shop being able to walk home with it directly.

[10] Here I understand both sellers and buyers in the auction as customers of e-bay since they both benefit from the electronic

Regarding company transaction costs they can be lower for the on-line competitor, but that cost advantage is decreased or lost when offering free transportation. All in all it seems that these aspects fairly balance each other out, since both online and off-line solutions simultaneously can act on the market. Based on a quantitative survey, Friberg et al. (2000) argue similarly, that market prices on Internet will reflect total customer transaction costs plus the price of a good and argue that this could lead to online prices above or below brick and mortar stores[11].

The case why food has never achieved more than a niche market is obviously as well to be found mainly in the interface between companies and customers. Transaction costs for customers are not considerably lowered if one includes the transportation costs often charged. For shops the transaction costs might even increase since someone needs to pack customer orders that the customer previously was doing himself. Few customers have been willing to pay for the increase of personal efficiency. In other industries it can change the production process. Internet has the potential to change the whole supply system to a build-to-order, where Internet is the customers' direct interface to for example the production at the car manufacturer (Kwoka 2001).

Many existing e-business strategies, or e-tailing with "virtual store fronts" as Williams (1999 p. 1) calls it, comes down to a focus on retail, that is a customer comes in a virtual shop and buys something. May it be books, software or flowers it is used and it functions in a similar way. Since the mobile information industry only exceptionally will sell these products, and if it would, then in a different way, guidelines received from e-business can have only limited direct use.

In the established perspectives on customer buying behavior two different fields of research in the Internet business can be identified (Wikström et al. 2002). The first, which is focusing on the customer emotional experience seeking perspective, stresses customer feelings, ease of use and creating the right atmosphere etc. The second field usually based on a cognitive decision-making process and then (often) expanded in to general management questions gives more general advice to a company engaged in e-business.

[11] I doubt there is a stable equilibrium under such circumstances, but with only small deviations in price it shows that both on- and offline distribution can co-exist for a period.

Similarly when addressing customer value it can be divided in two categories. Objective customer value, such as saving time, resources, or something else where it is clear what the customer gets out of it, and subjective customer value, which is directed to satisfying other needs. The latter is of course considerably harder to evaluate in monetary or utilitarian terms.

A few authors have tried. Huang (2001) focuses on the architecture of Internet sites. In real life (IRL) customers that come to shopping malls, factory outlets or exclusive streets and business quarters know what to expect from a shop due to prior similar experiences of similar environments. According to Huang (2001) there could, and should, be a relationship between a company's physical and on-line spaces. Architecture should match function in the virtual space. Huang (2001) divides retailing into seven discrete activities essential to the business. That is, attract customers, identify needs, inform customers, obtain orders etc. If one has these different activities in mind when constructing a web site the result would, according to Huang (2001), be more efficient.

Wikström et al. (2002) call this a mirror model of reality and add also the possibility to create synergy models and virtual models. The synergy model would mix attributes from the real world with purely virtual navigations for example a shopping cart. The virtual model would be a virtual space without any references, benefits or restrictions, from the real world.

With the conceptual ideas, such as stressing the importance of visualizing the presence of others, Huang (2001) follows a trend investigated also by other researchers and tried by practitioners, see for example Amazon.com or dn.se. Crowds attract crowds according to Hahn et al. (2002) who on the other hand also claim that there is a lack of tools and methods that can provide a clear link between systems design and business performance.

As the Internet takes hold in more fields, other companies will have to develop the interactive capabilities of an Amazon.com to keep customers engaged according to Prahalad and Ramaswamy (2000). The social aspect of human needs can hardly be overvalued.

Todays on line shopping malls are designed for effectiveness. There is a feeling that you are all alone, and no one is there to keep you in the store. The social aspects of shopping are lost. A customer's experience is highly influenced by the environment in which it occurs. People should have access to other virtual shoppers and also to the related physical site that would create a sense of belonging. "The more environments a company can provide the richer is the customers' experiences likely to be" Prahalad and Ramaswamy (2000 p. 82). Wikström et al. (2002) call this the social space.

The physical space is finally according to Wikström et al. (2002) the buildings, walls etc in the real world and can be the design including texts, pictures and sometimes sounds which resembles the web page the customer is accessing.

According to Berry (2001) there are five ways to create value in retail and these five strategies hold true regardless if the retail is done in a store or via a catalog or an Internet site.

1. Offer the customer superior solutions to their needs.
2. Treat them with respect.
3. Connect to customers on an emotional level not only to their rational sense.
4. Set fair prices that customers understand. Make it easy to compare the price and have no hidden charges that upset customers. Avoid trying to raise prices to take advantages of sudden blips in demand.
5. Save the customer's time.

The important off efficiency, that is not wasting customers' time, is also evident in Yang et al. (2003). A web page needs to attract customers, be informing, deliver what is being asked of it, and be positioned favorably for the target group.

It is harder to create an emotional feeling for shopping via Internet than it is in a real shop, which in itself can change shopper's perceived value of the service or good. Devenport and Beck (2000 p.123) stresses the emotional aspects of customer value when they argue that "one of the most important factors for gaining and sustaining attention is engaging people's emotions"

This approach does not have to be contradictory to Berry's (2001) opinion that one shouldn't waste the customers' time. By letting customers rate books and also displaying popularity, as Amazon has done, time can actually be saved for customers. When incorporating discussion groups after news articles dn.se manage to create a community of readers and at the same time offers a possibility to evaluate which news brings most interest to their audience. By letting the readers create their own content companies can also save money.

2.3 Mobile Information Industry

The mobile Internet is only in the beginning of its development. There are plenty of lessons to be learned from the mistakes made on the fixed-line Internet, which will be crucial if firms are to prosper on the mobile Internet (Economist 2001b).

2.3.1 Mobile Information Market

People use the mobile Internet differently than they use brick and mortar goods and the fixed-line Internet. Most, if not all, mobile information services are for immediate consumption and are often without rest value. We find out a direction to where we would like to go, listen to the traffic report, check the standing in the football game or participate in a multi-user game etc., etc. The mobile phone, the most common interface, is also according to Fang (1997 p.146-147) more personal than the fixed line phone, which belongs to the household rather than to a person.

2.3.1.1 The Mobile Information Industry Introduction

The mobile Internet is characterized by the technical expressions “always on”, “anywhere” and “anytime” i.e. the customer has the possibility to use it wherever he is, within limits, and whenever he wants to. According to Kliger and Ascari (2002) it is therefore possible for vendors to always reach, localize and identify the customer. This holds true at least if the customer is using a GSM or UMTS phone as terminal, when he is accessing the mobile Internet.

The service in itself can also be adapted to the customer's location and the time he requests it. At lunchtime a list of open lunch restaurants offering food below a certain price and less than 10 minutes walking distance from my present location can be obtained automatically. At night the same provider might instead offer entertainment of some kind, or if I am at home it might display the TV programs. Of course all other kinds of information are available but it might take longer to access, if the services are dynamically personalized to location and time-of-the-day.

Singh and Kundu (2002) have divided the fixed line Internet market in portals, market makers, and product and service providers. One could of course do that in the Mobile Internet context as well, but if one needs to analyze the possibility to make a profit, it makes sense to divide them by business objectives. It is then easier to sort out a part of the industry that will not be included when it comes to evaluating if it is being successful based on the criteria for this thesis. One can roughly distinguish between three different kinds of business models.

Drive traffic in operator's network. A service, which belongs to this category, is mainly supposed to promote traffic in the mobile networks. Usually there is no, or a very low fee, to use the service as such (apart from the network fees). If the service is given by a third party vendor, the revenues to this company come from the mobile operator who either pays a fixed fee or agreed on revenue sharing dependent on use. Sjölander et al. (2001) have concluded that many of the existing business models based on driving traffic need to be revised since mobile

operators so far largely have resisted sharing this kind of revenue with other companies. Samsioe (2004) on the other hand claims that the willingness of revenue sharing is increasing and forecasts even a further increase in operators' willingness to revenue sharing in the advent of UMTS networks.

Sponsored. A service falls in the category "sponsored" if the service as such is never intended to directly generate profit. Most marketing, customer relationship management and community activities fall in this category. BMW has offered a community where people can discuss different cars as well as recommending beautiful roads and other things related to the ownership of a BMW. The profit is seen long term, where the brand is strengthened and the customer is more likely to stay as customer. As such the services are not profitable, but compared to making the advertisement in print this can still be cost effective.

Stand alone services. A stand-alone service makes profit for the service provider without relying on revenue sharing with mobile operators based on traffic or on other sponsors.

Of the three different categories this thesis mainly pays attention to the ones that has as primary goal to be profitable. That is here, drive traffic in operator's network and the stand-alone services. The boarder between them vanishes with increasing willingness of operator revenue sharing.

2.3.1.2 Customizing Physical and Information Goods

A special feature of the information industry is its ability to, cost efficiently, personalize services. Traditionally it has been hard to customize services with respect to time and place on a big scale due to the difficulty of foreseeing demand and to adapt the service or good accordingly. There are of course a few examples where smaller companies try to be flexible. Taxi drivers, drive around and hope to pick someone up on the street. Exactly at the time when the customer realizes his demand the taxi driver wants to be there, and he hopes as well to trigger demand by being visible. Portable refrigerators carried around by students, or season workers, have provided sunbathing tourists with ice creams and sodas for years. Mainly transaction costs but also unpredictable revenue streams and legal issues, are some of the reasons why personalized services, with respect to time and place so far have played an inferior role in the economy.

For traditional "analog" information goods, for example newspapers, radio shows, or books it has been hard to offer customized editions. Instead versioning has been common (Reichwald et al. 2000, Shapiro & Varian 1999) where a good comes in different qualities, prices and sizes to

attract different groups of customers. Several local newspapers owned by the same media house, is one example from the physical information industry.

Pine claims (Economist 2000) that "anything that can be digitised can be customised".[12] According to Piller and Reichwald (2000) mass customization means the production of goods and services for a relatively large market that exactly meet the needs of every individual customer with regards to certain product characteristics at costs roughly corresponding to those of standard mass-produced goods. The services in the mobile information industry can therefore be seen as a mass customized product where time, and location among other factors form the basis for customization. A location-based service would in this case be differentiated depending on location of the customer and some other parameters that make up the actual service.

In the production industry personalized products have been around for a long time, but due to their production time and location the industry is usually not well suited to immediately satisfying a demand triggered by time or place. To evaluate companies' abilities to produce mass customized products, Piller et al. (2000) use a scale based on the companies' ability to: 1) Integrate knowledge about their customers' wishes and needs in the design of the products, 2) solve the configuration process, 3) plan their manufacturing, 4) integrate the whole internal and external supply chain, and 5) use information about customers to build up "learning relationships".

For the mobile information industry, planning manufacturing and integrating a supply chain are activities done prior to customers' demands and rather belongs to solving the configuration process. Mass customization abilities of physical goods can unfortunately not be directly compared to information products since production is based on a chain of activities that all aim to increase customer value of the final product. For information goods there can be several iterations and customer value is created differently. Piller and Moeslein (2002) on the other hand find that mass customization, also for physical products, is closely related to electronic commerce with its ability to reduce transaction cost, focus on information handling and its ability to create customer value in the interaction process.

[12] The Economist, p.59-61, April 1st - 7th 2000, found on http://www.mass-customization.de/engl_economist.htm last visited 03.12.01

2.4 Players to realize Location Based Services

Below I will continue to concentrate on the mobile information industry's ability to satisfy customers' demands. Zaheer and Zaheer (2001) propose that competitors in an industry are companies that are "members of the same customers' consideration sets" when it comes to selecting a service. An implication of this definition is that Amazon.com is a competitor to most small local bookstores, but Amazon.com might not define the same shops as their competitors, but instead cluster them to "local book stores" or something similar. One can expect the industry to be "layered", not only with local, regional and multinational companies that try to compete on the same markets but also with services that are local, regional and multinational and aim to solve the same problem.

In this sub chapter the underlying technological network is thought to be GSM, UMTS or equivalent. If, as Bolande (2003) predicts, another technical infrastructure would be the dominant bearer, the part of the analysis regarding technology and its impact on the industry needs to be re-done with that in mind.

2.4.1.1 The Location Based Service Industry

There are two factors that more than others can explain the likelihood of successfully delivering an information good. The first is money. If the monetary flow is such that the company easily can cover its costs it will have the chance to continue delivering this service/good. If a company cannot control the monetary flows by itself it becomes dependent on others, which weakens its chances of getting the most out of the total monetary flow.

The second important factor is information. Information is the actual good that the industry is offering its customer, but knowledge about the customer can also affect competitiveness. Company strategies are being reshaped to incorporate higher levels of information processing according to Glazer (1999), making use of their abilities to cheaper collect information about their customers. Innovation is widely recognized as crucial to the success of organizations, and the ability to innovate is dependent on customer information, Kim and Mauborgne (2000), Troy et al. (2001). "Information about consumers' behavior becomes a strategic resource with which to anticipate competitors and improve the fit between supply and demand" (Molteni and Ordanini 2003 p. 389). We can conclude that the more valuable information a company has about its customers the better, as it can continue to develop new services in line with customer demands.

On top of securing future business success, the information about customers can directly be used to increase the value of present operations since it can predict customer behavior better

and therefore for example sell commercials to a higher price (Jupiter Research 2000). The price for displaying a commercial, for example a banner, usually increases with a more defined target group. When valuable information can be obtained at low costs a company gets a competitive advantage. Internationally competitive companies are not those with the cheapest inputs or largest scale, but those with capacity to improve and innovate continually, according to Porter & Van der Linde (1995).

Since estimation of a customer's position is a piece of information that is valuable for producing services in the mobile information industry, it makes sense to study how market power can be estimated in the location based services industry. A way to estimate the power of different players in the industry is, as said before, to analyze the flow of information and money between the separate entities in the industry. According to Chaturvedi and Bandyopadhyay (2001), the number of unique web hits, average time spent by a user on a website, the click rate on banner advertisements, etc are also measurements of company power. However also that can be summarized to information exchange.

Below is a schematic picture of the industry. There, it is evident that the three main players are customers, application service providers and operators of mobile networks. The mobile network providers are usually the same companies as the mobile service providers who have the customer relation. In the following analysis a portal is included in the mobile service providers' sphere, but as we shall see later it is no bigger difference for the analysis if it would be treated as a part of the service provider or a stand-alone company.

The picture does not attempt to fully cover all flows but shall instead be seen as a starting point to schematically investigate how market power can differ.

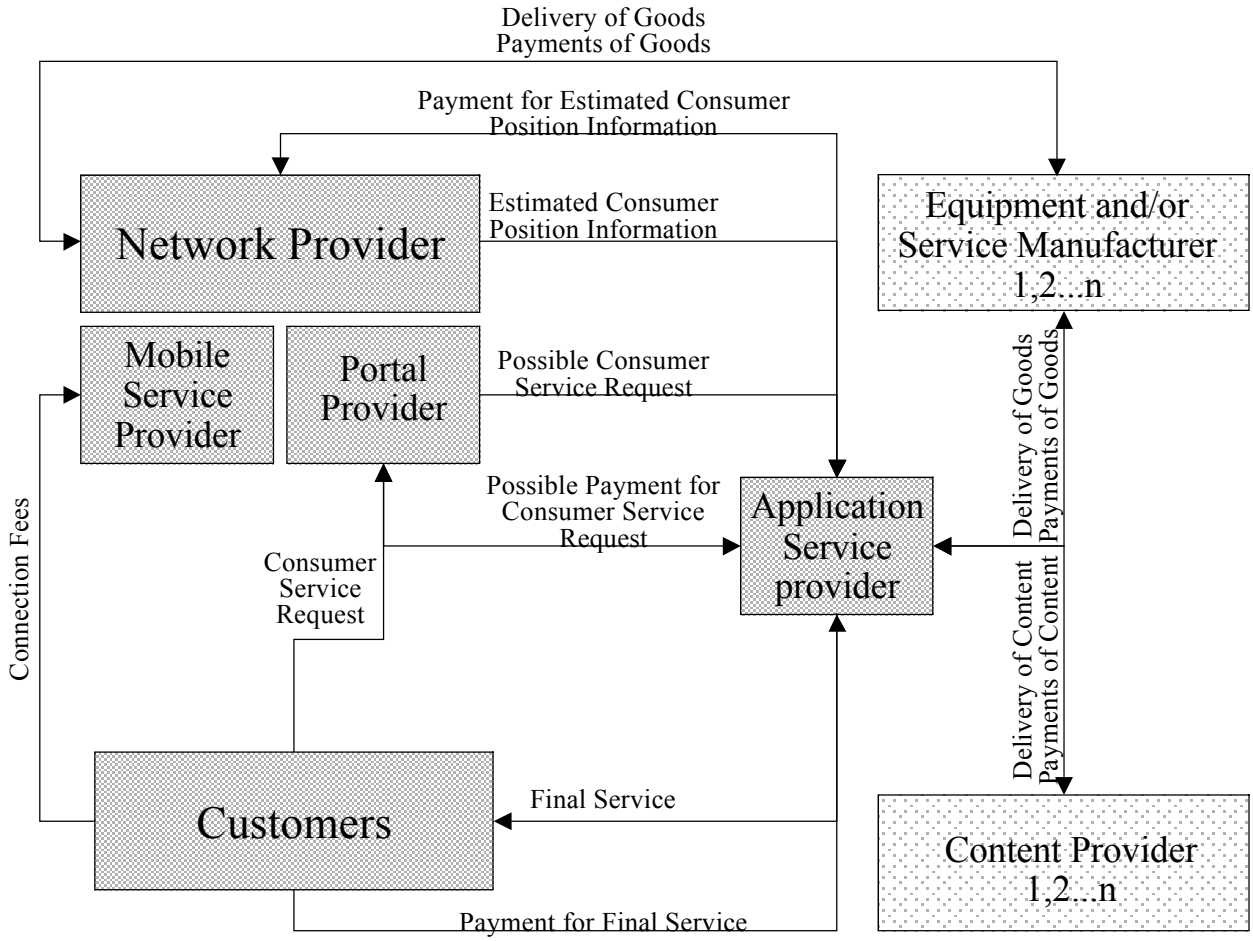

Figure 14: The industry for location-based services and its suppliers, incomplete overview.

A few important comments have to be made about the picture. The information request takes place at a portal, i.e. an order of a service is made there. This request could of course be placed directly to the service provider, since the portal, as we pictured it, is only fulfilling an aggregating role to lower customer search cost. If there is a monetary stream to the portal, the portal could be modeled as an application service provider, and the existing one, can roughly be treated as a supplier. There will naturally be mobile portals, which not only broker information or have a pure application service provider role. Fixed Internet portals offer own services, are brokering others', and offer personalization of content. For such portals the analysis becomes more complex, outside the scope of analyzing the main market forces. It is often possible to approximate those portals to one fitting the model presented here. MSN would with a similar mobile portal be approximated as a service provider and Google, would be considered an information broker.

Here a monetary stream is depicted directly from the customer to the application service provider, which seems rather unlikely, pared with the network estimation of customer localization,

but possible. The reason for depicting it like this is to cover two scenarios in one picture, and instead explain the differences of these two scenarios with even more simplified models below.

2.4.1.2 Location estimation in the Terminal

The deciding factor for the industry power is where the estimation of customer localization is made, since that changes the way information, as well as money, flows.

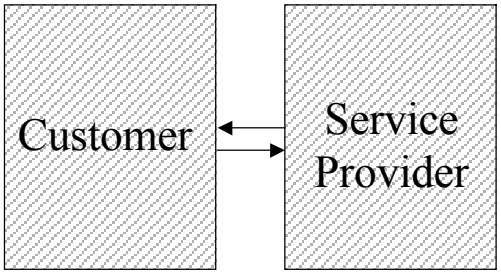

Figure 15: Information flow when positioning is done in the terminal.

When the positioning is done in the terminal, the mobile operator is not involved in the estimation of the customer's location, an ideal case for the service provider, less so for the mobile operator. Even if the mobile operator has additional customer information, this is not asked for, and the mobile operator is reduced to a transportation pipe when the customer is telling the application service provider that he is interested in a service.

The application service provider puts together a service based on the customer's location and delivers the location based service back to the customer, once again through the mobile operator's network, but reducing the role of the operator to delivering a service for which the market prices are already negotiated.

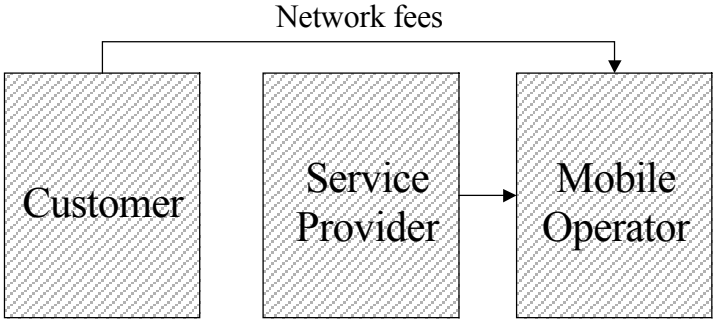

Figure 16: Monetary flow for a location based service when the positioning is done in the customer's terminal.

The interesting monetary flow, when analyzing the LBS industry, goes, at least in the mind of the customer, from the customer directly to the service provider. Additionally, the mobile op-

erator charges the customer the standard fees for the connection, but since this does not create any valuable customer information it is a different market relation.

Not only the customer but also the service provider might need to pay network fees to the mobile operator. There might be additional agreements between the application service provider and the mobile operator about priority classes or even that the mobile operator is handling the actual transaction, but then, only if there are no cheaper alternatives, and the mobile operator is in this case a competitor to credit card companies, banks, and different Internet payment companies.

2.4.1.3 Location estimation in the Network

When the localization is done in the mobile network the strength of the players are considerably changed.

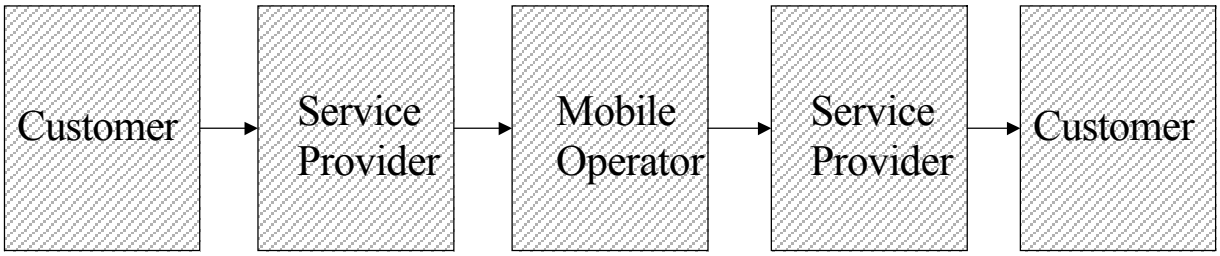

Figure 17: Information flow when positioning is done in the network.

The application service provider is totally dependent on the mobile operator to get access to customer localization estimates. This means the mobile operator can dictate the market conditions in a way, which suits him. It means as well that monetary, and information flows can be dictated by the operator, and leads also according to MacInnes et al. (2002), that the mobile operators will get most of the profits since they have the greatest bargaining power.

It would come as a surprise to nobody that mobile operators would try to get the industry established using network estimated positions and at the same time protect their “right” to this information from regulators. At the same time, application service providers without any connection to a mobile operator, probably favors other ways to make the customer location estimates. Additionally, the service provider might try to convince regulators to force the mobile operator to give away the location estimates free of charge or for a marginal cost.

The starting point of the analysis was that strength in the location-based services market is won by either an information advantage or by being able to control the financial flows. A pure por-

tal would have no such chances and therefore business models like these will probably be very limited, if any, and they would serve only as brokers of location based services. This means as well that the power in the industry would not change considerably depending on where the portal is located.

2.4.2 Different strategies of suppliers

The LBS industry, even though it has not yet really started, is already very dynamic. The suppliers and the industry players have just started to position themselves to get the most out of the industry.

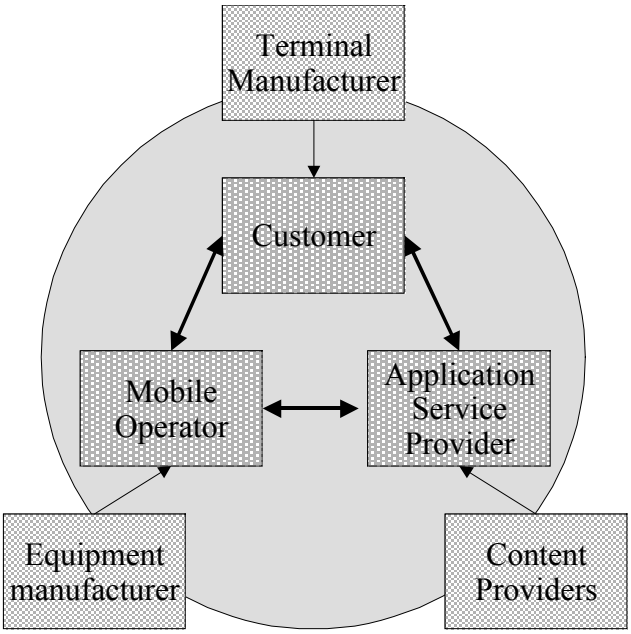

Figure 18: Suppliers to the industry move to strengthen their position.

Since information technology makes it possible to utilize a service in the same time as it is produced, it might look confusing that a company producing the content demanded by the customer is not necessarily considered to be part of the industry. However it is no stranger than Continental and Shell, offering tires and gasoline, are not normally considered parts of the car-making industry but rather supplier and complement to the same industry.

To fully understand this developing industry it is necessary to investigate customer utility between online and offline competitors. When all the different sub-markets are brought together in the LBS industry the mobile operator becomes a very important and powerful player.

2.4.2.1 Customers and terminals

When analyzing an LBS sub-market the terminals that customers are accessing services on become important, since they can often decide whether or not the on-line or off-line solution is the most attractive. The fact that terminals increases in importance does not necessary imply that the terminal providers increase in importance since they most likely can be seen as suppliers to the customers and do neither get part of the revenue nor the information stream created by the use of the mobile information goods. However it is likely that they will try. After all, Nokia, Motorola and Siemens have via their terminals contact with more customers than most single operators. How the terminal manufacturers will approach the market is not clear, but since most of them are also equipment manufacturers they need to think about the mobile operators' reactions.

For the moment off-line solutions often offer better alternatives and therefore the rapid growth will come only when the mobile information services industry can change this balance. Java enabled terminals can solve some of the download constraints of time and money, and bigger color screens can make it possible to offer more attractive interfaces. In general it is important for a mobile information service provider to watch the development of terminal associated matters closely. How is the price performance ratio of the terminals developing? How many potential customers can access my service and in which direction do the big terminal manufacturers move? Are they interested in starting their own services?

2.4.2.2 Equipment manufacturers strengthen mobile operators

Equipment manufacturers want to strengthen the future position of their biggest customers, the mobile operators, and they only want to overcome any annoying factor hindering customer adoption. One limiting factor for location based services, has been the lack of standards[13]. Ericsson products do not work together with Nokia products and vice versa. Therefore the major LBS infrastructure producers Ericsson, Motorola and Nokia have founded the Location Interoperability Forum (LIF). Their goal is that future products should make it easier, faster and cheaper for application service providers to create inter-operable location based services. They also want to make it possible for any Internet-based applications to obtain location information from the wireless networks, independent of their air interfaces and the positioning methods. By strengthening the mobile operators the equipment manufacturers are hoping to sell more products, and make sure that their technology wins over competitive technologies from the computer and Internet world.

Suppliers to this field are possibly less threatening to service providers in the mobile information industry. It is interesting to see whether the industry evolves towards open standards, which is the case in most Internet related fields, or if it goes towards proprietary de facto standards, which has been common in the telecommunication field and which Microsoft and a few other giants are pushing for in the mobile Internet area.

2.4.2.3 Content Suppliers move to the market

It is often hard to draw a clear border, in the networked structure of participants, between who is adding value, when and where, and thereby also to dividing it into a structure with suppliers, industry participants and customers. For the content suppliers this becomes especially hard.

Content suppliers in general have tried to spread their content on as many platforms as possible. Murdoch and Bertelsmann own newspapers, TV channels, radio channels as well as operating Internet sites. The idea is to reach as many customers as possible no matter the access channel. As soon as the mobile information service market takes off we can expect them to launch their own location based services, effectively becoming service providers themselves, or making sure that they can make the market believe that they can do so in order to keep prices up.

As said before, digitized information has a tendency to become a public good. The fact that a company has precious information and there is a demand for it does not mean that there is a market for it.

2.4.3 Users of mobile information services

Companies with a clear customer focus are more profitable than others Hult and Ketchen (2001). Partly according to Porter (1974 p. 419) because "the characteristics of consumer buying behavior vary markedly across consumer good industries in ways that fundamentally affect the nature of industry competition." Customer aspects are covered in many other parts and will not be repeated here.

A customer who had a bad in-store experience while buying a product is more likely to blame the retailer than the brand of the product that he wanted to buy. However when purchasing on the Internet the channel becomes more associated with the product. Reflect.com is directly linked to Procter & Gamble, database searches at economist.co.uk is certainly part of The Economist brand. Dussart, (2001 p. 630) notices that "commercial power has been slipping down along the distribution channel, shifting from manufacturers to mass distributors, and now

[13] Ovum, Mobile Location Services, Market Strategies, December 2000

to final customers." When manufacturers had large market power brands were chosen before many customers entered a store. Then customers made their choices in the store and now in the mobile information industry they the will choose when they are about to use a service. It would still be wrong to claim that users today have a strong role in the mobile information industry. As in all customer industries each individual user has little power to affect the market price.

2.4.4 Substitutes to the Mobile Information Industry

Regarding substitutes a discussion has been started above regarding the efficiency of using a mobile information service compared to a substitute. Roberts and Morrison (2002) compares different product depending on their operational efficiency and their functional richness.

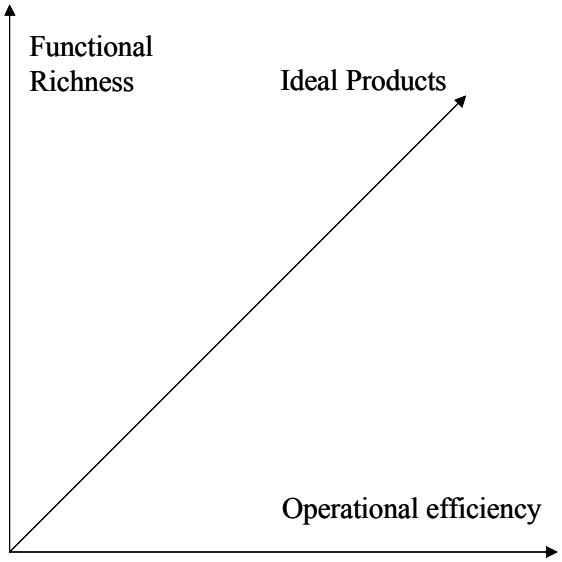

Figure 19: Perceptual mapping of existing services and substitutes (Source: Roberts and Morrison (2002).

A mobile service showing the way to Frauenkirche in Munich would score high on functional richness due to its versatility, but miserably on operational efficiency whereas a paper map would have the very opposite characteristics. In this example the two would approximately be equally good if the price including transaction costs where the same. As we saw in the example, the mobile information service would probably be 20 times as expensive and is in this case therefore not competitive.

Customers might choose alternative ways to receive mobile information, but since the substitutes are so dissimilar, ranging from market to non market fractured in many different aspects

there will never be a serious market power to the industry as a whole from substitutes. In special niche segments it might be different, and it has been concluded that from a transaction cost perspective there are competition, it still gives no reason from a market perspective to deeper analyses these substitutes.

2.4.5 Potential New Entrants

According to Barnes (2002) the predicted revenues from wireless data services are enormous and provide an attractive impetus to the entry of new players. To protect themselves, mobile operators therefore have, according to Barnet et al. (2000), preset their customers' mobile terminals to make themselves the default selection and even blocking other service providers. By doing so they can charge both customers for access to the net, and other service providers for access to their customer base.

Unfortunately this strategy has neglected the customer's value of the service and when it has been lower than the expected price that they are paying they have simply not used the services. Even if they would start using the services such a lock-in strategy might not work, according to Barnes (2002), because customers will simply choose another provider of the entire telecom service. That may be difficult since the mobile operator industry has the characteristics of a natural oligopoly on most markets (Valletti 2003). Hopefully operators will realize that it is in their interest to foster a large service provider industry. In a related industry, the open source software industry, Johnson (2002) has shown a critical mass of developers needs to be reached for the industry to grow. This holds of course true also in the mobile information industry.

There will be a constant threat from new entrants in the mobile service and application industry, but since they are natural oligopolies protected by licenses no such development is expected on the mobile operator side.

2.4.6 Internet Regulation and Markets

Marketing decisions are "strongly affected by developments in the political and legal environments (Kotler 2001 p. 81)" One of the characterizing factors of Internet content is that it is not very regulated. Coase points out that the market for ideas is "the only area where laissez-faire is still respectable" Coase (1974 p. 385). However regulation can come and the mobile Internet markets are according to Oxley and Yeung (2001. p. 705) dependent on "the institutional environment that facilitates the building of transactional integrity", which relates then once again to the location and clustering of companies discussed in previous chapters.

In Europe the European Commission tries to harmonize taxes and tariffs for customer goods. No matter how successful they will be in that aspect, sooner or later regulatory attention will be put on the mobile information market, especially if it is successful. Already today, mobile operators face price regulations on the transfer of information in for example Sweden. The right to freely express your opinion is protected by the constitution in many countries, but despite that, information goods are beginning to be regulated also in the western democratic world, perhaps especially in France (CNN 2000, Süddeutsche Zeitung 2003).

For some markets, such as the automobile market, we can roughly speak about a global market for the producers. The sales prices from the factory do not vary very much dependent on where it is sold. Taxes and tariffs can still make a car more than twice as expensive in a neighboring country, compare for example list prices of the Volvo V 70 in Sweden, Germany, Denmark and Finland (www.autoo.se)[14]. For physical goods, especially big products which require some kind of license and which are very visible or immobile, it is possible to have extreme taxes and succeed with the policing of these taxes. For smaller products such as cigarettes and alcohol it has been harder to maintain the penal taxes since increased private smuggling as well as organized criminality follow.

Cross-country exchange of information goods is with present technology nearly impossible to monitor and to police. USA has banned taxes on the Internet partly because they will be hard to enforce, partly because they want the industry to grow to create competitive advantages for USA compared to other regions, and gain further from clustering. Combining low or non existing taxes, with Coase's (1974) notion that regulators often have a laissez-faire attitude towards information markets, might lead to faster establishing a market for mobile information goods and making it larger than it would be if the information markets were as regulated and taxed as similar brick and mortar markets are today.

In Europe the European Commission tries to harmonize taxes and tariffs for customer goods. No matter how successful they will be in that aspect, sooner or later regulatory attention will be focused on the mobile information market, especially if it is successful. Already today mobile operators, one of the key players, faces price regulations in for example Sweden.

Privacy matters and differences in legislation between countries will be one of the concerns. Natural monopolies arising when economies of scale are so strong that it becomes a lot

[14] See for example www.autoo.se last visited Jan. 2001.

cheaper for one player to serve the whole market will give more work to regulators. The regulative matters are, and can become even more important on different sub markets.

There is an enormous difference between the US Internet regulation which has close to a complete laissez-faire attitude, compared with the Chinese which stipulate that only governmental approved information is allowed. But one does not have to go to dictatorial countries to find colliding regulations. On May 22, 2000, Jean-Jacques Gomez, a French court judge ordered Internet portal Yahoo to "make it impossible" for Web surfers in France to access sales of nazi-memorabilia. Under French law, it is illegal to exhibit or sell objects with racist overtones and Yahoo had to prevent all French people from accessing the site.

The interesting thing in the case is not where the border of free speech shall be drawn, but instead that the actual web page is not located in France on a French host, but in the U.S. where the constitution protects free speech and thus also allows the expression of both extremist and racist ideas.

Location of the customer has in this case, raised questions about the jurisdiction of national courts over international Internet companies and has sparked a widespread debate over whether local laws can, or should, apply to foreign Internet companies. The regulatory part is thus very interesting but will nevertheless, apart from one aspect, be excluded from the thesis on the grounds mentioned. Access to, and ownership of, customer location estimates is too important to completely overlook.

According to Samsioe and Samsioe (2002a) localization technologies can be divided in network based positioning and device enabled positioning methods. Today it is the mobile operators who control the location information of the customers when the localization is done in their network and mainly the customer himself who control it when it is device generated. It is possible that the customer terminal manufacturer partly can control customer locations, but in that case most likely only when the customer wants to.

The only industry players having granted themselves possibility to monitor customer location estimates are the mobile operators. All other service providers are dependent either on the customer to invest in special localization equipment or an agreement with the mobile operator to buy their location information.

A few possible scenarios and combination of scenarios can affect the mobile information industry according to Samsioe and Samsioe (2002a). Since it will be clear in each market how the

actual regulation looks like and reasonably clear for the players what to expect in a short time, this analysis becomes very short.

1. Location estimates belongs to nobody and therefore cannot be traded. Since it connected to some costs to calculate the location in the network this would probably mean that the industry would decrease investment in localization equipment. That would probably also decrease the amount of services offered leading to a decreased expected utility for customers giving their location away lower leading possibly to slower penetration of terminal location estimates as well.

USA has a tradition that most belongings can be traded; in Europe it is the opposite.

2. Location estimates become a good, which can be traded. The ownership of the location information can be expected to belong to the customer, or possibly, the company who makes the location estimate. This can lead to several different market solutions but the likely outcome is that someone will control customer location estimates. This can according to Samsioe and Samsioe (2002a) be:

    a. The customer himself, and in that case there is a similar market development as in case one. However, since location estimates can be re-traded and refined the market is likely to grow faster.
    b. The company doing the location estimates owns the data. This is a less likely sustainable situation, but it is de facto how customer location estimates are treated today, with the mobile operator controlling cell identity. This of course drives the industry more since the mobile operator wants to make the market for "their" location information as big as possible. If the mobile operator or another company manages to control location data possible regulation could:
        i. Have a laissez-fair attitude and let the market forces work
        ii. Force the company to sell location data to market price or to a regulated price

Ownership of the location data will also affect the industry structure by strengthening or weakening the different players' positions. To deal with changing favorable or less favorable legislation can be a problem in immature markets, but although this can make it more complicated to choose a successful business idea, it is not different to other immature markets.

2.4.7 Segmenting the Mobile Information Industry

To better understand the dynamics of the industry it is useful to segment it. Above the segmentation was done to exclude part of the industry. Below, this segmentation is mainly based on companies' abilities to better understand the competition within the industry.

2.4.7.1 Service Segmenting

Davis (1999) has mapped the general service industry onto a two by two to matrix. The deciding categories according to Davis (1999 p. 23) are whether the companies are providing routine services or knowledge services and how these services are delivered, in an integrated or decoupled process. This places significant importance both to the organization of the service as well as to the content of the actual service.

Service Delivery	*Service Task*	
	Routinized	Knowledge
Integrated	Fast food, car rentals, etc	Auto repair shops, personal services, small consulting companies, etc
Decoupled	Department stores, Hotels, Airlines, banks, etc	Hospitals, large consulting companies, investment banking

Figure 20: The service industry (Source: Davis 1999).

According to Davis (1999) five broad attributes of service quality influence customer satisfaction:

- Tangibles (Appearance of facilities, equipment, personnel and materials)
- Reliability (ability to perform the service dependably and accurately)
- Responsiveness (willingness to help customers and provide prompt services)
- Assurance (ability to convey knowledge, trust and confidence)
- Empathy (caring, concern and individualized attention)

The mobile information services are entirely digitized and service supplier and customer never physically meet each other. Piller and Meier (2001), with a mass-customization view on services, divide the market by how well the service can be digitized and whether a primary need or a secondary need is satisfied. A resulting similar matrix is presented where assurance responsiveness and reliability are assured by digitization.

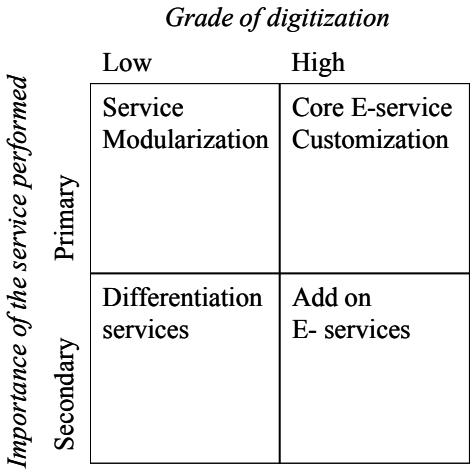

Figure 21: Depicting the service industry supported by ICT (Source: Piller and Meier 2001)

Since the Mobile information industry per definition is fully digitized it can only deliver core- and add on E-Services.

There are several examples of grouping mobile information services, not by company abilities but by sub-markets. Some research concentrates on a field, for example entertainment, and tries to break down that field into pieces, Baldi and Thaung, (2002). In doing so, they manage to study the diversity of that field. Such an analysis becomes static since it needs to be done again when the industry develops and it is often more descriptive than analytic.

2.4.7.2 Industry segmentation

According to Bertelé et al. (2001), most published work focus on the technological issues of the mobile Internet. The studies of Internet markets and business perspectives are considerably fewer. The ones that do exist can, according to Bertelé et al. (2001), be divided into:

- Studies to understand and evaluate the role of mobile operators.
- User centric studies analyzing customer response to the first mobile Internet services such as the GSA (2001a-2002) studies
- Studies of which groups of mobile Internet applications that are likely to be successful in the future.

All these aspects are important for the mobile information industry. The activities of the mobile operators affect the market power in the industry.

User centric studies are important to validate existing theoretical models. Among the most comprehensive are the Global Mobile Suppliers Association, GSA, quarterly surveys of mobile portals. GSA describes the services offered by 72 different mobile portals representing 18 countries with a focus on Western European players, but also including a selection of U.S. mobile portals. By studying the changes between the reports they also can get a hint of what is demanded from customers and how this demand changes as the industry matures (UMTS Forum 2001 a, b, c, d, 2002).

Studying different predictions of which groups of services that might be successful in the future can be interesting, but the existing surveys and reports often start with existing ones and then extrapolate future development, leaving out disruptive changes and by that failing to analyze a new specific service with respect to becoming successful. Unfortunately, several of these reports, also the ones from famous research institutes, can be considered marketing material rather than research in any deeper sense.

Additionally to the mentioned streams several researchers attempt to create a taxonomy for the entire mobile industry. Boston Consulting Group (2000), BCG, uses information about existing services when they try to explain the present mobile information structure. They classify the industry services in three different groups, "Connectivity", "Content" and "Transaction". By doing so BCG claim that one can see that the development of mobile commerce merges connectivity, content and transaction, and thus hints at what the future industry will look like.

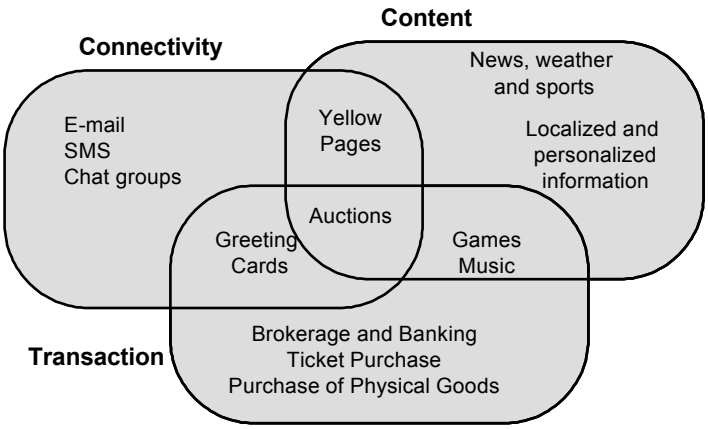

Figure 22: M-commerce merge connectivity, content and transaction (Source: BCG Analysis 2000).

Sjölander et al. (2001) have a similar classification but claim that "Entertainment", "Communication", "Transaction", "Information" are the name of the fields which the existing services should be divided in. Exact wording seems to be a matter of choice more than any differences in common understanding between the different authors.

The problem with only watching what is demanded now, which GSA is doing, and extrapolating this, is that one will leave out disruptive changes, which might be the most important in a business development model.

A strategy based on existing demands can give companies warnings, and reasonably early signs of changes, but a company is always obliged to react and cannot forecast the demand of a completely new information good. It will inevitably lead to me-too services if one is only following up on already successful trends. If one is only watching what is presently demanded, it will give little space for revolutionary ideas. The aim of this thesis is to be able to judge and valuate completely new services as well.

The BCG approach is also very "technically" oriented and neglects customer value. One cannot say that a service combining for example content and transaction is better and more likely to succeed than one that does not.

2.4.7.3 Segmenting Based on Core Competences

Drawing the border between entertainment and information or even connectivity and transaction is not always trivial and it is questionable if it is meaningful. A better way would be to focus on something which clearly separates the companies in the industry, such as intangible resources of a firm that are, for example, unique, rare, and inimitable. They can, according to Barney (1991), also translate into competitive advantages for the firm.

In order to explain the diverseness of the mobile information industry, and at the same time try to introduce tools to analyze it, the industry is below divided into different sub areas depending on the core competences in accordance with Prahalad and Hamel (1990). By doing so, one can tell which competences that are necessary to successfully compete with an information good. This subchapter will concentrate on location as one of the two major parts of mobility. In next sub chapter instead time will be in focus. Here, they are considered separately but naturally there are interdependencies.

The location based service industry, an important part of the mobile information industry can according to Samsioe and Samsioe (2002b) be divided into three major groups: Positioning Services, Localized Information Services, Fun and Entertainment. Additionally, Samsioe and Samsioe (2002b) include a fourth group Miscellaneous Services, not really fitting in with any of the main groups.

Companies developing positioning services need to be highly skilled in defining the accurate position of a user in a reliable way, as well as sometimes offering real-time data about his surrounding. The major part is tracking services. Theses services are considered to be the commodity services among location based services. There are basically two different types of services:

- Pure Tracking Services: Localization of missing persons or goods, for example avalanche victims, lost kids or stolen sailing boats. An example of a company developing the above-described services is the UK based company Tracker.
- Enhanced tracking services combine the positioning with other information such as a geographical information system, GIS. It is used in fleet management as well as routing of private vehicles or pedestrians. For fleet management companies see B&M systems and routing Tegaron.

For information services the most important success criteria for companies is content of excellent quality. For parts of the industry the user interface also plays an important role. Content, often of a public good nature, is enriched through geo-coding, e.g. latitude and longitude or another positioning data is associated with the original content. The services can be further divided into proximity services, advertisement, and general information. An example of a company providing localized information services is Germany based Mecomo AG. In this field, at least on the B2B market, it is often possible to make a rather accurate calculation of customer value, since the mobile information value can easily be translated into saved cost. Hubbard (2003) for example mentions that the part of the trucking industry equipped with an on-board computer have 13 percent higher loaded miles than the ones without. This can easily be calculated into increased efficiency and dollars or euros.

Companies developing applications in the game and fun segment are highly specialized in concept issues and user interfaces. Adding the position of a player as a component to a game can make it more thrilling to play. The game is no longer something taking place on a computer, but instead a component of real life for the user is included. There are two different types of applications in the gaming sector:

- Shooting Games: Players can equip mobile devices with weapon and defense systems and can start playing with opponents in a defined radius.

- Adventure Games: Players are achieving a certain amount of points in a game depending on their location. Variation of a similar theme is that the person playing has to go in a certain order to places in order to receive points[15].

An example of a company developing these games is It's Alive (www.itsalive.com), which has launched commercial services in Sweden (www.telia.se) Finland (www.dna.fi) and Russia.

An important field of entertaining location-based services is community applications. The following variants are possible:

- Role playing: The players take part in a soap opera as certain roles and interact with other players in the neighborhood or try to find other people from the soap opera.
- Flirting/Dating: Users register their profile and look for people according to a wish list in a certain radius. Another variant is to register as a member of a flirt community and get notifications if another interested person is in the area.
- Community: The users define buddy-lists and can see the location of their buddies and can communicate with them.

An example of a company developing community applications is Mobilico (www.mobilico.com) from Germany.

Especially with the advent of MMS (Multimedia Messaging) technology services such as sending a postcard from a location with the help of a mobile phone or a digital camera, will gain in importance. The Norwegian company Cellvision's application "Been There" supports these services with add-on information.

The majority of the existing location based services fit into one of the sub markets described above. However there will be services hard to locate into any of these markets. One example, different to services directed to customers, is location-based tools for companies to increase their profit or to enhance their service. It can be argued whether or not location dependent billing is a service or not. One example being market as such is O_2's Homezone, where users of mobile phones pay fixed-line telephone fees in one cell of their choice, their so-called homezone. Rather than seeing location or for that sake time dependent billing which close to every operator is using as a service I prefer to treat that as pricing tools available due to low menu costs. Ring-tones, logos and screen savers would fall in this category if they at all are considered to be mobile information goods.

[15] What is called Schnitzeljagd in German

Mecomo AG has according to Samsioe and Samsioe (2002b) approximately as much in common with It's Alive, as Nestlé has with Siemens Domestic Products. Both Nescafe and electrical shavers are sold in Karstadt, Wal-Mart and similar shopping malls. The distribution for the multinational companies is similar, but no one would claim only because of that, that they work in the same industry nor that they are bitter competitors. Similarly it would be wrong to claim that Mecomo AG and It's Alive AB are acting on the same market only because the use the same distribution system.

Samsioe and Samsioe (2002b) have only been concerned about the core competences necessary to compete in the location based service industry. If these core competences presented by Samsioe and Samsioe (2002b) are systemized after importance of location and the information richness the following matrix is developed.

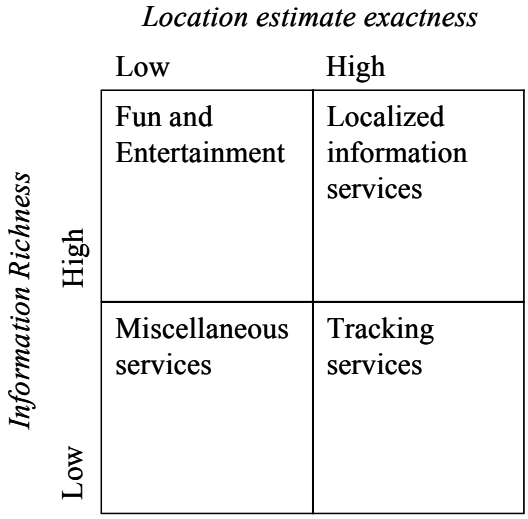

Figure 23: Depicting the location based service industry depending on core competences (Source: Samsioe and Samsioe 2002b)

The miscellaneous services, such as ring tones and screen-savers are questionable if the can be called mobile information goods at all since often other sales channels such as TV spots or Internet are used as well.

2.4.7.4 Time Based Segmenting

Samsioe and Samsioe (2002b) focus on the existing location based service industry. To cover more of the mobile information industry we need to add time dependent services.

There are two main kinds of information goods with time dependency. In the first kind it is important to have timely and or updated information. That could be news, real time applica-

tions such as parking guide systems or stock trading. In the second kind, time as a synonym to duration plays the bigger role. Here it is important to support the customer with information that increases the productivity.

A third aspect of time could be considered, which has only been hinted at before since it has lesser applications, such as services that function as “time-shifting devices”. For example, consider a customer on the way to an airport. If he arrives 30 minutes late and misses his plane, it has great consequences and he would be willing to pay a lot to avoid this. If he would be 30 minutes too early, this time has basically no value. With certain services such as remote Intranet access, these 30 minutes can become valuable. Sony sold their video recorders not as a media for recording movies, but as a time-shifting device that let you watch a film when it suited you. Other services falling in the same category could be baby-telephones. They allows parents to be away from a baby when it is sleeping but still feel as if they were there, and can also run there when the baby cries.

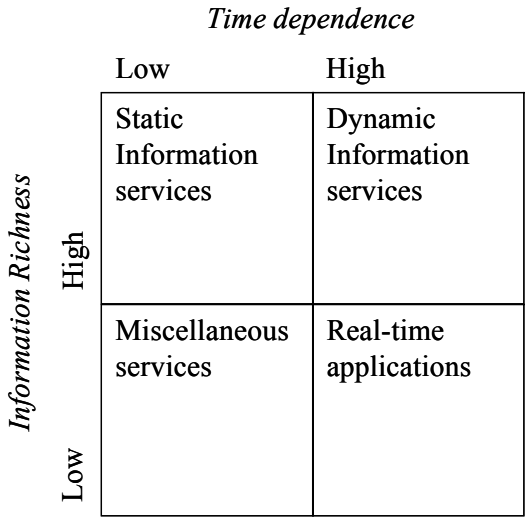

Figure 24: Depicting the time sensitive service industry depending on core competences.

The core competence regarding time is first of all optimized processes regarding speed and costs, but also expertise in conceptual aspects such as how information can save customer time.

Static information services are the ones where the content is not changed very often, for instance city information guides or databases of all kinds. The quality of the information as well as choosing the right information is crucial. Dynamic information services are decoupled high-knowledge services that focus not only on making the interesting content available, but also making it available under extreme time pressure. News or investment banking tips would be

examples of services falling in this category. Real time applications are heavily technology oriented and seldom offer much flexibility. A parking guide system has information about monitored parking spots, but not much else. A stock trading system can trade stocks but usually not currencies or stamps.

Miscellaneous services could be different reminding functions such as birthday recognitions or alarms etc. Similarly with the location-dependent miscellaneous services is it here questionable if they at all belong to the industry since the terminal, without a network connection, can handle them.

3 Creating Customer Value in the Mobile Information Industry

We shall never cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
T. S. Eliot

A customer can order a mobile information good almost anywhere and at any time. Often the information good is "consumed" directly at the very same place and time and it has a limited rest-value. The importance of customer location and all aspects of time compared to other industries are therefore different. It is not where, how and when the *offer* is available for purchase that need to be analyzed, but rather where, how and when the customer is *using* it, reflecting that customer value is situational (Lewis 1946, Hilliard 1950, Morris 1964, Von Wright 1963 in Holbrook 1999) and changing from time to time and between locations (Taylor 1961, in Holbrook 1999), stressing the importance of solving the customers need timely (Meehan and Dawson 2002).

This chapter will cover the aspects of time and location plus customer value of a service, which is necessary in order to understand the demand-side of the mobile information industry. A framework explaining how customer value is created in the same industry follows an investigation about time and place in the mobile information industry.

3.1 Defining Time and Place

When talking about something as diffuse and at the same time obvious as time and location, it is important that one vocabulary is used throughout the analysis to avoid misunderstandings. Below follows therefore a definition of time and place relevant to this thesis.

3.1.1 Defining Place

A location can be seen as a geometric figure in a coordinate system, perfectly defined in shape and position by its coordinates. A position on earth is defined in a coordinate system of latitude, longitude, and height. In reality people often refer to less precise locations. Potsdamer Platz, at home, on the bus, or even on vacation are possible answers you can get, if you want to know where someone is for the moment.

Absolute location, L, is a place that can have a mathematical representation in a coordinate system. Even if a person only can be at one spot at a time, the most adequate mathematical representation of a person's location doesn't need to be limited to a spot. It can be a dot, a vector, an area, or a volume. The real world representations of these mathematical expressions could be for example be the Eiffel tower, Highway 1, city center Munich and a large office building or a ski area. Real life absolute locations, especially dots and vectors can easily be written as a function of latitude, longitude and height.

Relative location, L_r, is perhaps even more common in everyday life than absolute locations. 100 meters after the crossing, next to the bar, or two hundred meters behind the leader of the Marathon race would also describe a place.

3.1.2 Defining Time

Similarly as with location, most people have an understanding of what time is and most people constantly wear a watch. Objectively, time is linear in the mathematical sense that, on earth, it moves with equal speed, forward and only forward during a lifetime. In a subjective way it is more complicated. Time moves too fast when you need more of it and too slow when you are waiting for something. Time can also be cyclical when an event happens with regular intervals, lunch once a day, summer and Christmas once a year etc.

Time is in our culture according to McGrath and Rotchford (1983) generally regarded as homogeneous, divisible, linear, measurable, singular, objective and abstract. In other cultures this can be different (Juster and Stafford 1991). Below follows therefore some definitions on what we mean by time in this thesis.

Time, $_t$ can be dealt with in a similar way as location, but it is slightly more complex. First time can be synonymous to *duration* e.g. how long time a task takes to fulfill, or how long the good or the service gives you pleasure. This kind of time will be represented by a "t", or by "time, duration". This corresponds to the linear time.

Time, $_T$, also answers the question, when? If time is seen as a continuum, a date, which is represented by a "T", is a fixed spot on that continuum. In the same way that a location can have different shapes, a date can occur more or less regularly. A date can be 23.59 December 31:st 1999, but it can in this thesis as well be Christmas or Friday evening. This corresponds to the cyclical time. Time,$_T$ could also slightly simplified be called timing.

One could of course discuss relative time, T_r, i.e. a certain time after an event has happened. After lunch or six hours after schedule, would be examples of relative time. In most cases relative time can be described by Time T, such as a date.

When time and location are defined, then all other things happening at that time and place are defined as well. If it rains on a certain place on a certain time then the customer value of a good is assumed to be affected. The value of an umbrella usually increases with rain, whereas the utility of a pair of sunglasses decreases, reflecting the situational aspect of customer value.

One can further divide time T into two different cases depending on predictability, each on a different endpoint of a continuum. Case 1, time (T_p) describes a special moment, precise and known in advance such as new years eve 1999 or a reoccurring moment with known intervals such as Friday evening, lunch or somebody's birthday. It is 100% predictable.

Case 2 time (T_s) are ad hoc moments that happen stochastically, whether they happen only once or are reoccurring. Airplane accidents, influenza, losing the car keys etc[16] would be examples of such events. They are not predictable at all.

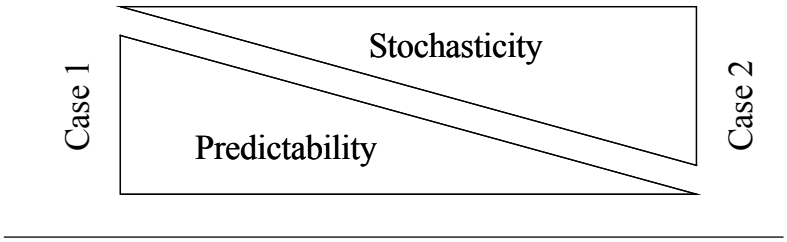

Figure 25: Moments are divided depending on their predictability and stochasticity.

Between these two cases all other happenings are supposed to take place. We cannot say much about the weather in one month, but it follows some patterns. Same things are true for people's moods, feelings, demands etc. They all fall somewhere on this continuum.
According to Eliasson (1994 p. 135) there are "four basic economic activities in the knowledge based information economy": coordination, innovation, selection, and learning. Predictable events can be monitored with the help of technology and stochastic events need to have a flexible enough organization to cope with the production and marketing of information goods.

3.1.3 Relationship Between Time and Place

Before continuing to investigate customer value it makes sense to also spend a few words on possible relationships between time and place. Physics tells us that there is a relation between them. Einstein (1916) explained in his theory of relativity that time is together with length, depth, and height the four dimensions in which objects can be defined.

Whereas Karl Marx already 1857 (in Sheppard 2002 p. 309) expressed that the economic development will lead to "annihilation of space by time". Martin (1999) concludes more than hundred years later that time might have eliminated space, e.g. distances between places. Pessimists claim that with the help of the computers, the "tyranny of distances" gives way to the "tyranny of real time" (Shepard 2002 p. 309). More neutral and optimistic researchers speak instead about the "now-economy".

Cairncross (2001) sees thanks to modern ICT the possibility to perform real-time tasks independent of location and Leamer and Storper (2001 p. 641) noticed that previous improvements in logistic infrastructure always have had a double effect. It has permitted dispersion of certain activities but at the same time "increased the complexity and time-dependence of productive activity".

A modern relationship between time and location is the development of location estimates by Global Positioning System. GPS required extremely accurate time measurements, which was not available until the atom clocks were invented. When it wasn't possible to measure time with close to perfect correctness, it was also not possible to make a location estimate as quickly and as accurately as today. The GPS system functions by measuring the time it takes to send a signal from satellites to the receiver, which through triangular multiple calculations estimates the position to within a few meters. More info about location estimation technologies can be found in **Appendix 1**

This thesis will certainly not go deeper into physical aspects of time and location, however it is worth noting that this relationship exists in a fundamental way not only in physics but also in economic terms.

[16] The examples given are in a mathematical sense not fully independent stochastic variables, but close enough to show the point.

3.2 Combining Time and Location

A relationship between the different research fields exists as well. "The early micro-economists copied the mathematics of mid-nineteenth century physics equation by equation. [Atom] became the individual, 'force' became the economists' notion of marginal utility (or demand), and 'kinetic energy' became total expenditure. All of this was synthesized into a coherent theory by Alfred Marshal – known as the theory of industrial organization" (Beinhocker 1997 p. 25).

Marshall (1890) noticed 100 years ago that the "markets vary with regard to the period of time, which is allowed to the forces of demand and supply to bring themselves into equilibrium with one another, as well as with regard to the area over which they extend." In other words, different markets were not equally efficient and it took time to make information widely accessible. When market information spread over a larger area the corresponding markets grew in size and also by population.

An example of this is presented by Flynn and Giraldez (2001) to show that there were different markets for silver in Europe and China before the 16th century. At that time the price of silver in terms of gold was about twice as high in China as in Europe. This price gap lasted some hundred years from 1540 until it disappeared under the weight of increased silver production and trade.

3.2.1 Traditional Information Markets' Dependence on Time and Location

Historically there has been a relationship on how information products were distributed with respect to location and timeliness. Print products can only reach a certain timeliness depending on printing and delivery time. The bible is probably the most widely spread printed information good and it is very location insensitive, and has only to a very limited extent changed its content in line with developments of the contemporary languages spoken. Local newspapers and direct commercials are among the most local and up to date print that exist. Roughly one can say that for printed information there is a relationship between decreasing possible audience, with increased local relevance.

For TV, radio and to some extent web news there is according to Evans and Wurster (1997) a trade-off between reach and richness. Traditionally one could perhaps say that there is a trade-off between local relevance and costs, but with the advent of the Internet and multimedia it is very questionable if the reach and richness trade-off is still an issue.

Information dealing with location such as maps, street signs etc. can easily increase its time sensitiveness, but once again only with increasing cost for the interface and/or for the actual information service.

There exist as well a few special services such as stock trading, which, if done electronically, can be completely location independent. The price of the stocks changes every second and this information is virtually location independent.

The picture below only describes information goods[17], however, similarly the price of real estate can vary tenfold in the same city and much more with larger distances. A lunch in a popular ski slope is more expensive than one at the lunch restaurant outside the office in a suburb etc., etc.

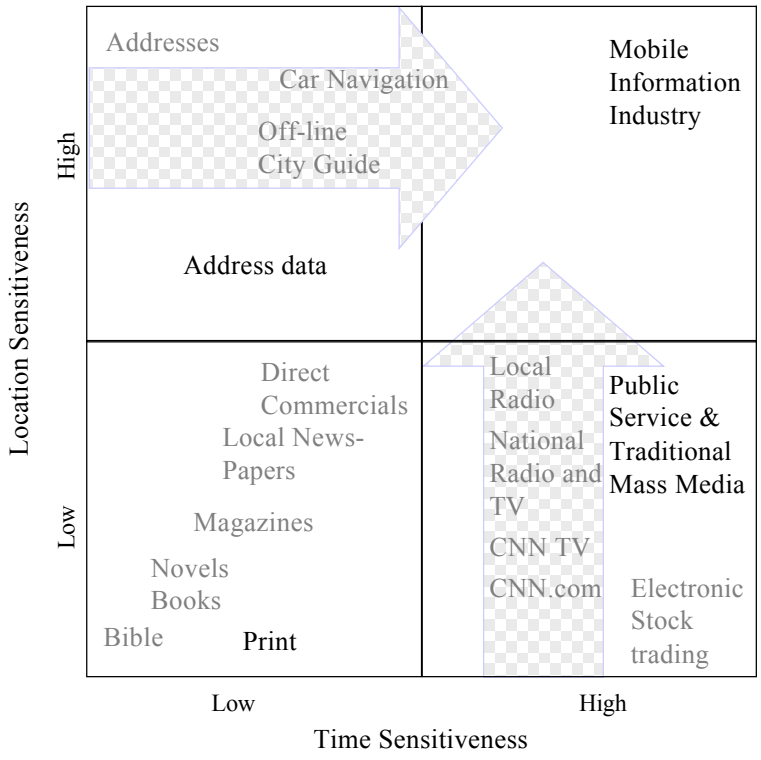

Figure 26: Place and time sensitiveness for a few products and services.

The top right quadrant is, no matter which field of analog services one looks at, hardly filled at all. The existing information services would in the depicted cases need to change information

[17] A road sign can be seen as information even if it usually very real in its daily meaning

bearer if they are to be able to cost efficiently approach this quadrant. The technology could be mobile Internet, or any other technology allowing ubiquitous use.

New services relying on modern information technology such as digital city-guides or car navigation systems with automatic location detection, begin to approach the top right quadrant. Costs have so far prohibited them from being more up to date. Maps need to be updated and CDs need to be distributed. When these products are combined with communication technology, which means putting them on-line, there is a new set of mobile information goods that can supply customers with both time and location sensitive services.

For the following analysis, it's interesting to note that prices on goods and services in general are time and location sensitive.

3.2.2 Disseminating Market Borders Regarding Time and Location

The information industry has moved from a local setting to a global one, it has become more continuous than periodical, and it has started to get personalized. For many information and news providers, the next step after personalizing the content will be to adjust the content to where the person is.[18] An early example of this was the Swedish news service “24timmar.se”. Thanks to an innovative design of the publishing system, they could serve 57 cities with localized information and mix it up with national and international news at a fraction of the costs of other local news providers. With mobile Internet this can be taken a step further. The news can be tailored to the customer's location, his past behavior, time of day, or any other variable. Optimizing a service with respect to time and location means optimizing a service taking all four dimensions into consideration.

For a market to develop, some kind of trade between sellers and buyers needs to take place. If such trade is to take place there need to be an agreement regarding quantity, price, payments and so on between the parties involved. Historically this exchange took place at different marketplaces and later in shops and supermarkets, which sometimes are considered to be private marking places (Alchian and Demsetz 172 p. 793).

[18] Outside the scope of this thesis is to try to foresee yet another step in the development of information products. Possibly it will be how the user feels, that decides which services, and which tone these services will have.

It is still not incorrect to associate a market with an area even if that neglects other important properties. In medieval times the markets were very much related to geography, often the market square in a town. Later the market became enlarged to a nation or group of nations. This is still true for most products. Today there are very few products, and even fewer services, which truly have the world as their market.

The truly world wide markets, such as the one for crude oil, or, even though politically distorted, also the one for grain, are still today physically located at an exchange. The ones located in London and New York, are the most important. Today, nearly everything can be traded electronically, but it was not long ago that everything had to be done in the pit.[19]

The traded goods are still produced where they used to be produced. New is that traders can be scattered around the globe, or in other words, the market has partly lost its dependence on time and location (Cairncross 2001, Leamer and Storper 2001, Martin 1999). The market information about the physical good is globally available, and we can therefore talk about a global market for these particular goods.

The need for the actual exchanges diminishes too. Technically, any Internet page can be downloaded to any device that possesses the soft- and hardware required. The market is no longer connected to geography, since its function is taken over by a networked electronic market, where everyone can interact immediately with everybody else without need for market makers or even a certain designed electronic meeting place. Compare the development of the peer-to-peer exchange of music on the Internet. First, Napster that was build up as an exchange with a central broker function was the dominating player. When the business was changed Kazaa.com, where no central market place was needed, took over.

Similarly for customer markets ICT can solve the information exchange and thus, it is possible to inform oneself and to place an order on an good over the Internet 24 hours a day[20]. The markets' dependence on time T has disappeared. If the good is a physical good, customers most often need to wait for the delivery, but if it is an immaterial good, it can be delivered directly after it is ordered. For such products the dependence on time, t has almost disappeared, or rather changed. A customer can satisfy his information demand immediately when he experiences it, with the help of modern ICT.

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[19] The pit is the name of the different trading floors in which sellers and buyers physically interact.

[20] This one can do in many 24 h open shops as well, but then it is location dependennt. In Internet one can do that basically location independent.

With the Internet, it is technically possible for the world to be a single market, but there are still information barriers, which have to be overcome. These information barriers have taken the same role as geographical barriers had before. This means that there are only parts of the population who will benefit from the lowest prices and best products on this "global" market. The market for many information goods is not approximated very well with a geographical area any longer, but instead with a subset of the population reached. This subset can be homogeneous with respect to a certain variable[21] or completely heterogeneous.

For mobile information goods the importance of location is not lost. By enlarging the market companies have to overcome the information barriers, but to perfect the service they need to take customer location into consideration. From being a boundary that the companies tried to overcome to enlarge an existing market, location becomes an enabler for new innovative services.

3.2.3 Lack of Economic Theory Combining Time and Location

When markets are changing with respect to time and location, there is a chance not only to improve existing services but also to perform new services. In microeconomics there are several references to how we value time. One can find pricing and differentiation models which take time into consideration, interest rates are paid depending on among other things duration of a credit, decreased delivery time usually has a price etc., etc. But utility of a location is hardly dealt with at all in microeconomics.

In macroeconomics as well as economical geography plenty of interest is focused on location. Macro economists try to answer where we shall build a factory or why cities are formed. Despite being highly interesting matters, they give only limited help in explaining customer value in the mobile Internet area. Theories combining time and location to explain customer utility are missing in micro economics.

Not even if we study history, when we already know the outcome of different actions, we have been able to explain how location and time are linked to economic behavior. According to Kent (1987), many, although not all, studies of activity areas have been limited to descriptions without theory. Kent is referring to tribal communities' and groups' utility of a space in and

[21] This variable can be a language, an interest group, but also a an area can make an approximation even if I believe that there will be several better variables explaining the size of the market.

around villages. When it comes to individual behavior and utility, there is neither a comprehensive theory in marketing nor in economic history.

3.3 Utility of Time

> *"What we assert is not that we are clever enough to make illuminating applications of utility-maximizing theory to all important phenomena – not even our entire generation of economists is clever enough to do that."*
>
> *Stigler & Becker (1976)*

In this subchapter some earlier research about customers' valuation of time will be reviewed in order to find inputs for a customer oriented utility model taking $time_t$ and $time_T$ into consideration.

3.3.1 Household Production Function

Gary Becker (1965) introduced the household production function in his article "a theory of the allocation of time". People do not only buy goods and use them, they also produce utility with the inputs of market goods and non-work time. The core of the article is that people are not seen only as customers but also as producers of utility (Shapiro 1997). This way of thinking fits well with the value creation of many mobile information goods were the customer is producing or co-producing a service.

Having the customer taking part of the production process has received increased attention lately. Most of it focuses on products, especially development of products (Jeppesen and Molin 2003, Von Hippel 2001, Ramirez 1999). Much less is written about services or information goods, although according to Kristensson et al. (2004) it is useful to capitalize on customers' ideas not only in a customization process but also for innovation. Meuter and Bitner (1998) distinguish between firm production, joint production and customer production of a good. Below, where co-production is mentioned, I use it in accordance with for example Bendapudi and Loene (2003), who state that as soon as the customer has made any input in creating the service or the information good, it increases the final customer value. Simply put, the customer value of a normal telephone call depends more on who the customer is speaking with than who owns and operates the network.

The other important fact in Becker's article is that customers' value time differently depending on how much they have and what the alternative cost is. Becker suggests that the value of time

is related to what could be earned on the marked if the time available were instead put into production.

Becker's (1965) utility functions lead to two constraints. To purchase goods, you need money and to turn the goods into a utility you need time, both available only in limited amounts. Genuine basic provisions can be substituted by expensive prefab dinners to reduce the cooking time, which on the other hand requires more money. We "buy" time. To maximize utility, one has to find the best mix between market goods and the time required to transforming the goods into a utility.

The fact that (spare) time has a monetary value for individuals, wasn't new when Becker (1965) wrote the article. In "an Economic Analysis of Fertility" Becker (1960) himself mentions that one of the costs of having a child is the time it takes for the household to give the services a child needs. I.e. the household has alternative costs while caring for the baby. Smith (1928) had already 1928 similar thoughts although it was about a special case. Smith (1928) claims that in time of a war people tend to be more short sighted and the demand for goods which can be consumed immediately goes up whereas prices of goods that require long time to give the same utility decreases. The reason for this was due to the problems of forecasting and the reluctance to invest time in anything for an unsure yield in the future.

Schumpeter (1908-9) used the idea of personal utility functions in his article "On the concept of social value", but gives W. S. Jevson credit for developing the theory. However, the two mentioned articles by Becker brought the present research together, and Becker has many followers Reuben Gronau (1973,1977), Ghez (1975), and Biddle and Hamermesh (1990), all part of the "New Home Economics". Their works are interesting, but mainly outside the scope of this thesis.

In this thesis, mainly the methodological approach of Becker, seeing households as producers of utility, and the initial discussion on valuation of time, will have any continuous importance. For the following analysis it is also necessary to notice that there is a possibility to substitute time for market goods and vice versa. This will lead to a decrease in time intensive goods as wages increase (Becker 1965), and increased customer value of products saving time (Holbrook 1999).

3.3.2 Perception of Time

DeSerpa (1971) develops Becker's works further but he focuses entirely on the time-dimension rather than following the track of the economics of households. Whereas Becker

(1965) simply claims that the price of time is proportional to the alternative use of time, which according to Leclerc and Schmitt (1999) is at odds with behavioral theories. DeSerpa (1971) presents a more detailed but still general model for evaluating the cost of time.

"In reality, the amount of time allocated to consumption of any commodity is partly a matter of choice partly a matter of necessity" (DeSerpa 1971 p. 830). This makes the modeling of cost of time difficult.

It is on one hand important to have an objective view on how time can be evaluated, on the other hand it can be more relevant to consider a subjective view, explaining how a particular customer values time in a given situation. Many of the earlier theories on the evaluation of time were of the kind where mathematical reasoning and proofs played an important role. Finding objective relations between activities can be used as a base for constructing all kinds of reward systems, for example salaries. Such work can on the other hand only have a guiding role in this thesis. Trying to find customers' marginal utility of a service depending on time and place would, with Vickreys (1945 p. 319) terminology, be a wild-goose chase after a function that would have a doubtful meaning even if it could be determined. More important than finding an exact answer to a simplified reality is to understand the subjective valuation of time that customers have.

According to Chase and Dasu (2001) the perception of passage of time is very individual. When we are engaged into something done for pleasure and for fun we do not even notice that time is passing. When we are forced to estimate how long an event took , regardless whether it was mainly pleasure or pain, we overestimate the time elapsed.

Chase and Dasu (2001) claim that when an encounter is divided into sections we perceive it as longer than if it is only in one piece. Half an hour waiting in four different waiting lines is perceived longer than the same half an hour if we were waiting only in one line. The conclusion is for marketing purposes that unpleasant things shall be dealt with in one sequence whereas pleasurable things should be divided into sub activities.

Research also indicates that unless an activity is much longer or much shorter than expected, people pay little time to its duration. Niklas Savander at Nokia claims (Economist 2001) that mobility makes people much more impatient. Nokia has found that a five-second delay to access something on an Internet-capable phone seems far longer to users than a five-second wait to call up a web page on their desktop computer.

3.3.3 Cost of Time

It usually takes a long time to find a shorter way
Anonymous

DeSerpa goes as far as claiming that when a good is consumed for pleasure, most customers "do not consider time as part of the price of the commodity being purchased" and that the cost of time has "no effect upon the consumer's decision" (DeSerpa 1971 p. 840 and p. 843). People have, on the other hand, according to Becker (1965), the possibility to substitute money for time. When spare time is scarce we tend to be willing to pay more to get the most out of it.

Claiming that five hours on the beach for a well-paid manager should be exactly twice as expensive, or double as valuable, as for his half-paid employee only because the alternative cost is twice as high cannot be done. Some moments, that are some non-work activities, must be seen as investments to be able to handle future work. A thought indirectly mentioned already in the bible (Genesis 2:1) several thousand years ago when God was resting after having created the world.

So far, most works about time have regarded time as an input factor among others, for which it is important to evaluate the cost. The timing of the customer's demand has not been considered in the same way. Or to use the terminology earlier defined, it is a lot easier to evaluate time $_t$ than time $_T$. Unfortunately, Becker (1965), DeSerpa (1971) and most other authors, do not show that the individual valuation of time is as well a function of time. We value time very differently depending on which time of day it is and if we are in a hurry or not.

From the discussion above it is clear that we cannot draw any general conclusions about the value of time when it comes to mobile information industry.

It is also not possible to conclude whether we as customers value a certain timing in a way that matters when developing a service. Modern ICT can eliminate time and location restrictions and obstacles. When developing a mobile service it would be interesting to know how the obstacles of time and place in the real world actually create opportunities for customer utility in the mobile information industry.

Taking time, both duration and timing, into consideration when designing a service means allowing for "postponing, rescheduling, and last-minute behaviour, as well as to catch up on lost time." Ahonen and Barret (2001 p. 43).

3.4 Utility of Location

> *If we don't change our direction we're likely to end up where we're headed*
> Chinese Proverb

In this subchapter some earlier research about customers' valuation of location will be reviewed in order to find input for a customer oriented utility model taking location into consideration.

Utility of a location is similar to utility of time T. Perception of a location is individual, and it changes over both shorter and longer periods of time. To completely cover the topic it is necessary not only to analyze the utility of a factual technical location, that is, a coordinate of a customer, but also what the customer can expect from that location and most importantly how it affects demand for information products.

3.4.1 Existing Location Models

A model in which resources are immobile but goods can be traded with or without regard to transaction costs can explain international trade. Models where production is perfectly movable and shall be situated so that transportation costs are minimized, solve the classical factory location problem.

There are models and frameworks explaining how the relative costs of production in a certain area could decide where a production plant should be located (Wright 1971, Lederer & Hurter 1986, Justman 1994, Holmes 1998), or where research and development shall take place (Santangelo 2002), or direct investments are most likely to be successful (Chadee et. al 2003). Others minimize transportation costs or a closely related variable, for example Dudey (1993). Seminal works from Marshall (1890), Hotelling (1929), and Lösch (1943) has increased understanding on how location decisions of production and retail can affect profitability.

In the early models, the location is fixed depending on a task that the company wants to fulfill as efficiently as possible. In the same manners as dealing with utility of time, many scholars continue to produce mathematically exact solutions to a simplified reality, (Eaton & Lipsay 1979), Palma et al. (1987) something which the to-be Nobel laureates Vickrey and Samuelson, already in Jorgensen et al. (1964) claimed should not be accepted as anything other than fables.

Yet others try to solve more complex location based problems. Peli and Noteboom (1999), concentrate on finding models for catchment areas explaining size and supply diversity on a market. Delios and Beamish (1999) examine optimal market reach, and there are studies of differences in industry concentration in different locations (Venables 1995). All these models are somehow related loosely or directly to the utility of a location, but always with a company perspective.

These approaches try to explain an observable macro economic phenomenon with logical models, or a practical goal of lowering for example transportation cost for companies especially in the logistics field. None of them explains directly customer utility of a place, neither do they say anything on how the utility of a single or a group of customers is affected depending on their location. Coase (1960) mentions the negative effects of pollution, and shows that there is a market solution to overcome negative network externalities, but that deals more with market solutions to pollution rather than valuing the actual location. Moeslein and Piller (2001 p. 8) conclude that "organizations moving towards e-business are confronted with a whole spectrum of location problems that cannot be answered by classical organization and location theory." Also Moeslein and Piller (2001) focus mainly on the location of companies and its workforce and less on where customers are located when using a product.

The positive utility of being at a special place can perhaps be compared with different amusement parks entrance fees or restaurants' prices in comparison with the neighboring ones' in worse locations. However, that would only form a limited part of the analysis, which also needs to cover how different locations, positive or negative, can trigger demand of information services.

Mobile information goods use location as one of many variables to optimize the actual service and also to change the service depending on the location of the customer. It is only lately that we have seen a revival of location both as a resource for firms (Porter 1990, Hanson 2001) and as defining borders for competitive space, (Krugman 1991). Still this is once again mainly on a macro level, or at best strategic management level. The micro economic understanding for how location affects customer utility in general and how it affects the utility of an information good in particular, is not well explored.

3.4.2 Mobile Internet and Location

Instead of focusing on how location affects customer demand, which would help the understanding of the mobile information industry, Kellerman (2000) goes the other way and tries to

explain information production. Kellerman (2000) observes that the production of information for the Internet is extremely location dependent. Production of information goods, according to Zaheer and Manrakhan (2001), seems to comply with Porter's (1990) framework of competitive advantages of regions. Internet companies still see advantages in being located in, New York, San Francisco, Munich and Stockholm since they gain from clustering. Despite the higher salaries and office rents and despite that they from a delivery perspective could sit wherever in the world, the clustering advantages are higher (Koski et al. 2002). The clustering leads to a successful balance between localized sources of interaction and those residing at wider geographic areas (Nachum and Keeble 2003). Power (2002) even clams that the spatial dynamics of a cluster may be the key to the development of cultural industries' competences and success.

According to Kellerman (2000) marketing and urban geography notions such as "service areas", "catchment areas", "influence areas", etc, relating to the location of customers vis-à-vis a stores or service providers disappeared with the access to electronic information from the Internet. Considering the amount of sales over the Internet today, that was probably a premature conclusion. The fact that the customer's relative position to a brick and mortar distribution outlet decreases in importance only broadens the meaning of these aspects so that the customer also takes virtual locations into consideration.

Kolko (2002) basically agree with Kellerman (2000) but recognizes the importance of the web-based location. According to Singh and Kundu (2002) the web can be divided into three different areas: The center of the Internet, the ways leading to the center, and the outback. The center of the Internet consists of those pages which several other links to. The ways to the center have links to the center but no links back from the center and the outback has neither links to, nor from the center. The reason why this "location" becomes comparable to the physical location of a store is that search engines, for example google.com, uses a page ranking to determine how high up a certain company should be presented on their search list or if it knows about it at all. Having the highest page rank means that you are presented first in a list of pages about the search criteria. Page rank, easy URL, links, and a few other aspects are the Internet counterparts to A-locations in cities.

Internet is also seen by Cristiansen & Tedlow (2000) to weaken the importance of location. They even claim that Internet negates the importance of location.

At the same time practitioners claim the opposite, that location based services will be the killer application of Internet (Ulmer 2001). Focus-group research carried out by Nokia found for

example, in opposition to ordinary Internet commerce, that "users expect purchases on mobile devices to depend on where they are, rather than the desire to buy a particular item" Economist (2001b). According to Moeslein and Piller (2001 p. 2) "business 'any time & any place' often seems to be the logical consequence", when it is possible. There is a need of a demand focus rather than only a supply focus when investigating the customer value of mobile Internet.

3.4.3 Cost of Location

In the marketing literature, one of the best-known theories dealing with location is Kotler's Marketing mix; see for example Kotler et al. (1999). Place in Kotler's marketing mix, is however not what we normally refer to as a location but rather focused on the marketing channels. From a material supply point of view the importance of having the right goods, on the right time, at the right place, is a determinant for an effective logistics chain. It is in this case also often possible to both foresee demand and exact usage of the good supplied.

In customer retail location-related questions have also been concerned about catchment areas, i.e. estimated geographic size of the immediate market, in-store layouts, cost efficiency as well as building an augmented product with the help of distribution channels, for example exclusive outlets etc. This process is also something that the company can control. How, where, and when the customer is using his painting, TV, lamp, or any other physical good, the manufacturer cannot completely foresee and he cannot change the product afterwards if it wasn't used as expected. Partly for this reason the available literature covers the area useful to the manufacturer and retailer.

If the product is an information good, and the interface between customer and company is a cellular device with a return channel, for example a mobile phone, the company can, at least technically, have full control of where the customer is and at which time he is using a service. Also the company can keep information of the past behavior of the customer. That helps when one wants to study customer behavior and to estimate customer value of a service, but it is very difficult to make it into a general customer behavior model.

It is harder to make a useful theory about how customer value depends on location, than a theory dealing only with time, since there are so many more aspects that need to be taken into account. An hour is always an hour. Noon is always at daytime. Home on the other hand, can be something very different, 100 meters to the left changes with the object and also depends on where he is looking. A detailed theory for how every single person values every different place will not be possible to make in the foreseeable future, - if ever.

Unfortunately it must be concluded that until now there is no useful model that is able to predict customer choices in the mobile information industry depending on customer location. Neither the "cost" nor the "benefit" of a location can be estimated. A general cost or benefit of a location can therefore not be derived solely from prior studies in these areas. Given the importance of time and location for the utility of the mobile information industry it is possible that an even greater change of how we value location is ahead of us.

Due to this it is necessary to start developing a theory that at least says something about location-dependent services and introduces demand-side focus alongside the supply side focus of many other scholars. The knowledge about the customers' location and the time of the day will in the mobile information industry change focus from point of sale, to point of use for the good.[22]

Unfortunately it will take a long time before we can better understand customers at their point of use. Or as Stigler and Becker (1976, p76) stated it; "What we assert is not that we are clever enough to make illuminating applications of utility-maximizing theory to all important phenomena – not even our entire generation of economists is clever enough to do that."

3.5 Customers' Choices

Recent research on customer-value is based on the concept of trade-off. It is however derived from the economic theory of utility (Payne and Holt 2001). The utility theory has a long tradition. According to Schumpeter (1908 p. 219)[23] "we know very little about our utility curves, and are forced to make assumptions about their shape." In a note to this quote, Schumpeter writes "A most interesting assumption would be that, at a given time and in a given place, individual utility curves for each commodity do not differ very much from each other".

Schumpeter (1908) continues also with stressing that the utility curves are always individual. It does not make much sense to talk about a community's utility curves, since communities cannot feel needs and wants. Only individuals can do that. The form of the individual utility curves on the other hand are very much dependent on the society in which the person lives. Many attempts have been made to exactly measure this marginal utility, however none have been very successful (Vickrey 1945).

[22] Similarly in the future, the mood of the consumer might create a similar change.

Related to utility theory is customer decision behavior. According to classical decision theory one can predict the behavior of any human, when the environment, that is time and location as well as individual background, is fully known by assuming perfect rationality. If uncertainty or imperfect competition is introduced, the classical theory unfortunately fails. Since uncertainties about customer behavior and rationality can, and will, affect the industry it is useful to very briefly review the way we make decisions. The dominant perspective has changed from economic man, to bounded rationality (Simon 1979) and is, about to change to also account for decision-makers "arational [sic!], pleasure-seeking estheticism" (Hirschman and Holbrook 1986 p. 214).

The neoclassical approach of treating customers as rational economic subjects has many opponents. Akerlof & Yellen (1985) claims that approximations of rational human behavior in economic theories are useful when transaction costs are low. When they are not, also second order deviations from rational behavior can lead to larger, first order changes of market equilibrium, and thereby changes in profitability of the participating companies relying on the approximations. Transaction costs theory will therefore be reviewed in chapter 5.

According to Simon (1993 p. 156) customers aren't rational in the neoclassical view, but instead humans have "the tendency to depend on suggestions, recommendations, persuasion, and information obtained through social channels as a major basis for choice." This behavior is also rational, since the information we obtain from our social contacts is far better than what we can find out individually, or even with the help of search engines or commercial information.

Decision-making is according to Garvin & Roberto (2001) not an event before a decision, but rather a process. The processes are shorter when the decision has less importance, that is, when options and risks are limited, and longer when the stakes are higher. Customers are constantly solving a dynamic stochastic optimization problem according to Allen & Caroll (2001), shall I spend the money now or save it for a better offer that may, or may not, come? With non-complete information, or when information is totally unavailable, people react differently in different situations. Some make an immediate decision while others prefer to wait.

In addition to the claim that customers search information until the expected marginal cost of information is higher than the marginal value of additional information (Stigler 1961), there are also those who claim that we base our decisions with much less calculative efforts, mainly on grounds that customers are not capable to compute such complicated tasks, Thaler (1994).

[23] From an electronic reprint, original could be page 220 or 221 as well.

Simon (1979) stresses that people choose solutions sufficient to the situational needs rather than optimal ones.

We are in our decision-making, as mentioned by Becker (1996), formed both by social aspects and our history. Charness and Rabin (2002) noticed that in constructed games subjects were more concerned with increasing social welfare than always maximizing personal utility. From birth, we constantly develop our decision-making. We learn more and more, develop expertise in important or unimportant areas. Therefore, according to Becker (1996), customer choices dependent mainly on past experiences and social forces.

Kotler (2001) claims that customers will estimate "which offer will deliver the most value" (Kotler 2001 p. 19) and choose accordingly, and that customers are value-maximizers within the bounds of search costs due to limited knowledge, mobility and income. It is evident that any exact prediction of human economic behavior is presently impossible, but models can help us understand customer decision-making (Kotler et al. 1999 p. 230).

Behavioral decisions can according to Jaccard and Wood (1986) be classified into three different types: *Impulsive decisions* are those that mainly depend on impulsive or emotional reactions without reflections. *Routine decisions* are decisions in familiar situations depending on habits, customs or moral/social rules. *Thoughtful decisions* are made after evaluation of alternative courses and consequences of each action. Kahneman et al. (1997) differentiate also on the utility that a customer get depending on it was achieved. "Decision utility" is the weight of the outcome of a decision and "experienced utility" is the hedonic experience.

We make decisions all the time, and we aren't aware of most of them. Before crossing a street, I decide to look to the left and I start walking only if there are no cars. In a place like London everything is different. There, I become aware of the fact that I am making decisions. Decisions, which I used to make without thinking, are then made deliberately. Lawrence (1999 p. 1) distinguishes here between decisions and decision problems. It seems that not only which decisions people make, but also the decision pattern can be dependent on time and location.

3.6 Customer Value

> *"Marketing is an approach to producing desired responses in another party that lays midway between coercion on the one hand and brainwashing on the other". (Kotler 1972)*

"The core concern of marketing … is offering of values. The marketer is attempting to get value from the market through offering value to it." (Kotler 1972 p. 50). It will be argued that creation of customer value has not yet been explored in the mobile information industry in a convincing way. Increased knowledge about customer value creation in the mobile information industry can lead to better predictions about new goods' chances of being successful.

Below a review of different types of value is being done. Based on this is it is possible to suggest a framework on how customer value is created in the mobile information industry.

3.6.1 Key Influences

According to Payne and Holt (2001) it is possible to separate the marketing literature about value in nine separate fields. It indicates broadly a chronological representation however some streams overlap and may even compete. Payne and Holt (2001) cluster these nine fields into Key Influences, Recent Perspectives and Newer Developments. Additionally, a fourth group called "Industry Specific" have been added, to depict that it is necessary to use influences from most of its predecessors to understand value creation in the mobile information industry, see figure 27 below.

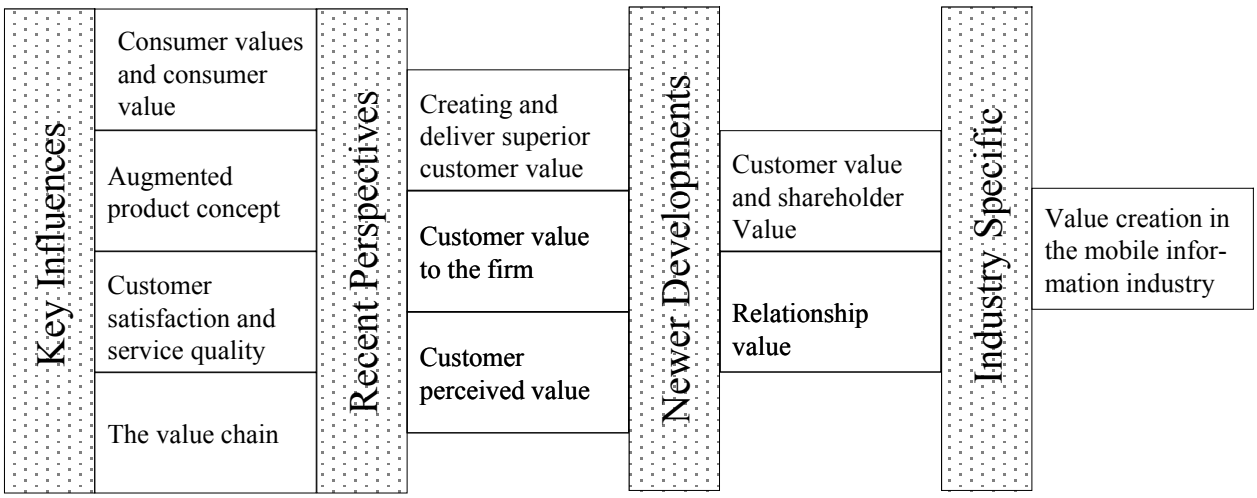

Figure 27: Development of the value concept (Based on Payne and Holt 2001).

The following chapters mainly deal with the key influencers but also what Payne and Holt (2001) call "Recent Perspective" and "Newer Developments" will be covered.

Consumer Values and Consumer Value

Holbrook (1999), a representative for the "Consumer Values and Consumer Value" direction identifies three continuums in which customer value is created. On these three continuums cus-

tomer value of opposite kind rests, and thus forming a three dimensional cube. The axes Extrinsic↔Intrinsic, Active↔Reactive, and Self-oriented↔Other-oriented defines the space. From this space Holbrook (1999) identifies the basic customer values in accordance with the table below.

		Extrinsic	*Intrinsic*
Self-oriented	Active	EFFICIENCY (Output/input, Convenience)	PLAY (Fun)
	Reactive	EXCELLENCE (Quality)	AESTHETICS (Beauty)
Other-oriented	Active	STATUS (Success, impression, management)	ETHICS (Virtue, Justice, Morality)
	Reactive	ESTEEM (Reputation, Materialism, Possessions)	SPIRITUALITY (Faith, Ecstasy, sacredness, Magic)

Table 2: Typology of customer value. (Source: Holbrook 1999)

According to Holbrook (1999) all kind of customer value can be expressed in these terms.

Implicit in many definition of value are also the concept of value-in-use (Payne and Holt 2001, Bowman and Ambrosini 2000). Value is not transferred to the customer at point-of-sales but rather at point of consumption or point of appreciation (Holbrook 1994). One can here differentiate between value-in-use, and value-of-possession.

More practically oriented is Zeithaml (1988) who rather than seeking to describe value subjectively argue that value is:

- Low price
- Whatever I want in a product
- The quality I get for the price I pay
- What I get for what I give

She argues further that Customer Value is "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given" (Zeithaml 1998 p. 14).

Augmented Product Concept

Closely related to customer value at the point of appreciation is the literature about the Augmented Product Concept. It divides the product in its parts depending on how it delivers cus-

tomer value. The core product is the bearer of the problem solving capability or the core benefit. In a camera it would be the ability to create a picture of a special moment. The actual product, which is what the customer is really buying, consists of the core product plus all styling, features, quality and brand name. It is the tangible good. The augmented product is the, mainly, non-tangible factors around the product such as customer service, warranties, distribution etc. (Kotler et al. 1999).

When the logistic chain is as part of the *augmented* product for physical goods, for mobile information goods the distribution becomes an *integrated* part of the actual product. A connected network of producers, complements, and users increase the value of the stand-alone product (Frels et al. 2003). The total customer value of a mobile information good becomes dependent on the mobile network, the terminal, the amount of other alternative information goods the customer can access, and of course the reliability and quality of all parts.

Customer Satisfaction and Service Quality

"Customer satisfaction is essentially a response to an evaluation of perceived product or service performance" (Flint et al. 1997 p. 172). The "customer satisfaction and service quality literature tries in often to measure and quantify this satisfaction. Attempts to improve quality and use this in marketing and have lead to organization apply for quality awards from associations dealing only with quality aspects, for example the Malcolm Baldrige national quality award, in the U.S., and the European quality award in Europe.

Similarly indexes concerned about measurable differenceses between goods have been introduced. Most influential are according to Payne and Holt (2001) SERVQUAL and PIMS.

Value chain

One of the best spread models of company value creation is the value chain. According to Porter, (1985, 1990, 2001,) the value chain logic, with its ability to create value through the set of activities inside the company and between different companies delivering parts of the final good to its customers, is valid in all industries. Porter even claims that "the basic tool for understanding the influence of information technology on companies is the value chain", Porter (2001 p. 74).

Stabell & Fjeldstad (1998) argue that the value chain is only one way to describe the customer value created. The other ways are value shops and value networks.

A value shop, according to Stabell & Fjeldstad (1998), does not have several long linked activities like the value chain. Instead it is focused only on resolving a particular problem, relying heavily on knowledge and technology. Professional firms in law, medicine and engineering are examples of firms, which can be modeled as value shops. Here the flow of goods is not linear, and value is not added in each activity. Instead, the value shop has cyclical, interactive and interruptible activities that hopefully lead to a satisfied customer in the end.

A common characteristic among doctors, consultants, lawyers and other companies that could be modeled as value shops, is the information asymmetry between customer and company. Often a classical principal-agent relationship problem has to be managed in the value shops. It's not rare that companies that can be modeled as value shops also have to deal with the information paradox, the customer does not know the result in advance, and when he has the result, it is often not possible to reclaim the money or change the service. When there is a chance to obtain extra information from a trusted third party this seem to effect demand positively (Jin and Leslie 2003).

The value networks facilitate a network relationship between their customers using a mediating technology or process. The customers as such are independent from each other and the network takes responsibility for the service. Typical examples of companies that can be modeled as value networks, are postal services and telephone operators but also banks and insurance companies. These companies all facilitate the “exchange relationships among customers distributed in time and space” (Stabell & Fjeldstad 1998 p. 427), either directly, as is the case for the operators, or indirectly as a bank, which provides lending and deposit services. The customer value of a value network is often dependent on positive demand side economies of scale. (For an explanation of network externalities and demand side economies of scale see for example: Katz and Shapiro 1985, Or Shapiro and Varian 1999)

In a value chain, inbound logistics, operations, marketing and sales, outbound logistics and service are the primary activities. For the value shop it is instead problem finding and acquisition of resources, problem solving, execution of the solution, and control and evaluation (Stabell and Fjeldstad 1998). It is harder to systematically decrease the costs for these activities since they are less structured and harder to automate. It is therefore difficult to apply a cost leadership strategy if you have a business that can be modeled as a value shop.

The primary activities in the value network are once again completely different from the two other sorts of companies. Network promotion becomes important since there are demand side economies of scale therefore increase of the customer base needs attention. Stabell and Fjeld-

stad (1998) also mention contract management, service provisioning and network infrastructure operations as important activities.

Jutla et al. (2001) claim that that the Internet value chain is generally about to evolve into a value web. Hermann et al. (2000) found that many technology startups, also in the Internet business, could be modeled as value shops. The problem when it comes to the mobile information industry is that there are companies that fit into all three models above. Even worse, several firms cannot be categorized in just one model, but fall into two or three of the models at the same time. That makes it harder to analyze the mobile information industry as one entity, since the different types of companies have different types of primary activities that create value.

3.6.2 Recent Perspectives

The literature area "creating and delivering superior customer value" focuses not only on customer value as such, but is also the linkage between existing value discussions and organizational profitability, performance and competitive advantage (Payne and Holt 2001, Woodruff 1997). Therefore many of the influences come from the market-orientation strategy literature.

In the research stream "customer's value to the firm" the focus is not to produce value to the customer, but rather the customer is an input of value to the firm. Firms allocate their limited recourses between two fundamental processes; creating value and appropriating value (Mizik and Jacobson 2003). First, firms produce value through innovation, production and product delivery, and then they try to recapture some of the value it has created from the market.

An important distinction is the difference between use-value and exchange-value. Every customer subjectively assesses use-value. Exchange-value is only realized at the point of sales (Bowman and Ambrosini 2000). It is the exchange value that transfers a company's produced customer value into value-to-the-firm and shareholder value.

A key concept is the Customer Lifetime Value[24] (CLV). Based on CLV there have been studies on customer retention (Verhoef 2003, Reinartz and Kumar 2003). These studies have emphasized the importance of customer segmentation and minimizing churn. It has also been suggested to use changes in CLV to measure effects of different marketing campaigns ranging

[24] Also called Customer Portfolio Lifetime Value, CPLV (Johnson and Selnes 2004) and Profitabble Lifetime Duration (Reinartz and Kumar 2003).

from advertising (Reinartz and Kumar 2003) to loyalty programs (Rust et al. 2004, Verhoef 2003).

"Customer-perceived value" is the logical prolongation of "consumer values and consumer value". Having said that value is individual and situational-dependent, the move from objective value to subjective is natural. Customer value becomes a customer's perceived net tradeoff received from all relevant benefits and costs (sacrifices) delivered by a good and its use (Flint and Woodruff 2001). That is, when acquiring a good a customer has different sacrifices, may be price, transportation costs, time, learning costs etc.

Customer value Perceptions are about…	Customer Value Perceived at the time of.. Purchase	Use
Imagined Ideal	Desired Value 1	Desired Value 2
Actual Experience	Predicted Received Value	Perceived Received Value

Table 3 Customer Value Before and After Purchase. (Source: Woodruff 1997b)

For a customer the value experienced is according to Woodruff (1997b) often not the same as predicted before purchase, and not the same as imagined. Flint and Woodruff (2001) also continue on this argumentation when they differentiate between received value (the value customers actually experienced through specific product–customer interactions) and desired values, which refers to the value that customers want to receive from products/services and their providers. Kahneman et al. (1997) differentiate between what you know before a decision and what is known after the decision in analogy with Woodruff (1997b). Interesting is that our subjective expectations seem to be at least as important as the objective fulfillment (Easterlin 2001) when it comes to satisfaction from a good.

The conclusion from the famous quote, (Simon 1997 in Shapiro and Varian 1999 p. 6) "A wealth of information creates a poverty of attention", is that customers not only are overwhelmed by the information noise, but that increasingly there will be search costs as well.

Therefore, according to Glaser (1999), customers' behaviors in information markets are based on twin expectations: Freedom of choice and help in making these choices.

If a person searches for an item to purchase, the items found are by most search engines according to Milutinovic et al. (2001) ranked by the amount of keywords matched. However, this is not the only issue, and definitely not the most important aspect for a potential customer. Although Milutinovic et al. (2001) are not correct regarding search engine functionality they are correct in noticing that it may be more important how satisfied other customers are with purchasing from the a certain web site, or how useful that site would be to satisfy a certain customer demand.

3.6.3 Newer Developments.

"Customer value and shareholder value" is very much related to prior research streams. It combines the wish to measure value delivered with financial performance. EVA (Economic Value Added and SVA (Shareholder Value Added) are arguably the most well known.

The connection between customer value and shareholder value is not entirely clear. Perissinotto (2003 p. 495) claims that "creating shareholder value is strictly linked with creating customer value". Woodruff and Flint (2003) are considerably more careful and point out that attaining shareholder value through customer value strategies requires committing major management attention to how to best create, deliver, and communicate superior value to targeted customers. According to Payne and Holt (2001) there is even a trade-off between delivering value and appropriating value from the market. Therefore there is also often a tradeoff between creating customer value and shareholder value. Short term cutting down customer service can lead to less costs and increased shareholder value, long term it may create higher churn and decreased shareholder value. Lowering employees' salaries could have a similar effect.

Several studies on CLV are according to Reinartz and Kumar (2003) limited since it is impossible to track customer purchase history. Within the mobile information industry it is at least for the mobile operator easy to track all activities opening up the possibility to make interesting relationship marketing. Customizations of products can for example form the cornerstone of enduring customer relationships (Ansari and Mela 2003).

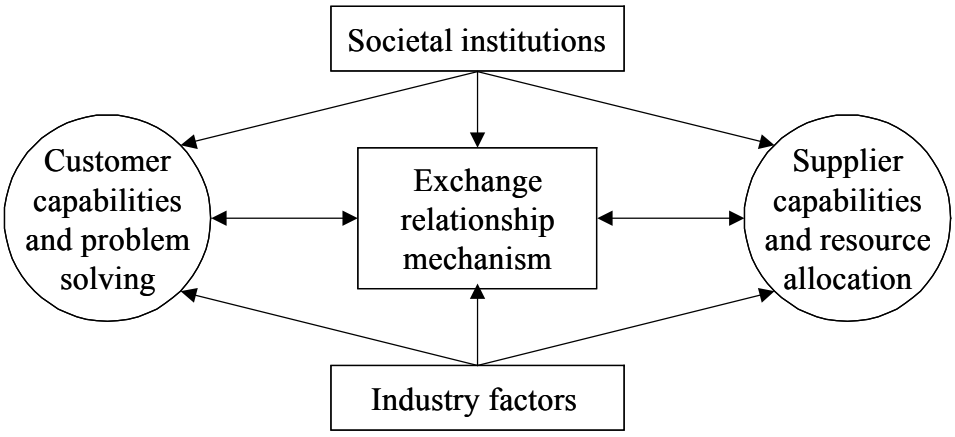

Figure 28: Exchange relationship framework (Source: Johnson and Selnes 2004)

Whereas Johnson and Selnes (2004) emphasize the importance of the relationships and shows that these are an important part in creating value, Payne and Holt (2001) instead try to explain how the many different relations affect the value created.

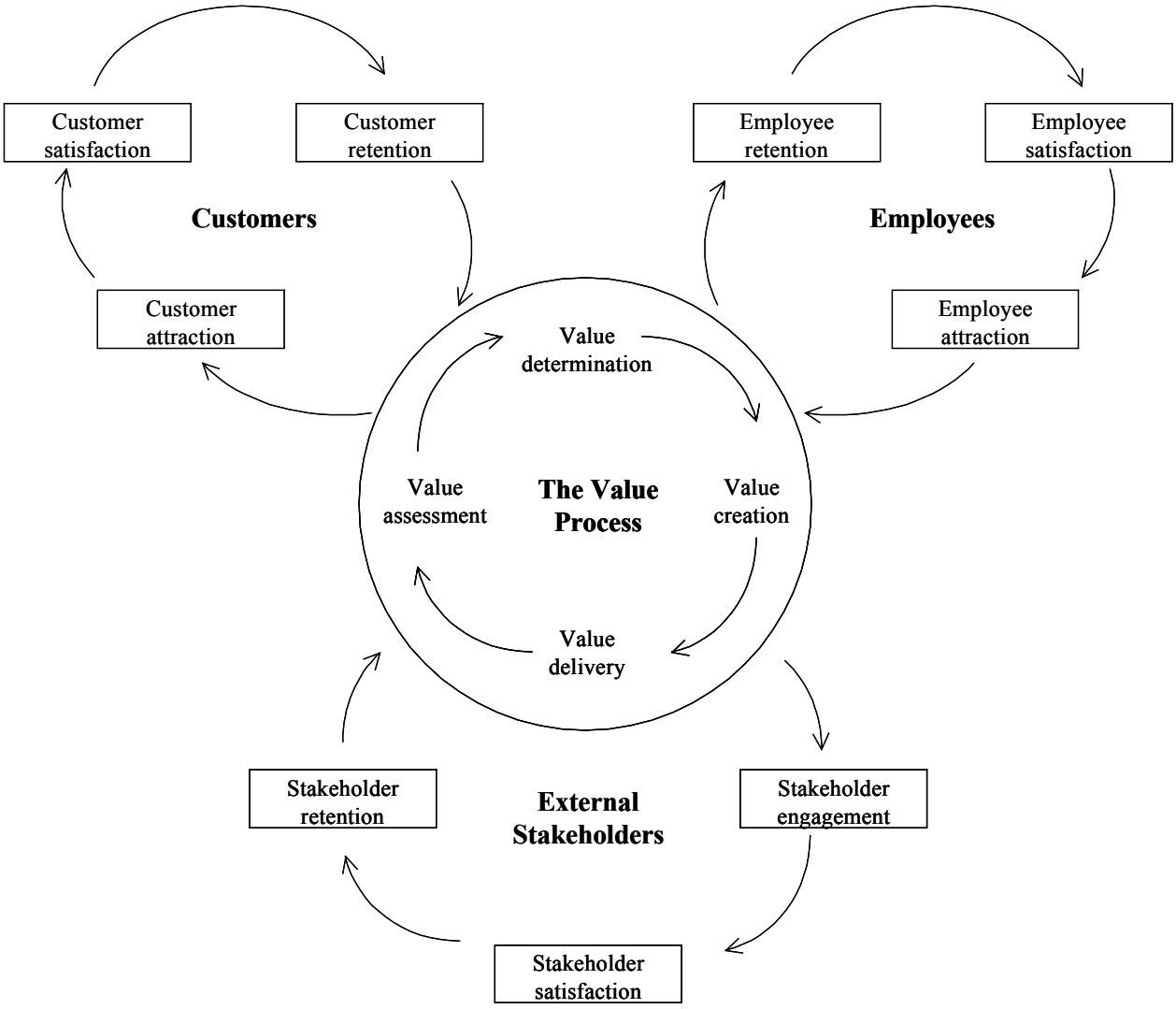

Figure 29 A framework for relationship value management (Source: Payne and Holt 2001)

One could say that Figure 28 emphasizes the relation and figure 29 the value creation from a company's perspective. To understand the mobile information industry it is important to also be able to depict this relationship from a customer's point of view.

3.6.4 Industry Specific Value Creation

The idea of creating a special value chain for the Mobile information industry is not new. Many different value chains have been proposed and promoted for information goods (see for example Benjamin and Wigand 1995, Achleitner et al. 1997, Maitland et al. 2002, Sabat 2003, Ovum 2001, Yankee Group 2001, and Strategy Analytics 2001). Basically all of these value chains represent a mix of activities and goods you need to produce an information good, instead of being a linear chain of connected activities that are adding customer value.

Most of these value chains from scholars or research institutes have at best only limited value in explaining customer value creation in the information industry. In the worst case they even distract practitioners from the real structure.

There are good reasons why there are so many different attempts to present information good value chains. In the printing industry, for example, it is possible to bypass certain steps (e.g. typesetting and proof-reading) and to make endless iterations on other steps (e.g. peer review and updating or redrafting of material). A mobile service could be accessed by surfing to it via several different pages and search engines, but the final customer value of the good show usually no path dependencies. If there are path dependencies they are often only negatively correlated with the search time.

Information technology has made the information chain more flexible and less linear. The traditional distinctions of the old value chain are blurred in the information industry, according to Mastroddi (1996). The total customer value of for example a shirt is usually not dependent on the amount of different logistics steps but much so of the outlet itself. An up-market distribution, ad customer value to the augmented product of the shirt and/or to its brand. The amount of iterations adds to the search costs, whereas a good terminal that enables the customer to access the service optimally supported by a delivery network can improve the overall value of the good itself.

Spotorno and Syritellis (2002) claim to present a “value web”, but present a mainly linear value chain, based on knowledge and abilities, that makes sense also for information products. According to Spotorno and Syritellis (2002), increased value for the user follows a chain that starts with “technology”, and via “application” and “services” reaches the consumer, see picture 30 below.

- **Technology:** Providers of the technology to implement services and applications. Examples are network equipment suppliers, handset manufacturers and application platform builders.
- **Applications:** Software developers making the service possible, such as application providers, application developers, and content providers.
- **Services:** Delivering the service to end-users, such as MNOs (Mobile Network Operators), MVNOs (Mobile Virtual Network Operators) and portals.

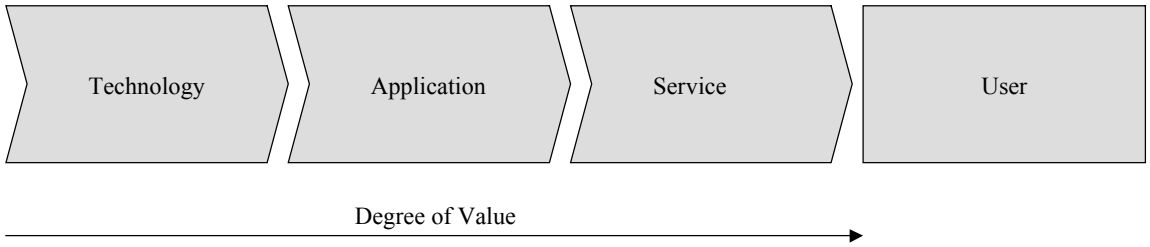

Figure 30: The value chain, from technology to the user (Source: Spotorno and Syritellis 2002).

Inside the three core building blocks, technology, application, and service, Spotorno and Syritellis (2002) present some interlinking between different players in the industry, creating what at first glance seems to cover most of the important players, but displaying the same weakness as most other linear value chains, it does not differentiate between the possibility to exclude steps or iterate the same step several times. Very similar is Sabat's (2003) value chain.

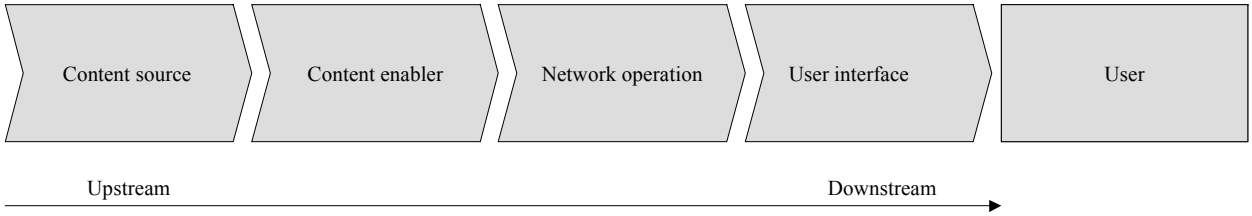

Figure 31: The value chain, from content to the user (Source: Sabat 2003).

Sabat (2003) focuses on activities that can be separated and coordinated by market mechanisms, but he separates them differently. Interesting to notice is that Spotorno and Syritellis (2002) have content/service at the end of the value chain and Sabat (2003) starts with it although he calls it "upstream". Other authors have also placed the production of "Content" in the middle of a nine-step value chain (Maitland et. al. 2002), where content development is considered an enabler.

Clearly "the evolution of the mobile wireless value chain and market structure has outpaced the research" (Sabat 2003 p. 506). Some of the authors suggesting different value chains with spread activities should remember DiVanna's (2003) simple explanation of the value chain: It is about buying stuff, doing something with it and then distributing it for a higher price.

A mobile information value web would, according to Durlacher (2001), be centered on the enabling technologies and reaching the customers via their terminals. Before an information good reaches the customer it can according to the model iterate among, and/or surpass most players in the industry.

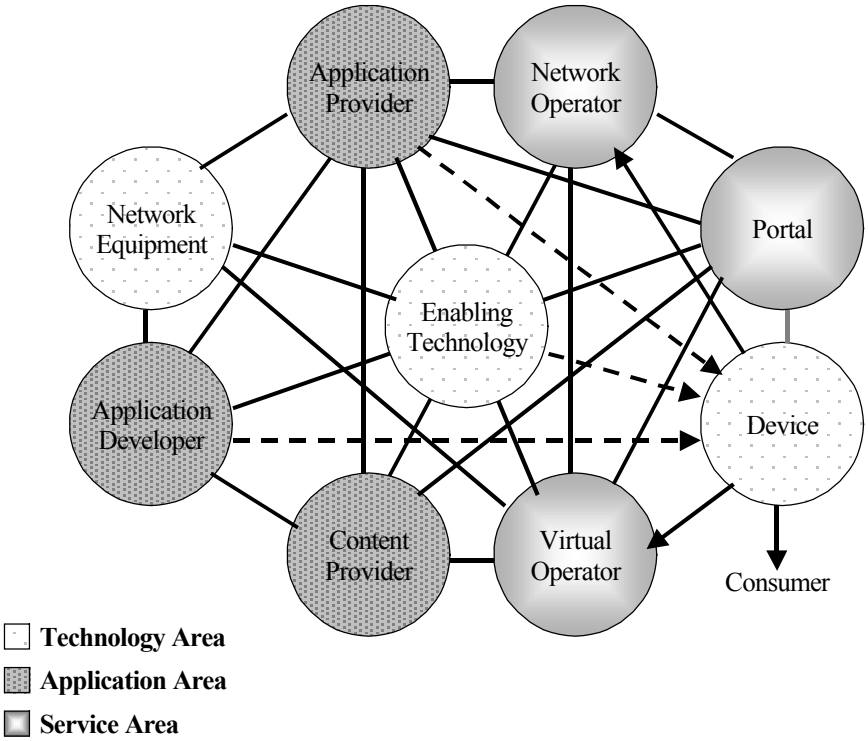

Figure 32: Mobile data value web: mobile devices. (Source: Durlacher Research Ltd./EQVITEC Partners Oy 2001).

Stoetzer and Mahler (1995) take a similar network approach. They focus on the many players involved in order to reach critical mass in the mobile information industry. It is only when all nodes in such a web are filled with enough players that it is possible to create enough customer value and the system becomes self-financing.

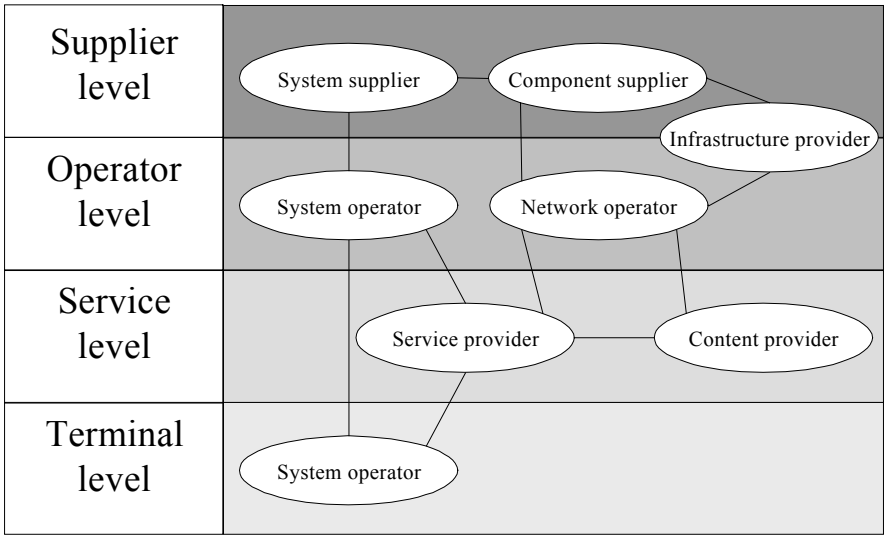

Figure 33: Multi-dimensionality to reach critical mass (Source: Stoetzer and Mahler 1995).

Combining Durlacher's (2001) and Stoetzer and Mahler's (1995) webs and Spotorno and Syritellis (2002) value chain we get a pyramid explaining why the mobile information industry so often is technology driven rather than market driven.

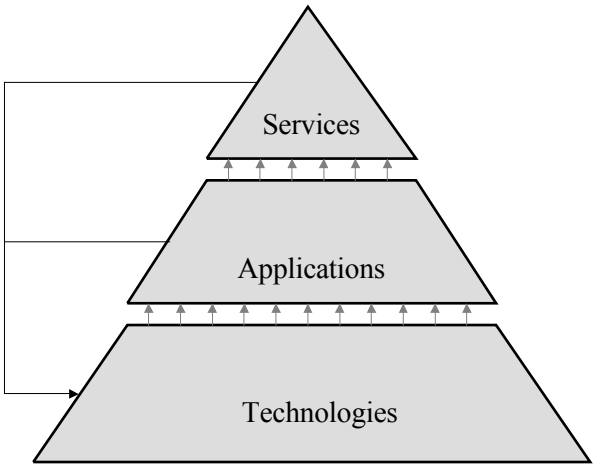

Figure 34: Technologies make applications possible. Applications make services possible. Ideally there is a feedback loop.

Services are dependent on existing applications and technologies. Since the companies developing the basic technologies often are different from the ones developing services, the feedback loop often takes time and there is a need for trial and error both on the technological side (what can we do?) and marketing side (does anyone demand what we created). In practice a service provider also needs to, in accordance with Stoetzer and Mahler (1995), try to "invent around" shortcomings of other participants in the value net to create a critical mass.

The discussion above is still very much focused on technologies. Customer value of a piece of music does not directly depend on which format it is saved in. Compressed or not compressed is unimportant as long as it sounds good, and is a good song. Similarly, there are no path dependencies. The lead does not get better or worse depending on whether the customer found it on a portal or directly from the service provider, or whether the customer had Vodafone or T-mobile as the mobile service provider. On the other hand the network capabilities affect the customer value all the time. What reach does the network have, what functionality does it have and what costs does the customer have. The network capabilities can decide what additional services are available, from where and when a customer can use them.

Barnes is one of the first to present a value chain where technology is separated from the content production (Barnes 2002). The value chain according to Barnes is divided in one content chain and one infrastructure and service chain. The content chain consists of: content creation,

content packaging and market making. The infrastructure and service chain consists of: "mobile transport", "mobile services & delivery support", and "mobile interface & applications" (Barnes 2002 p. 96). Unfortunately this value chain does not realize that customer value is not linearly created. Barnes (2002 p. 93) claims that "like any product or service, m-commerce involves a number of players in a chain of value adding activities that terminates with the customer". Including development of markup languages in the value chain for m-commerce (Barnes 2002 p. 93) he recognizes the importance of supporting technology but fails to depict this importance correctly.

Relying on what has been presented above about customer value it is possible to develop a framework for how value is produced in the mobile information industry. Creating customer value is an important factor when evaluating companies' abilities to attract customers (for example Hirschman and Holbrook 1986, Sabat 2002, Kotler 2001, Desarbo et al. 2001, Chen and Dubinsky 2003, Frels et al. 2003, Reinartz and Kumar 2003). This customer value depends on different factors. Borrowing from the augmented product discussion, the information good in itself can be seen as the core product. It is the core of the problem solving, or the main benefit for the customer.

Continue with the augmented product allegory. The real product depends on all factors that directly can influence the way the good is perceived and thus customer value. The mobile information counterparts to the real product with its features, functions and design is the good in itself, i.e. the core product, the terminal on which it is accessed and the delivery channel. The good in itself obviously makes a difference compared to a different good. A better terminal may display a good in a more attractive way, improves the handling and/or the sound quality. The delivery channel can speed up access, offer additional functionality, and an improved coverage compared to another delivery option.

With the augmented product it is here meant all the intangible aspects such as warranties and additional services. The augmented product can be extremely important for some goods in creating a full service and less for others. The same is true for the brand name in the original model belonging to the real product. However this is not different to the brick-and-mortar industry. For some parts of the industry brand name is very important, soft drinks and fashion for example, in other less so, transportation and medical treatment. The role of the brand name will also not be much different in the mobile information industry, but given that the actual product is possibly made up of three brands (the information good, the mobile network, and the mobile terminal) it might be slightly more cumbersome to estimate the value of a brand.

In addition to the product itself there is one aspect that directly influences customer value and that is the situational aspect of the customer, which has been mentioned several times before.

In general a customer has a mobile phone subscription with one service provider. This contract usually includes the benefit of using one or perhaps several mobile networks, and it involves certain costs for the customer. To be able to use the mobile network(s) the customer needs an interface, usually a mobile phone. The interfaces can be characterized depending on capabilities, ranging from simple handsets with SMS capability to PDAs and laptops (Tsalgatidou and Pitoura 2001).

The customer handset(s) and available network(s) are for any customer at any one given time and place fixed. The customer has only a limited number of handsets to choose from and also only a limited number of networks. For a large majority of customers, that means one handset, and one network, at a given location and time. On the other hand the customer has access to almost an indefinite number of services that offer some kind of customer value and his personal situation is constantly changing.

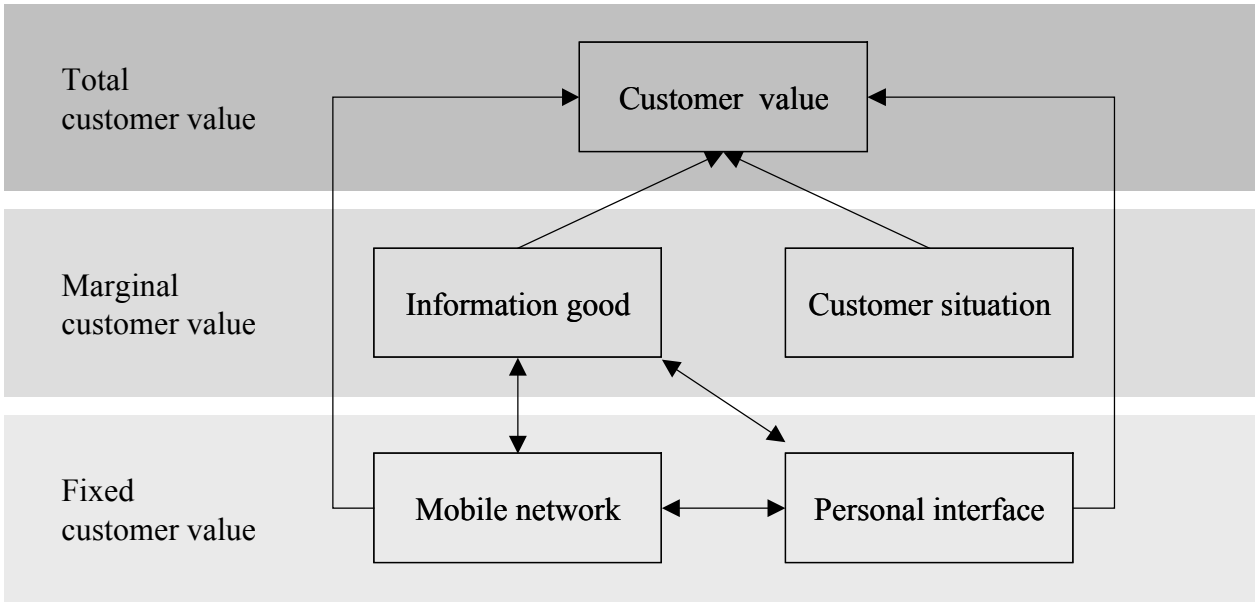

Figure 35: Framework for customer value creation in the mobile information industry.

Customer value depends on two fixed variables, the mobile network and mobile terminal/interface, and two marginal variables, the mobile information good itself and the situation of the customer when realizing his need.

The different value-deciding factors are interrelated and provide also direct customer value. Having the chance to be constantly on-line creates value through transactional immediacy ac-

cording to Dai and Kauffman (2001). According to Sahay and Riley (2003) the choice of standards and interfaces will even decide which kind of information goods will be consumed. This is however a conclusion too drastic since it neglects both the information good and the situational aspects in the value creation.

When investigating why customer changes their mind Flint et al. (1997) differentiate between "change in value judgment" and "change in desired value". Judgment about a good is changes when I value this good in a different way compared to the other goods all other things equal. Change in desired value, is according Flint et al. (1997) triggered by customer location and environment. What here is call customer situational aspects.

The more mobile devices that can connect to a network, the higher is normally the potential value of the same network. The more services that can be used on a mobile device the higher is the customer value for it etc.

3.7 Conclusions and Further Investigation Need

Mobile information goods create customer value through transactional immediacy in addition to the actual service. It is therefore not where, how and when the offer is available for purchase that is interesting to analyze, but rather where, how, and when the customer is using it. This becomes even more interesting when one takes into account that customer value is situational and changing from time to time and between locations.

Information services can be used to save time, to find a location or to get the most out of a location. Information services can also be pure amusement, something that gives the user another kind of customer value. Since the customer is free to use a service independent of where a supplier is located, the focus of an analysis need to be shifted to the demand side.
The demand side has been concentrated around customer value. Based on customer value it is possible to create a framework for how value is being created in the mobile information industry.

Based on this framework, customer value is dependent on two marginal factors the mobile information good and customer situation, as well as two fixed factors, the terminal and the network. These factors will be investigated in the following chapters.

4 Assessing the Market Based on Customer Value

This chapter will present a tool that combines customer value from a good with the customer situation. That reflects the marginal utility from the information good and customer location in the framework presented in chapter 3. This tool can be used to identify substitutes, to estimate the total market size and of course to shed light on where and how customer value is created.

4.1 Forecasting Customers' Choices Based on Customer Value

Niels Bohr, the Danish Nobel laureate, is credited with saying that prediction is not easy, - especially not about the future. According to Cowles et al. (2002 p. 634) "no single Internet strategy is inherently 'good' or 'bad,' 'effective' or 'ineffective'. The ever-growing spectrum of tactics and strategies, made possible by the Internet's unique characteristics and wide range of capabilities, must … support corporate goals and marketing objectives"

When trying to predict customer adoption in the mobile information industry, companies can rely on prior decisions in similar markets or similar products, and thereby estimating customer value of a similar product. When doing so one needs to bear in mind that people normally exaggerate the degree to which their future tastes will resemble their current tastes (Loewnstein et. al. 2003).

4.1.1 Satisfying Consumer Needs

Personal values are the central core enduring beliefs that guide customer behaviors across situations (Flint and Woodruff 2001). Personal values and need will steer the subjective value of a good. Even if there will be exceptions, one can argue that a service, which satisfies needs A and B will in general be more demanded than one, which only satisfies need A, given everything else is the same. For example, if services 1 and 2 equally satisfy a primary need but service 1 also satisfies a secondary need, the total customer value of number 1 is higher than that of number 2.

Maslow (1970) developed the "hierarchy of needs". According to Maslow the needs on a lower level must be completely satisfied before humans start to try to satisfy higher needs. The first hierarchy consisted of five levels with different needs. Physiological -, Safety -, Belongingness and Love -, and Esteem - were the four so called deficit needs. Self-actualization was the top level.

An interesting phenomenon related to Maslow's work is that, in spite of lack of evidence to support his hierarchy (Wahba & Bridgewell 1976), or the fact that there is no apparent hierarchy of human needs at all (Zeleny 1982), it still enjoys wide acceptance. According to Zeleny (1982 p.19) the higher needs are in fact organically enmeshed with the lower. In addition to the need for security, the need for belongingness makes according to Zeleny (1982) people seek and organize groups and common shelter. However according to Shapiro and Varian (1999) much of modern economics still proceeds on the implicit assumption that the main determinants of preferences of customers are the basic biological needs for food, drink, shelter, and some recreation.

The music industry, and other so called cultural industries, have often non-material goods directed to customers for whom they serve as an aesthetic or expressive, rather than a clearly utilitarian function. (Hirch 1972, in Molteni and Ordanini 2003). Utility in the form of money, resources or productivity describes a cultural good poorly. Still a cultural good provides customer value and people have cultural needs.

William James was one of the persons that Maslow greatly admired. Maslow studied him to understand how people that he believed had come furthest behaved in their development. People like James had reached the level that Maslow later would call self-actualization.

James, also a physiologist, wrote long before Maslow about the three levels of "self" (James 1890). According to James (1890) there is a material, - social, - and spiritual self. Roughly, the material self corresponds to Maslow's two lowest levels, the physiological and safety needs, even if it also touches the third level. Social self corresponds to the next two levels, belongingness and esteem. The spiritual self, our feelings of our own subjectivity, fits worse, but can be connected to self-actualization, which was Maslow's highest level in his original hierarchy. Wolfe and Sisodia (2003) reflect on this in their differentiation between the "social you", which, when you get older and seek self-actualization changes to become a "real you", a self-actualized man or woman to whom according to Wolfe and Sisodia (2003) different marketing strategies apply.

4.1.2 Predicting Customers' Basic Decision Making

> *The early versions of most new paradigms are crude.*
> Kuhn (1970 p156)

To be able to predict whether or not customers will use a mobile information good, it is important to be able to describe human basic needs and demands (Kim et al. 2002), to which mobile information can play a role. According to Zeleny (1982 p. 20) "our needs depend on the courses of actions open to us".

Related to using an information service is the information exchange when a customer is customizing a mass customized good. Kurniawan et al. (2003) identify three reasons why it is hard to model customer behavior during the customization of a (physical) good. Customer preferences are:

- Situational and change over time
- Dependent on mood, emotions, and impulsive feelings
- Dependent on aspects such as family influence or social environment

These problems lead to the necessity of capturing and evaluating individual data for each customer, usually with data mining techniques, or one tries to extend marketing theories to this area (Kurniawan et. al 2003). A model or a tool to predict customer behavior must therefore take customer situation into account, as well as being adoptable to social needs and impulsive actions.

Transferring James' "selves" to customer needs is not far fetched. Customers display "spiritual needs and yearnings, just as they exhibit 'worldly' materialism. They possess faith, just as they do reasoning. They are moved by passion just as they are guided by intellect" (Hirschman and Holbrook 1986 p. 216). In short they have material, social and spiritual needs. These needs cover all aspects of life and customer value can occur in any domain of customer behavior, be it economical, social, artistic or spiritual (Wagner 1999). Kim et al. (2002) recognize that experiential, social and functional needs can be satisfied by brick and mortar goods, but here we shall stay with material, social and spiritual needs, which is a broader classification.

Material needs are all the basic needs for safety, functional, material things such as shelter in the form of a house, a possibility to transport things etc. Included in the material need is as well the need of your immediate family such as security. Social needs are all the communication you do with other people and the self-esteem that you require. Spiritual needs are not only religion but instead everything which makes life easier, such as entertainment, literature, knowledge, beauty only for the sake of enjoying it etc., etc.

A nice and expensive car signals wealth and good, or bad taste. People have different tastes and different needs. The "same product or a service can impart different types of value to different perceivers" (Bevan and Murphy 2001). It is therefore from the perspective of the perceiver that one can truly understand what value has been delivered. If a car should be in one, two, or all three of the fields above depends on how the company wants to position the car and how customers perceive it.

After all, a car can with Becker's terminology be seen as a service where the customer uses a market good, the car, adding the input of time to create the customer value of taking the driver from A to B. This is a pure transportation (and perhaps a political statement increasing ones self-esteem within a group), with an old Trabant and something else, and in either case a lot more expensive, with a Porsche. In both cases the car is a part of the social needs rather than only a material thing that provides transportation. Similarly, "By consuming cultural goods, people express who they are and the social group they belong to" (Molteni and Ordanini 2003 p. 391). That means that music for example not necessarily primarily satisfies an aesthetic need but perhaps more a social one.

The possibility of unions of the different sub-sets makes it more useful to predict customer value than the BCG model (Figure 22: M-commerce merge Connectivity, Content and Transaction). A union of two or more needs satisfy more needs and are therefore better all other things the same since total customer value consists of image value, personal value, service value, and product value (Kotler 2001 p. 20).

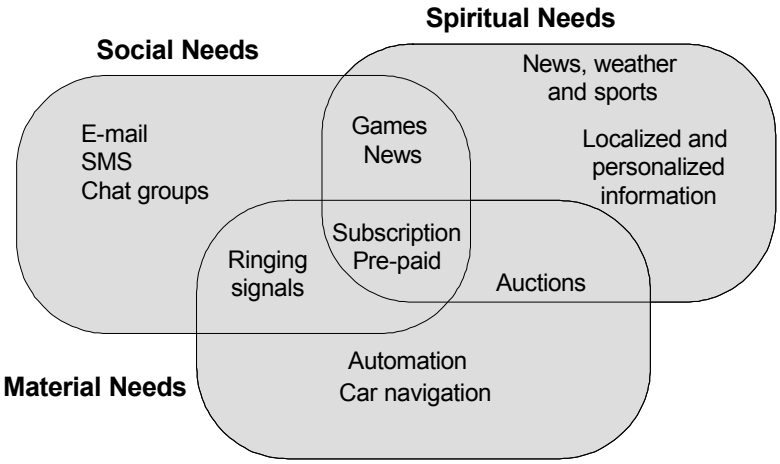

Figure 36: Material, social, and spiritual needs. Information services that possibly could satisfy a certain need are included.

Although many if not most of our actions are determined by our perceived needs, humans also act apart from a priori goals, Zeleny (1982). An option might be taken only because it is there for the moment. Later considerations will decide whether it was a good way of acting. Such "ad-hoc decisions" makes our customer decision model for the mobile information industry complete.

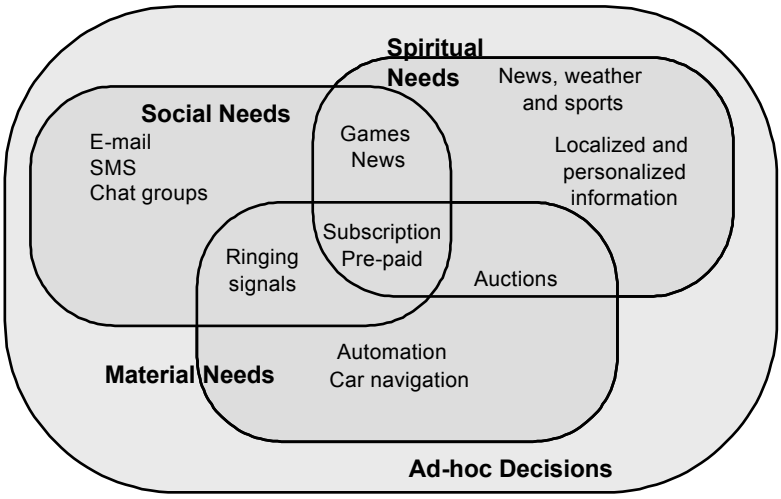

Figure 37: Material, Social, and Spiritual Needs combined with ad-hoc decisions.

The ad-hoc decisions, according to Zeleny (1982), cannot be explained by utility measurements or logical rationalizations. Naturally some customer decisions do primarily fulfill one or two needs, but can still be taken in an ad-hoc way. Allowing for ad-decisions outside the purely utility maximizing fields makes it possible to get around the weaknesses of the neoclassical view on decision making. This way the model also corresponds better to what is being observed in existing information goods.

On the negative side one must conclude that it is very hard, or close to impossible, to draw the boarders. Similarly as one cannot draw a clear boarder whether certain cultural activities fulfill a spiritual or social need ((Molteni and Ordanini 2003). Why should an e-mail be judged as a material and social need whereas a prepaid subscription is additionally put in the spiritual needs. As a tool it becomes much too imprecise and subjective to be really useful to base investment decisions on!

4.2 Using Customer Value to Predict Usage in the Mobile Information Industry

From above we learn that it is possible to, in a crude way, from a customer value perspective, describe customer choices. The general discussion in this and the next sub-chapter will be continued and directed more towards a tool useful in the mobile information industry.

4.2.1 Vertical and Horizontal Product Differentiation

For brick and mortar products with vertical differentiation, all customers have the same ranking of all the different variants of products. One can consider the parameter "quality", in which all agree that higher quality is better and thus the product with the highest quality will be the only one demanded if prices where identical. Information goods often have a horizontal product differentiation, and there is not such a natural ranking of products. Ben Hur is not a better or worse movie than Titanic only because it is longer, nor can one say that quality, theme or another one-dimensional variable differs so that it is classifiable. It is as mentioned earlier that it is objectively not possible to classify many of the goods of the cultural industry. If all products with horizontal differentiation are sold for the same price there can still be demand for each one of them.

The most used models to explain customer demand for horizontal differentiation are the location or Hotelling-type models (Cremer & Thisse 1991). All products are defined by their location in the characteristics space of n dimensions, where n is equal to the amount of possible differentiating factors. Customers rank the products in order of how far away they are from their ideal location in the same imaginary product characteristics space.

Since we cannot foresee what all customers want we need to get around this problem. Suppose that an information product is differentiated horizontally and there are several variants of the good. One way to depict how a product is demanded is to create a similar space, not focusing on product characteristics, but rather on how well the depicted services solve customer needs.

In general customers have material, social and spiritual needs. These needs cover all aspects of live and customer value can occur in any domain of customer behavior, be it economical, social, artistic or spiritual. To shift from describing the industry in "technical" terms, to instead describe it in utility terms makes it possible to develop a crude tool describing customer choices. It allows us to start making predictions about demand of future services. By establishing a Hotelling-type utility space it is possible to differentiate the different services better.

4.2.2 Customer Utility Matrix

If an industry is to grow and prosper it must first be able to deliver customer value that satisfies customer demands. Therefore a "prerequisite for success in online business is an understanding of consumer behaviour" (Koivumäki 2001 p. 186). Manufacturers must also understand users' needs in order to develop successful products, which can satisfy these needs (Von Hippel 2001 p. 2). Expectations, desire of a service and perceived performance are the main determinants of customer satisfaction according to Khalifa and Liu (2002) .

Above customers' needs have been divided into material, social and spiritual needs. That is however too vague to create a space with enough differentiation between products and services, and some products do not solve a need directly but create utility in a way that indirectly solves a need (Holbrook 1999). Products can create customer value by saving time for the user, which roughly corresponds to material needs, or by being exceptionally environmental friendly, which could correspond to spiritual needs, but also beautiful and funny products would be useful to satisfy our spiritual needs.

By dividing the material, social and spiritual needs into categories, which create direct and indirect utility we can describe an information good and compare it with other products on the market and see where this product is strong at creating customer value. We have created a new Hotelling-type model focusing on customer value for the user rather than product characteristics.

Kim and Mauborgne (2000) have created such space in which they call the different aspects of customer value "utility levers". For them a product must create exceptional value in at least one of the following areas to be demanded; environmental friendliness, fun and image, risk, convenience, simplicity or customer productivity.

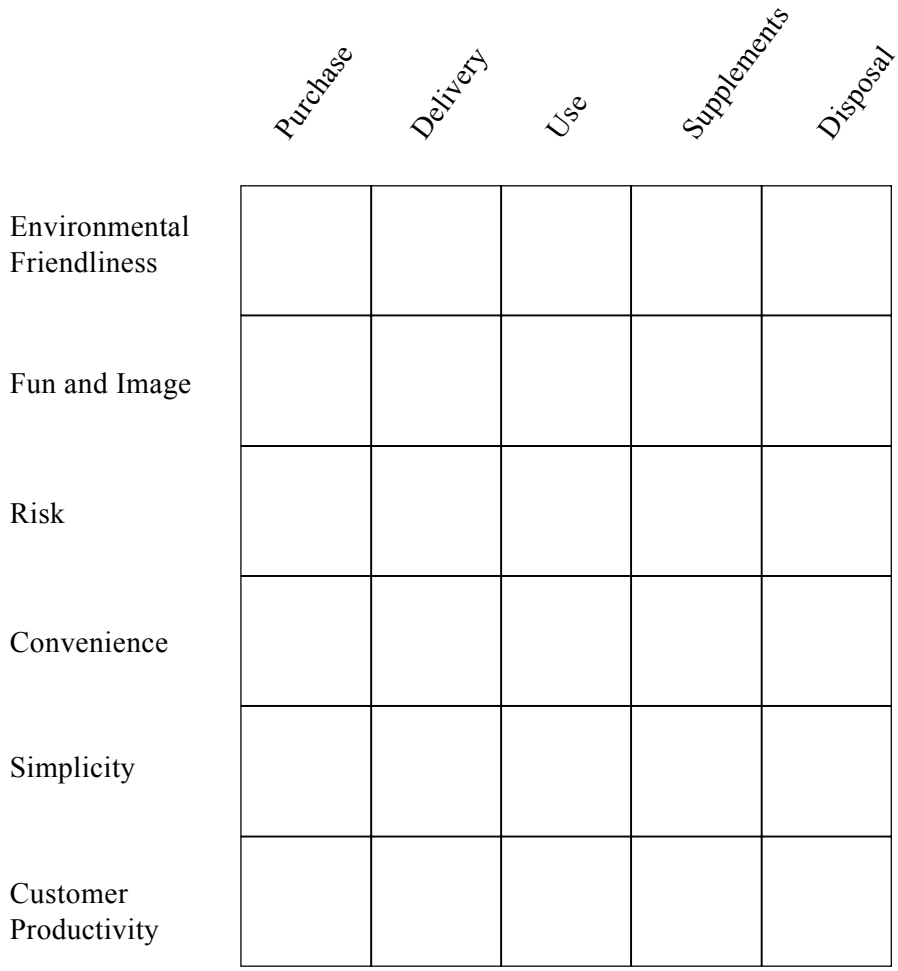

Figure 38: Utility and product life cycle matrix (Source: Kim and Mauborgne 2000).

When Kim and Mauborgne (2000) develop a model for evaluating business ideas, they start with the ability to create customer value. A new product has to offer customers exceptional value at an attractive price (Kim and Mauborgne 2000). At the same time a company must be able to deliver it at a tidy profit. Successful innovators will therefore according to Kim and Mauborgne (2000) try to identify where and how the new product or service will change the life of its customer.

To accomplish this Kim and Mauborgne (2000) create a matrix with the six stages of the buyer experience cycle on one axis and six so called “utility levers” on the other. This five times six matrix allows one to graphically identify where value is being built. It is also possible to identify the competition from inside the industry as well as from alternative substitutes. Often even complex products fill only two or maximum three squares in the matrix of Kim and Mauborgne (2000).

As shown in the picture above the factors put on the horizontal axis by Kim and Mauborgne (2000) are derived from a product's life cycle. In the attempt to cover most products in a brick and mortar world this is necessary, because the product life cycle is for them the smallest common denominator. For mobile information goods this could and should be done more precisely, which is explained in the next sub-chapter.

4.3 Estimating Customer Value in the Mobile Information Industry

Creating a tool to estimate the market starts with recognizing customers' needs and having the satisfaction of these needs as the basis for the industry. The success of an information good depends on whether it better than other media can deliver customer value for a customer in a specific situation (Geer and Gross 2001).

Ahonen and Barret (2002) suggest segmenting users of mobile information services based on customer needs to explain the industry. Companies in the mobile information industry often face more competition from non-industry members than from other services in the same industry. Such segmentation is useful when one tries to compare information goods with different substitutes, which is necessary to estimate the total market. Such segmentation is less useful when estimating how the industry as such will develop. It makes thus sense to do both.

All methods, economical, statistical, or methodological are in the end dependent on the correctness of the available data. This chapter will provide a tool to create data to make a correct evaluation of customer value and size of the market for a mobile information good.

4.3.1 How to Evaluate Mobile Business Ideas

Several authors identify three or more success factors, which they claim can describe the likelihood of being successful. According to Ahonen and Barret (2001 p. 41) a service needs to meet all the five so-called "M:s" to have "any chance of becoming an early adopted service for the mass market". These five M:s Ahonen and Barret (2001 p. 41) define as:

- Movement: Escaping place (local home-base, mobile)
- Moment: Expanding time (Multitask, plan postpone, stretch, fill, catch up, real-time)
- Me: Extending me (Personal relevant customized community, permission language, multi-session.
- Money: Expanding financial resources, m-commerce, micro payments, m-banking trusted partner etc.

- Machines: Empowering devices (telematics, machines, appliances, robots, metering devices, remote monitoring cameras, connecting with any conceivable machine

Similarly Geer and Gross (2001) claim that the mobile phone is the better alternative to receive information services:

- For time critical activities.
- For receiving local information, through the ability to make a localization of the handset and adopt the information accordingly.
- For functions that could be technically integrated in the mobile terminal, but before were performed with other equipment (e.g. digital ID cards and payments).
- Integration of processes where prior to the mobile phone several different interfaces were needed.

In the "now" economy, which Jutla et al. (2001) call the electronic information industry, they claim that knowledge, trust, technology, and the relationships among stakeholders are the keys to success. Geer and Gross (2001) also identify a few factors, which will decide customer value for mobile services. These factors are first of all price, communication technology, and ease of use.

It is questionable if one at all could claim that three, or more factors similar to the ones mentioned above can explain such a diverse industry. It is even questionable if the remarks above are generally true. Clement (2002 p. 43) goes to the other extreme when claiming that due to the diversity and vague borders of the mobile information industry, it is not possible to predict anything regarding business models but instead we will be limited only to "best practice" reports.

4.3.2 Customer Value of a Mobile Information Good

It is possible to make a finer segmentation based on customer value than shown before. However, the utility based and ad-hoc decision tool from above can help us to realize this goal.

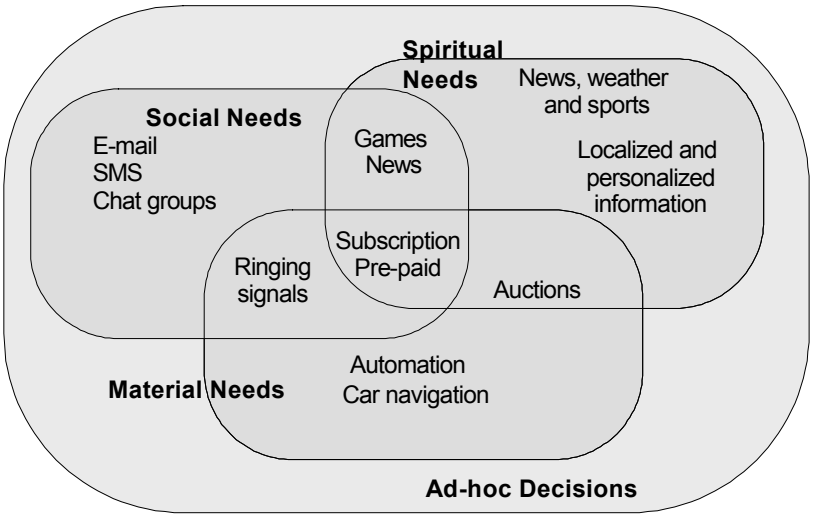

Figure 39: Material, social, and spiritual needs combined with ad-hoc decisions.

In general; the long-term potential of a mobile service increases (Geer and Gross 2001):

- The more time critical an information good is, since that increases the chance that it will be used mobile.
- The better the content is adapted to "the situation 'mobile'" Geer and Gross (2001 p. 155).
- The more a technology is adapted to the situation "mobile".

It is possible to change some of Kim and Mauborgne's (2000) utility levers to narrow the scope and to better adjust it to the mobile information industry. Combining Holbrook's (1999) more theoretical customer value framework with Kim and Mauborgne's (2000) practically oriented tool it is possible to simultaneously adopt it to the mobile information industry.

For the mobile information industry the difference between convenience, simplicity and customer productivity is very small, as they are all closely related to saving time or effort. I will therefore combine them into one field, which closely relates to efficiency in Holbrook's typology of customer value. "fun and image" is being split up and image is made broader and renamed into "Image needs". This roughly combines Holbrook's (1999) status and esteem. "Fun", which corresponds to Holbrook's Play is made an own category. This introduces another border when one needs to decide whether a cultural good is used for fun or for its image creating ability. In practice, as will be shown this is not very important since it is possible to create customer value and fulfill both needs.

Added are "Spiritual needs". Spiritual needs cover Holbrook's (1999) spirituality, ethics, and aesthetics. Kim and Mauborgne's (2000) Risk will be changes to "Security needs" since that

better describes what is intended. This kind of customer value is missing in Holbrook's typology, but it's a sign of weakness in his typology rather than in this model.

More complicated is to add communication. It is the most dominant way of using a mobile device, (UMTS-Forum Reports 2001, 2002, GSA 2001, 2002, BCG 2000, and Yankee Group 2001). For different reasons communication cannot be seen as a separate customer value. Communication is part of many of the other customer values, - fun, security etc., therefore it is already a part of the tool above. One could for example see the use of a mobile phone as a *convenience* or customer *productivity*-increasing device for my communication, fulfilling my need to entertain myself and having *fun* with a friend.

The only customer value that Holbrook (1999) mentions that is not covered in the tool is Quality. There are two reasons. First, it is not a need in itself. One can only appreciate quality *of* something. The second reason is that since it is supposed to be used *before* an information good exists. It would be premature and misguiding to evaluate the quality of something not yet decided on. Compare also the difference between decision value and experience value above (Woodruff 1997b and Kahneman et al. 1997). More important is that there is no objective methodology to decide upon quality for a cultural good, neither before purchase nor after.

The utility levers for the mobile information industry divided on the customers' needs look as follows:

> **Material Needs**: "Security", "Customer productivity, convenience, and simplicity",
> **Social Needs**: "Image", "Environmental friendliness"[25]
> **Spiritual needs**: "Fun", "Spiritual needs"

Kim and Mauborgne's (2000) matrix was originally developed for material goods and therefore even more emphasized on the material needs. Nokia (2000), only focusing on mobile information goods, has in a white paper divided mobile information goods in information, communication, productivity, and entertainment, and thereby indirectly showed that a change of utility levers based on psychological needs can also be used in practice.

[25] Environmental friendliness could also be seen as a material or spiritual need depending which need for the consumer the service satisfy. I chose to treat it as a social need here, but it does not change anything in the following analysis if it would have been a material or spiritual need.

Kim and Mauborgne (2000) continue by identifying when customer utility is created. Referring to the product life cycle is actually nothing else than a differentiation with respect to linear time. Above it has been claimed that also customer situational aspects affect customer value and it is therefore necessary to find better alternatives. Location and cyclical time, i.e. Time, $_T$, has greater relevance to base the analysis on than the products' life cycles.

4.3.3 Customer Value is Situational

The mobile information industry's "Buyer Experience Cycle" is different from an industry delivering physical goods, as described before. Moreover the mobile information industry is about more than buying goods. The anywhere, anytime availability and the instant execution of a service in many cases make the "Buyer Experience Cycle" obsolete. Using a mobile phone, listening to radio or using another information service does not necessarily mean that one is "buying" something. There is a relation between a company and a customer, but this relation is not necessarily best described in buying and selling terms.

Models for brick and mortar goods need to focus on something abstract such as a buying experience cycle to be able to say something about customer behavior and industry competitiveness, since that is the lowest common denominator. For brick and mortar goods, there is no chance for the firms to control how and when customers use their products. For the mobile information industry the companies can perfectly monitor when and where most of the products are used. It is desirable to investigate the actual user-environment when consuming the service instead of only looking at the different stages of a product's life cycle to approximate customer value.

A stronger customer focus, rather than a product focus, is developed when a practitioner can concentrate on the customer's situation and events that trigger demand. Since our model concentrates only on mobile information it is possible to optimize this axis for the mobile information industry.

Instead of a buyer-seller relation over a product's life cycle, the base of the analysis is customers' behavior, location, and timing, shortly customer situation. This will better describe the customer value of a service.

The three states "Stationary", "Mobile" and "Not Present" can from a location perspective, generically categorize a customer's mobility behavior. In each of these situations the demand can, as described in chapter three, be triggered by an event, which is divided on a scale depending on predictability and stochasticity. To differentiate the mobile information industry with

other competing information service providers, a factor called “time sensitive” is also included. This takes also some of the customer value the interface can provide into account.

- Stationary: All services, which a customer might use when at home, in the office, or at any other place, in which the user is not moving are classified as for stationary use, for example in a cafe. It is necessary to take possible competing infrastructures into consideration when developing such a service.

- Mobile: All services mainly developed towards a user who is moving by car, by foot or by any other means of transportation, in which the customer is active. There are different technical problems as well as different needs compared to stationary use. The user has most likely less time to concentrate on a service. The information and communication infrastructure is different, but certainly not non-existing. It is still often easier, cheaper, and more accurate to ask locals the way to a restaurant, than try to find it via a mobile navigation on a cell phone.

- Not present: The slightly cryptic representation of a situation where the user relies on the information and communication system to virtually be somewhere else. Most social (tele-) communication falls in this category. Customers use mobile phones to call friends to talk about whatever feels important for the moment. Other services, in which the customer is not necessarily present such as surveillance, theft protection, etc. would also fall in this category.

- Predictability was explained already in chapter 3 together with the definitions of location and time. The market size decreases if the customer need is triggered by an external event. The likelihood of using a mobile information good increases at the same time. Services, which require immediate response or action of some kind, are especially well-suited for being served by the mobile information industry.

- Time sensitivity answers how urgent it is for the customer to get his need satisfied. In general a mobile good has the prerequisites to take advantage of time sensitive matters, but that requires that the time to find and use the good does not take too long.

There are no fixed borders between these terms but rather a possibility for overlap. If one is in a train the person is clearly mobile, but since he is not actively taking part of the motion, the situation can in some aspects better be described as stationary. The same is true for a passenger in a car when it comes to killing time, but not when this person tries to get help finding his

way. To understand how a good creates value and to estimate the size of the market satisfying a special need, it can as well be a strength that one needs to analyze two different scenarios since that may lead to the discovery of a substitute not thought of before.

4.3.4 Proposing the Mobile Information Good Value Matrix

Unfortunately it is not possible to make a situational customer value as graphically pleasingly as Kim and Mauborgne's (2000) matrix. Taking mobility, duration, and timing into consideration requires two more axes and thus would become a four-dimensional cube rather than a two-dimensional matrix. The increased complexity can on the other hand graphically be dealt with in a practical way. Two different continuums with a maximum and a minimum can be included in a matrix as showed below.

Combining the changed "Utility Levers" with customer activities gives us a two-by-two matrix. Observe that when analyzing where to build customer utility, it is important not only to compare the service with other potential mobile information products, but also with off-line information products and physical substitutes.

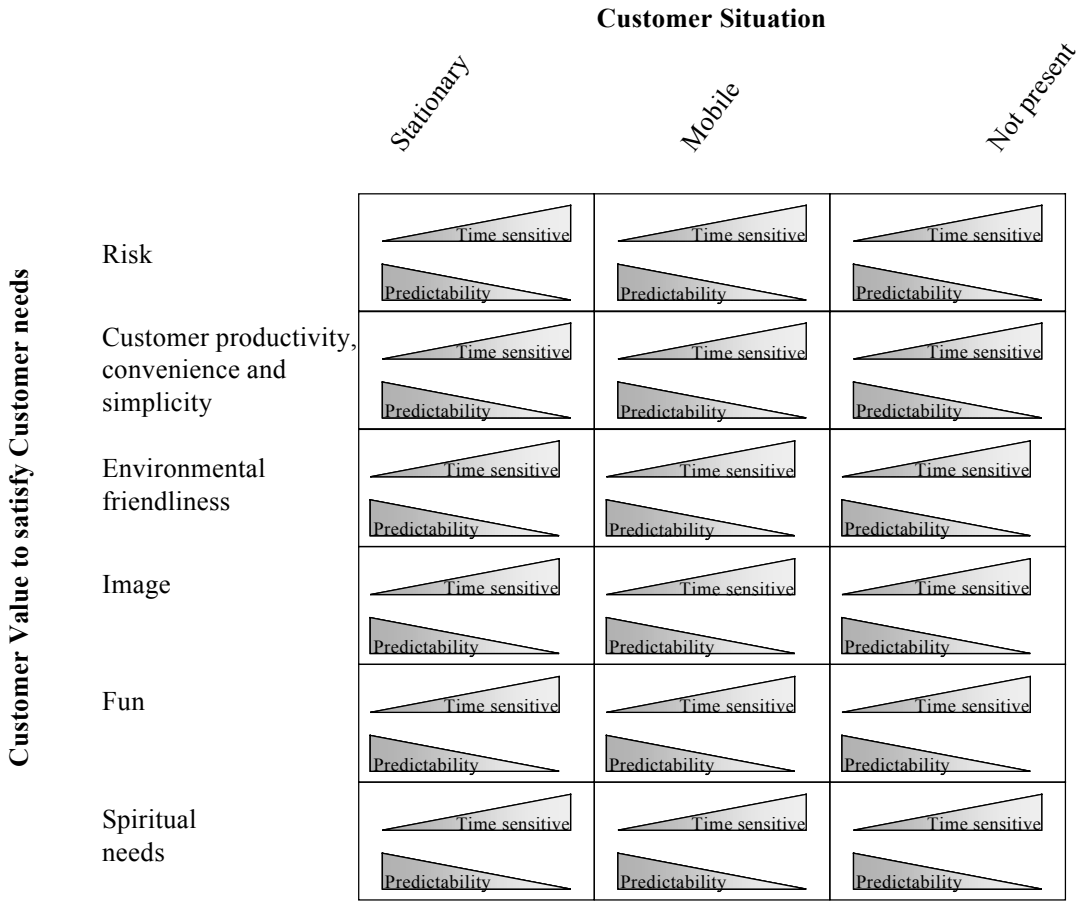

Figure 40: Customer value matrix for mobile information goods.

In the matrix above the importance of location is pretty clear. To make customer value situational one could perhaps expect that time would play an even more prominent role. Time as duration is incorporated in the factor ” Customer productivity convenience and simplicity”, but also in “time sensitive”. Time with respect to timing is covered by the axis of stochasticity and predictability, but also here in “time sensitive”. “Time sensitive” is, shortly, the urge for immediate action.

They are depicted below as triangles since they fall on a continuum given a value between 0 and 1. One is completely predictable and extremely time sensitive, and zero would be completely stochastic that is not predictable and also not time sensitive. The likelihood for an event to occur can at least in theory be described and normalized. The subjective time sensitivity is practically not possible to calculate for every individual and it also depends on what time of day it is, as well as on other factors. Mean and median of a sub-population is on the other hand possible to calculate exactly. Calculating predictability and time sensitivity can be used both to estimate the competitive position of a mobile information good vis-à-vis its substitutes and to estimate the size of the market.

A navigation service for finding the closest Italian restaurant would be placed in the category "Customer productivity, convenience and simplicity" and the customer situation is most likely "mobile". The predictability of people being hungry is rather high (let us in this example assume that we have calculated it to 0,75) since most people are having lunch or dinner, or both, every day. Time sensitivity depends in this case on how hungry the customer is and how urgent he needs to find an *Italian* restaurant. I have chosen to picture it fairly time insensitive (0,2), which I believe is most often the case (the value could be estimated by a market research). See shadowed field and arrow in the picture below.

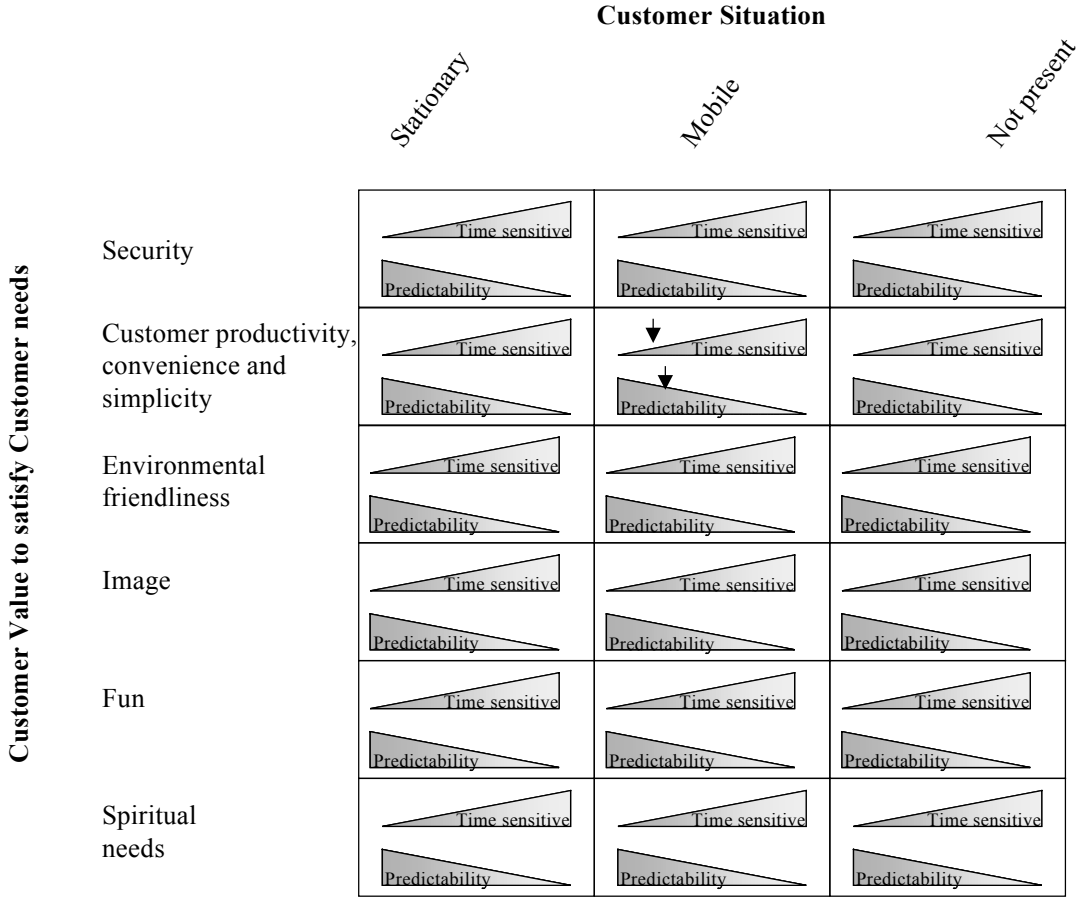

Figure 41: Customer value matrix for finding an Italian restaurant.

From this information we can estimate the size of the possible market. The fact that with rather high predictability customers are having lunch or dinner, leaves a large proportion of the daily market for finding a restaurant untouched, but it has given this group plenty of time to find alternatives to a mobile information service. "Mobile" means in this case that you are striving

for a goal of which the location is not yet known, and that the person has left the office, has gone off a train, etc. Rather low time sensitivity might open up for other alternatives.

If it is possible to reach higher customer productivity, convenience or simplicity in another way, or at a lower price, customers might choose that alternative. In the potential market for finding Italian restaurants, asking one of the locals about the way, just walking until we find a restaurant no matter if it is Italian or not, or looking in a tourist map are alternatives, which many people will find more attractive than trying to find the information on the wireless web.

The market for this service would mainly be hungry people who are in an unfamiliar place, since if you know the area there would be little reason to use the service. This drastically reduces the possible market. Market data can supply the inputs of the amount of first- and second- time tourists to the area a company plans to covering as well as approximations of the market share from Italian restaurants, and languages that the tourist speaks. Combining all this information would give the practitioner an approximation of the market size considerably smaller than the one only obtained from noticing that hunger comes once or twice per day.

In either case our potential market is decreased, but before we can go on with locating competitors, substitutes and making market research on how much customers are willing to pay for the utility we should investigate how the service is affected by the fact that it is received on a mobile device.

We have on the other hand also seen that the customer choice is not only rational. One weakness of the above-presented tool is that it does not count for the sociological tendency to define solutions that a certain technology can and should provide (Allen 2003). Trying to offer solutions to other problems than the market associates with a certain technology can be difficult. For example, a PDA was for a long time a device that did not need to be connected and a telephone was connected but lacked most of the PDA functionality.

The trade-off a customer might have to receive an information good must also be analyzed. Trade-offs could be costs, time to find or use a good, or simply the information he's transmitting to be able to use the goods etc., etc. These aspects are to a great extent depending on the interface between customer and firm. Assuming that the good has reached the customer, it must be possible to estimate how the mobile terminal and the network are affecting customer value. The next chapter will introduce a tool to depict the interfaces' impact on customer value.

5 Assessing the Market Based on Interface - Customer and Firm

In order to fully be able to understand the location based service industry one must have a multi dimensional perspective. On the one hand it is necessary to know how customer value is created in the industry, on the other one needs to look at the participating firms, compare their offer with other companies inside the industry as well as with their on and off-line competitors to judge if they also can extract value for the firm. The competitive forces inside the industry must be understood to judge whether there is a chance to make a profit on a specific information good.

A strategy in the field of e-business should be market oriented, especially customer oriented, and should consider the competences and weaknesses of the company executing the strategy (Kunz et al. 2001). In this chapter the last tool will be developed. It is a graphical tool that builds on the framework for customer value creation in the mobile information industry, but made adoptable to the specific situation that needs to be analyzed.

The customer value matrix was focusing on the good as such and the customer's situation. It makes it possible to analyze the usefulness of a good. To complete the analysis it is necessary to also introduce a tool that takes the terminal and the network into account as well as the system costs, system capability and reliability (see figure 42 below and compare with figure 35, Framework for customer value creation in the mobile information industry in chapter 3).

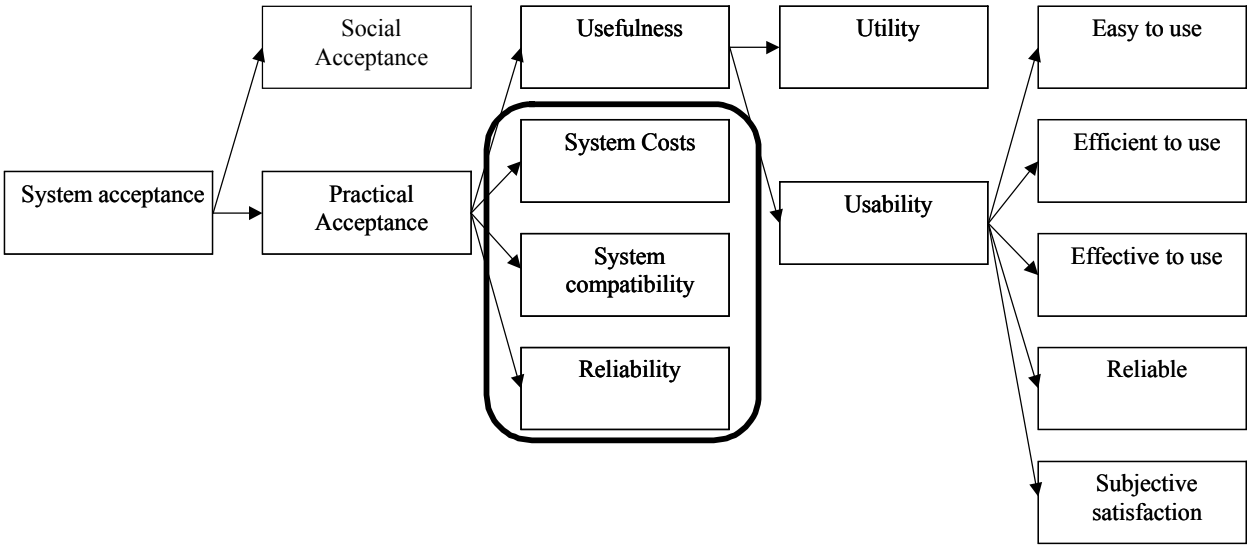

Figure 42: Acceptance of a new technical system (Source: Nielsen 1993 in Yom 2001).

Additionally, the tool presented in this chapter is helpful when it comes to determine a company's strength among the industry forces.

5.1 Transactions in The Mobile Information Industry

Having said that companies sometimes can be modeled as value shops and sometimes as value nets, we need to consider the companies' positions in the industry and in a similar way we need to make sure that the tool can depict business ideas also where the customer himself is creating the main value, for example when a company is acting as a mediator between two or more customers.

The importance of studying the interaction between customers and companies is important also because the interface can distort information. Scholl (1999) defines three forms of information pathologies applicable in for example the mobile information industry. Information pathologies can according to Scholl (1999) be actor related, knowledge related, and interaction related. Knowledge pathologies lay on the actors, or in problems in handling the technical interface and the interaction pathology is certainly dependent not only on the actors but also on the interface as such.

It has been shown that the created customer value depends not only on the good as such but also on the network and the mobile terminal. Network and terminal will in the figure below be combined and referred to as the technical interface. The service as such is in the mobile information industry always information, or at least the ability to send and receive information. The cost a customer has for using a service, or the revenue a company gets, complements the

model so that it is possible to estimate total customer value. It is also possible to depict the cost a company has to deliver this value.

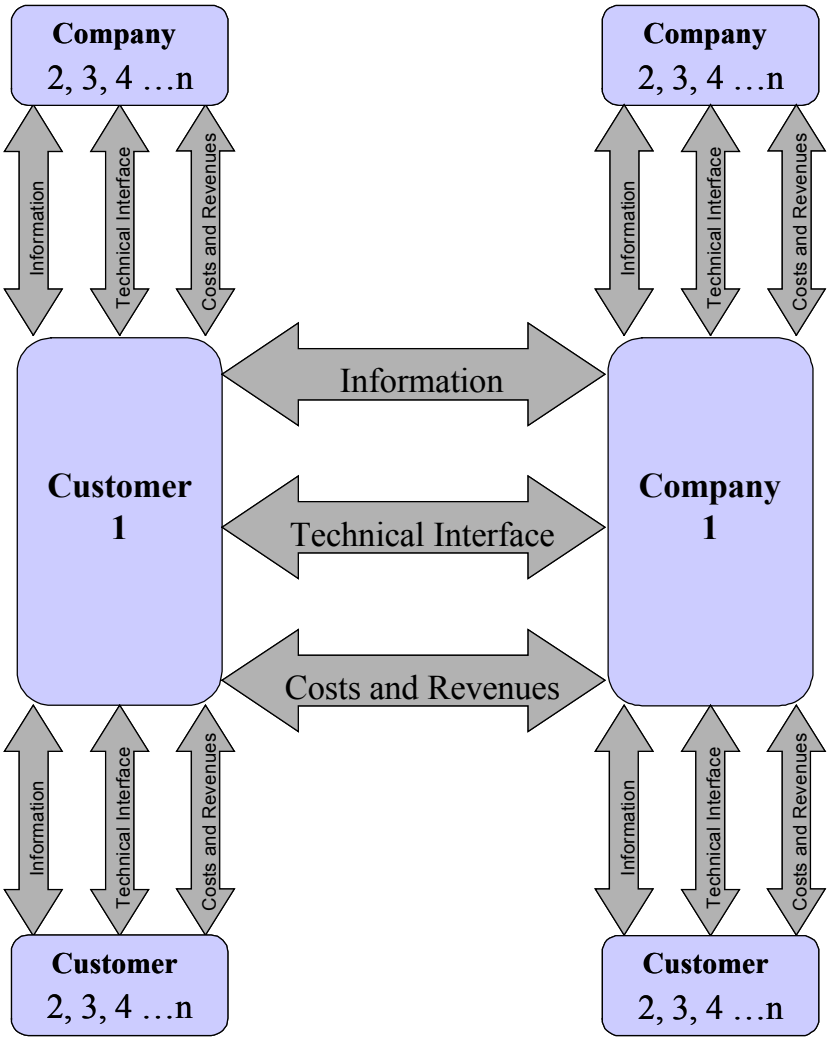

Figure 43: The mobile information industry depicted.

The figure has two axes. The primary axis, the horizontal one, is the relationship between the customer and the direct service provider. The secondary axis, the vertical ones, depicts all other relations the two (main) actors have. That can be competitor offering similar products, or other companies offering complementary goods. It can also be contacts that the main actors have with other customers.

The tool emphasizes in a way also the need to consider demand side economies of scale. If a service with network effects is depicted, “Customer 1” has contact with the service provider “Company 1”, which in turn has contact with “Customer 2”, Customer 3” … and “Customer n”. Since the value of the service with demand side economies of scale are directly de-

pendant on the amount of users[26] the tool makes it possible to also account for demand side economies of scale when estimating total customer value of a good.

When "Company 1" has to go through several intermediaries, for example "Company 2" and "Company 3" market power as discussed in chapter 2 can also be estimated by depicting the industry structure.

5.2 Transaction Costs and Mobile Internet

This chapter will investigate if, according to transaction cost theory, there exist strong hindrances for the industry to form. It will focus mostly on "cost and revenues" but also touch "information" and "technical interface".

5.2.1 Transaction Costs

The core concept of marketing is according to Kotler (1972) the transaction. A transaction is the exchange of "an economic good or service" e.g. some kind of value, between two parties. The things-of-value need not to be limited to goods, services, and money; they include other resources such as time, energy, and feelings (Kotler 1972 p. 47).

Perceived customer value, a function of perceived quality and perceived price (Desarbo et al. 2001), has won support as being one of the most important factors when creating a company strategy (Desarbo et al. 2001). Put in another way, all objective and subjective costs can and should be compared with all objective and subjective benefits. For example, Piller, et al. (2000) claim that it is possible to look at the relationship between the customer and supplier as a co-operation, providing benefits for both sides, but demanding input of both participants too. In mass customization processes, this integration of the customer is required primarily during configuration. The "costs" of this process from the customer's point of view are an important success factor. As "costs" Piller, et al. (2000) mention mainly time and customer uncertainty, in line also with Williamson (1981). To minimize these costs, successful companies have implemented strong instruments to build trust and reliability, (Piller, et al. 2000).

[26] According to Metcalfs law the total utility of a network is increased more than proportional when it is enlarged, (Handelsblatt 2001). Suppose that the value of a network to a user is proportional to the total number of people on the network, *n*. For simplicity choose the constant of proportionality to be 1. The value of the entire network is then n^2, which according to Varian (1999) is in accordance with Metcalfe's law. If a network is enlarged from n to m participants the utility has risen proportional to $(n+m)^2 - n^2$ which means

Before we can continue with the investigation of customers' value of mobile information goods it is useful to investigate the costs that customers and companies have in order to satisfy the possible demand for an information good. If customers do not know if they need an information good offered, or that this good at all exists, and if it is at the same time expensive to find out more about the information good, this can create adoption barriers difficult to overcome.

The transaction cost analysis is performed to make sure that transaction costs theory does not suggest that the industry cannot be successful. If transaction costs would be so high that they would prevail the market from forming, or if there would be strong arguments against a market coordination of information goods there would be no need to investigate how this market could deliver customer value.

Transaction cost theory is, according to Williamson (1981), a way of analyzing the smallest building blocks of an organization, and by doing so better understand why companies exist. In it's core, transaction cost economy focuses on completing transactions by one institutional mode rather than the other (Williamson 1975).

The smallest building block of an organization is not the personnel, nor is it any of the physical assets. According to Williamson (1981) it is the transactions, the transfer of a good or service that takes place. The theory says that these transactions will be handled in such a way that the costs are minimized. Williamson identified markets, hierarchies and hybrid organizations as "institutions" to realize these goals (Williamson 1991).

Especially problematic for a market coordination is (David and Han 2004):

- When asset specificity increases, the transaction cost associated with market governance increases
- When asset specificity is present to a nontrivial degree, uncertainty raises the cost associated with market governance
- When both asset specificity and uncertainty is high, market coordination is the least attractive choice compared with hybrids and hierarchies.

Malone et al. (1987) tells us in the "move to the market hypothesis" that some transactions that prior to ICT innovations were marginally more cost efficient to perform in a hierarchy, after ICT innovation were better performed on a market. This does not only mean that transactions that historically were coordinated in a hierarchy will thanks to innovations in ICT be co-

that it has increased with $m^2 + 2mn$ if the m people were not before internally connected to a separate net-

ordinated on a market. It also makes it possible to offer new services that prior to the ICT innovations had too high transaction costs to be considered at all. Compare for example e-bay, where Internet lowered the value of what could be auctioned and at the same time increased the possible audience.

Seldom has two words caused so much friction within the economic research society as transaction costs. Coase (1937) is generally seen as the theoretical father of the expression even if he in his article, "The nature of the firm" never mentions transaction costs, but instead talks about costs of using the price mechanism. These costs were used by Coase to explain why companies existed. If there weren't any costs of running the price system there is no need for companies since every one can then produce and sell his work and goods separately. Later scholars have continued to develop Coase's work but still there is not one common definition of transaction costs that everyone can agree on.

The main reason for the lack of a single definition is according to Allen (1999) that there are two different schools, both claiming ownership over the term transaction costs, the property right approach and the neoclassical approach. Alchian & Woodward (1988) conclude that one school emphasizes assuring the quality of performance of contractual agreements and the other focuses on the administrating, negotiating and monitoring of the joint productive teamwork in a firm. It is of no use for the thesis to take a stand between the two fields, however it is useful to shortly recall the main attributes of the different approaches.

5.2.1.1 Property Rights Theory and Transaction Costs

From a property rights perspective, trade is the same as shifting property rights. In one extreme, if there are no property rights, there will be no trade. If all goods are publicly owned or even have to stay unowned, there will be no one paying for something that he can control no more or less than if he didn't pay anything. When there are no property rights, there can be no trade and thus no cost for trading. Transaction costs with no property rights are always zero.

It is in this aspect interesting to notice the difficulties that Internet companies have had to charge for many of their information goods when customers based on prior experiences knew that the good sooner or later will be comparable to a public good.

The other extreme from a property rights perspective is when there are perfect property rights, then no theft and no unowned goods exist. The transaction costs in such a world can be defined as the cost for establishing property rights. If we look at reality and also take into consid-

work and with 2mn if so was the case.

eration theft, opportunistic behavior etc, a definition from the property rights approach would, in accordance with Allen (1999), be:

Transaction costs are the costs for establishing and maintaining property rights.

Note that this is a very broad definition. Two important conclusions can be drawn from the definition. First, no transaction is needed for transaction costs to occur. When a property is maintained in any respect transaction costs are present. Second, since transaction costs are present all the time, they are *not* a result of overcoming boundaries between firms or customers.

5.2.1.2 Neoclassical Approach to Transaction Cost

The neoclassical approach is more in line with the semantics of transaction costs. A neoclassical definition could be considered to be closer to what Coase originally wrote about costs for using the price mechanism. In the neoclassical approach there are no transaction costs within the company, e.g. costs for governance and policing inside the company is considered to be something else. In a world with only one monopoly company you would have no transaction costs. Demsetz (1964) originally wrote that transaction cost may be defined as the cost of exchanging ownership titles. An easier definition that builds on Demsetz (1964) and semantically easier to compare with Allan (1999) would state that:

Transaction costs are the costs associated with the transfer of property rights.

This is a definition that also suits the intentions of the tool presented here and the discussion that follows. Transaction costs arise both at the buying and selling side. The company needs to keep total transactions costs as low as possible to maximize customer value compared to the total cost. Observe that the costs *associated* with the transfer of property rights count as transaction costs. That means that search costs prior to a transaction also when there is no transaction are still transaction costs. In general one can also say, with the definitions given above, that the magnitude of transaction costs would be higher in a property right perspective since that includes more activities.

5.2.2 Asset Specificity

The critical dimensions for describing specific transactions are according to Williamson (1981a); uncertainty, frequency of the transaction, and the degree to which transaction specific investments are required to realize least cost supply. Williamson includes all transactions necessary to finalize a product. By examining how transaction costs differ between markets and

hierarchies Williamson can draw conclusions of which transactions can be made on the market and for which transactions it is better with a closer relationship between seller and buyer, in some kind of hierarchy.

Uncertainty and the frequency of a transaction will in the mobile information industry differ from company to company in the same way as it does in traditional industries. However, given the cost to produce and agglomerate information, the absolute majority of all mobile information goods will have a repetitive use for the producer, even if it can appear personalized for the user.

I will below first concentrate on how possible transaction specific investments affect the industry and then come back to the problem of evaluating information goods.

5.2.2.1 Producer Asset Specificity

Since this thesis does not aim to explain the internal processes of a company in the mobile information industry in depth, the interesting transactions are basically only those that can be conducted on a market. Since transaction costs were defined earlier as the cost associated with the exchange of property rights, business ideas in which the transaction cost becomes so high that they are better conducted in a hierarchy should therefore probably not be realized.[27]

Williamson (1981a) talks about asset specificity when describing goods, which require high transaction specific investments. It is important to note that the investment, which needs to be done to reach cost efficiency can be very large, but the rest value of the investment if the transaction does not occur, is close to zero.

There are three types of asset specificity according to Williamson (1981a). Site specificity, where different stations of for example an assembly line are located next to each other in order to save transportation and inventory costs, physical asset specificity, where a specialized dies is required to produce a component, and human asset specificity that arises from learning by doing. Malone et al. (1987 p. 486) have noticed that the value of some goods is highly dependent

[27] There can be very important process innovations that helps the company to achieve a competitive advantage, but that falls outside my definition of business development since it cannot be marketed directly to consumers. One can also claim that there exist goods marketed to consumers but not coordinated in a market structure. Buy item A, get B free, or reach so many bonus miles and get C for free or reduced prices can be examples of the latter, but that is of less importance for the general validity of the discussion.

Market coordination of course also includes subscriptions, fixed costs for unlimited usage, and many other innovating ways of arranging the payments.

on that it is “reaching the user within a specified, relatively limited period of time”. The goods that have these properties Malone et al. (1987 p. 486) call “time specific” goods, which adds a fourth specificity to Williamson’s list of asset specificities.

5.2.2.2 Asset Specificity in the Mobile Information Industry

There are several reasons why asset specificity is important also in the mobile information industry. First, traditional products or services with high asset specificity are less suited to be traded on the market and are usually cheaper organized in a hierarchy. If traded on the market, buyer and seller are locked-in to each other. For the seller, it is obvious that he has high sunk costs if the relation would be terminated, but also the industrial buyer is locked-in since he cannot get as favorable conditions anywhere else. The investment causing the specificity was done to reduce costs of this specific transaction. Opportunistic behavior such as forced unmotivated price or quantity cuts or changing supplier without reason will quickly erode the trust from the sellers (Pitelis 1996) side but more than occasionally also from the rest of the industry. This may act as a bond that actually discourages opportunistic behavior (Rokkan et al. 2003).

For the mobile information industry, physical specificity should play an inferior role, since transportation and inventory costs are diminishing due to digitization. One could consider different standards and interfaces to create physical asset specificity. Companies might find that they would like to protect content or a customer base by artificially producing proprietary standards, which allows them to lockout competitors or lock-in the existing customer base in a design that does not allow them to switch. Whether or not deliberately created physical asset specificity exists, changes customer switching cost. Although it does not effect the forecasting of basic customer demand, it can affect the size of the available market and the barriers of entry.

Human asset specificity, in the producing company, can play an important role for the efficiency of the company and the internal transaction costs, but for business development it plays an inferior role since the asset specificity occurs when an employee is trained on a company specific matter with limited use outside this company. That means that company internal human asset specificity is mainly important when it comes to process improvements.

If one sees the transaction from the user's point of view, it is different. To use many information goods efficiently and to their full potential the user has to learn about how to use this specific information good. Everything from reading manuals to finding the information about a mobile telephone service could be considered human asset specific knowledge that affects the

transaction costs for a user and possibly creates a barrier to adopting the initial service or a lock-in effect when considering changing to a competing service.

Site specificity and especially time specificity has a slightly greater importance for the mobile information industry. Williamson (1981a) was primarily concerned with the production of goods, but Malone et al. (1987) brought in a customer perspective when they added time specificity to the list. From the production point of view, mobile information goods are normally not site specific but could be very, or not at all, time specific[28]. From the user's point of view, one can claim that site specificity would be information about the vicinity of the user in a direct as well as metaphysical way. If so the mobile information goods are to a great extent both time and site specific. If one sticks with the original meaning, that the information needs to be produced in the vicinity of the user, then one cannot claim at all that there exists any site specificity.

It was earlier said that asset specificity was characterized by high, often sunk, costs, in order to lowering the total cost of a specific transaction. For a producer of information goods, the production can be seen mainly as a fixed cost. Content produced for a special event, time specificity, or a special location, here site specificity, can often only be used for what it was intended for, which is so far in complete analogy to Williamsons asset specificity.

One can hardly claim that the customer of a mobile good must invest a great deal only to be able to use an information good. All he needs is a mobile terminal and an agreement with an operator to use a certain network. For a company the investment lays in producing the information good something, as said before, often entail high fixed costs. The mutual lock-in can still be there since it can be expensive for the customer to find a new service, which satisfies the demand equally well, and that has low enough switching costs to make it worth the change[29].

[28] It has been argued (Kellerman, 2000) that the mobile information industry can gain from clustering, but that is something else than site specificity. Production of news can have a site-specific component in it, but that is usually less dominant than the time specificity, since news has a tendency to quickly transform themselves into public goods. Regarding time specificity one could claim that that an information requested, from a stock exchange or an automatically updated time table tracking busses' actual location and adjusting for delays, is time specific, which is correct from a user point of view. Regarding the production I believe that it is more correct and in line with Malone et al. (1987) and Williamson's (1975, 1981, 1991) reasoning to consider the production taking place when the equipment is installed and not when the information request is terminated.

The lock-in effect in the mobile information industry can be both stronger and weaker than for a typical manufactured good. If customer transaction costs are a high percentage of the total cost at the first time a service is used, the lock-in effect is strong. That is because the service needs to be found, the customer might need to learn how to use it and the customer needs to be able to easily operate the terminal that he is accessing the service from. It becomes then "expensive" to search and change to a competing service. The computer game industry, another mature information industry, has increased the switching cost with proprietary technology.

The typical service on the Internet has so far been free, if neglecting the connection fees. The mobile Internet will most likely have a higher amount of services that are not for free, but the fees to these services will most likely be small, at least in the beginning, in comparison to the total search cost for finding a better alternative. According to Shamsie (2003 p.199) "dominance is more likely to be observed in industries that offer customer products that are purchased frequently and have lower prices". Knowing that many information markets due to high fixed costs are so called winner-takes-it-all markets, it is obvious that customer transaction costs need to be taken very seriously when evaluating a certain good's chances of being used by the customer and profitable for the provider.

5.2.3 Magnitude of Transaction Costs

Below, I will mention authors belonging to both of the above-mentioned directions of transaction cost theory, but it should not create any confusion.

5.2.3.1 Magnitude of Transaction Costs in the Industry

Wallis and North (1986) have made one of the most, if not the most serious attempt to quantify transaction costs. They have estimated that transaction costs in the U.S. have risen from some 25% to account for more than half of the GDP between 1870 and 1970 reflecting the increased specialization and complexity of the business world during the same time. Wallis and North (1986) talks about "the cost of running the economic system", which puts them in line with the property right theoretic approach.

[29] Consumer transaction costs can be a high fraction of total costs as shown before. Here the costs would mainly be search, learn and uncertainty costs.

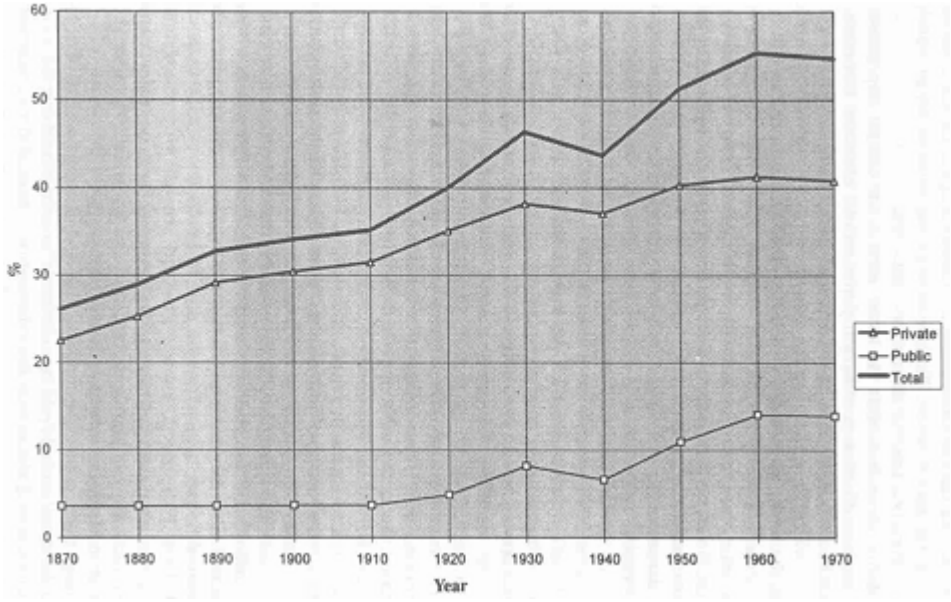

Figure 44: Transaction costs in the American economy (Source: Wallis and North 1986, in Wigand et al 1997).

Jonscher (1984 p. 95) concludes similarly that "about half of all economic activity in the United States can be attributed to the processing of knowledge or facts" rather than being production related and the proportion of knowledge and information related work continues to grow. Most likely a major portion of these numbers are overlapping, however the information and knowledge portion of a product can be high at the same time as transaction costs are high.

In that regard, the costs of a good for a customer can be divided into production costs, transaction costs, and profit, but since a useful analysis must emphasize the transaction and delivery of a special service, this approach will be of limited use. The graph can therefore not be representative for transaction costs in the mobile information industry, but it is interesting when one tries to distinguish information markets from brick and mortar ones.

Another reason why the graph above, also for this thesis, is very important is because it is easy to misunderstand the basic properties of mobile information goods when it comes to transaction costs.

We usually say that transaction costs decrease with the use of information and communication technology, ICT, for example Malone (1987), Brynjolfsson et al. (1994) Lindbeck and Wikström (1999). Software can now be downloaded instead of being bought on a CD, contracts can be closed electronically without meeting each other. Bookstores on the Internet reduce buyers' search costs for product and price information according to Brynjolfsson and Smith

(2000)[30] at least 30-fold compared to telephone-based shopping and even more compared to physically visiting the retailers. This might be true when only comparing the search costs in the distribution system. However the present distribution system also functions as a marketing tool reminding customers about the fact that the products exist, which can trigger demand. Last but not least the books need as well to be delivered.

Surely ICT can lower specific transaction costs, but a whole set of services that prior to the same innovations were not at all possible to perform can have a very large share of transaction cost. Let us once again take an example from the moving picture industry, were the marketing budget could amount to 30% of all costs (Miller and Shamsie 2001). To claim that 30% only in marketing costs would be low transaction costs would be rather strange.

Also, brick and mortar transactions once faced similar problems. Exchange in a barter system was very costly, the seller had to find a buyer who not only wanted the goods the seller could offer, but also offered something the seller wanted. This prevented many beneficial exchanges from taking place. The introduction of money lowered these transaction costs, (Coase 1992), but some 30 years ago the retail and marketing system of USA still accounted for 40% of the total costs of a good (Kotler & Schultz 1970).

The rather long initial discussion about transaction cost, lead us to the not so spectacular conclusion: Transaction costs in the mobile information industry can be very high, but they can also be very low, making it important to investigate whether the transaction costs work "for you" or "against you" compared to substitutes and alternative ways of making the transaction.

5.2.3.2 Magnitude of Transaction Costs for Customers

The discussion above has been centered on the company and is slightly simplified. To better understand the mobile information industry it is also important to analyze customer transaction costs, since this can decide whether a mobile information good or a substitute to this good gives the customer the best expected price performance ratio.

If we consider a company that has only two types of product costs, production costs (C_p) and transaction costs (C_t), then the price to the customer of a product, C_{prod}, can be calculated as follows:

[30] Such figures need to be taken carefully since it all depends on which assumptions are being made. Does the customer have a computer with Internet access or not. Is he only going to shop for books or does he buy gro-

$$C_{prod} = C_p + C_t + C_{marg}$$

Where C_{marg} is the margin the producer wants, or can achieve, on his products.

However, for the customer the real price for a product, C_{Cons}, is the monetary price of the producer, $C_{prod,}$ + the transaction cost which the customer has, which is leading to the fact that $C_{Cons} > C_{prod}$.

Above it was shown that transaction costs not necessarily are low when it comes to mobile information goods. Everyone who has tried to search for something special on the Internet knows that it can take a lot of time to find what you are looking for. Also, it takes time to decide whether you have found enough information.

These search costs should of course be added to the transaction costs for the customer. Kotler (2001 p. 20) adds psychic, energy, time, and monetary cost together to form total customer cost, but determining all customer costs exactly, will in either case be difficult.

For the customer the ratio of transaction costs depend on a few other variables, for example the pricing of the good. Let us assume that the costs for a customer, C_{Cons}, depend on the cost to the mobile network operator C_{mn}, the cost for using a service, $C_{good,}$ and the search costs C_{search} that he had to find the service. There can be other costs defined, such as learning how to use a service, the time spent to find the good or using it etc., etc.

$$C_{Cons.} = C_{mn} + C_{good} + C_{search} + C_{prod}$$

The cost of using a mobile network, for example a GSM or UMTS network, can depend on time, total amount of data downloaded or a combination depending on which contract the customer has with the mobile operator. Furthermore a flat fee for data download is also possible, or that a third party, such as the user's employer, pays the bill. This would change the importance of the different cost factors and possibly change the customer behavior accordingly.

The search costs can, theoretically, be unlimited in absolute terms. In practice, a customer gives up if he hasn't found the desired service or information after a certain time (and cost). Typically, one could distinguish between using a known service again, trying to use a new

ceries or clothes at the same time? Before such questions are answered one cannot consider this figure for

known service, and trying to solve a problem to which no known service exists. The search costs, as well as the uncertainty among customers, usually increases between the alternatives listed above with most search and uncertainty when one tries to solve a problem without knowing if it exist a good that can solve the problem.

Whether transaction costs are high or low for the customer cannot be answered before all of the above-mentioned cost factors are known. If customers will have to learn how to use a particular mobile information good, a form of transaction cost in itself, the transaction costs part of the total experienced costs increases. If the cost of the product is low, or for free as it is in many cases today, then there are very high relative transaction costs for the customers. In the case of a "free" good it would of course amount to 100% of the total costs.

The solution to the problem that customers are scared of high transaction costs is the same as in the traditional supply chain. When the total cost for the customer is a lot higher than the cost of the product, $C_{Cons} >> C_{prod}$, producers or intermediaries need to bear some of the transaction costs for the customer. This is already done outside the Internet, for example in the case of food distribution where companies have an assortment and an availability function. Intermediaries such as shops use their economies of scale to make it possible for a customer to shop at one place instead of traveling around to all the factories and farms himself to collect the goods on the place of production.

In a similar way producers of information goods need to lower the transaction costs for customers on the Internet. Today search engines, personal agents of different kinds, a good brand name, established relations outside the Internet etc, accomplish this.

An interesting example of the importance of the customers' perceived transaction costs is that most e-commerce retailing sites "are characterized by decreasing visit times and that generally those sites with the fastest learning curves show the highest rate of purchasing" (Johnson et. al. 2003 p. 62).

5.3 Interface Value

Johnson and Selnes (2004) define the exchange relationship as a mechanism for creating value through the coordination of production, consumption, and related economic activities between customer and supplier.

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the further analysis.

From Chapter 3 we learnt that customer value depends on two for the customer relatively fixed variables (mobile network and mobile terminal/interface) and one marginal variable, the mobile information good itself. In addition, acquiring an information good entails a trade-off, or cost, for the customer. Parts of the total customer cost are payments of different kinds to the party marketing the information good. It can be money but also information or paying attention to commercials.

In this chapter some aspects are suggested that need to be considered by a practitioner. This is not a complete listing but rather a way of showing with examples what can be understood by "Information", "Technical interface" and "Cost and revenues".

The major opportunities for e-businesses to create new value are according to Jutla et al. (2001 p. 1) "shorter timeframes for processes, cost reductions due to reengineered processes, the real-time availability of information, the ease of making new relationships and maintaining existing ones, and the cheaper global reach." The same is true for most parts of the mobile information industry. All opportunities mentioned by Jutla et al. (2001) can actually be seen as value creation in the interface rather than any enhanced service. Value creation is here synchronic and interactive, not linear and transitive (Ramirez 1999). It is therefore necessary that the interface is bi-directional allowing information to flow both ways. The value created in an exchange relationship is a direct function of both the customer's and the supplier's capabilities and strategies (Johnson and Selnes 2004). Therefore "success or failure in the marketplace is a joint function of a firm's influence on the customer and the customer's influence on the firm" (Moore 1986 p. 205).

In the interface between different parties, for example a company and its customer, are three major aspects to consider, the information transmitted between the different parties, the technical interface, and the cost that the parties have to bear in order to make the exchange happen.

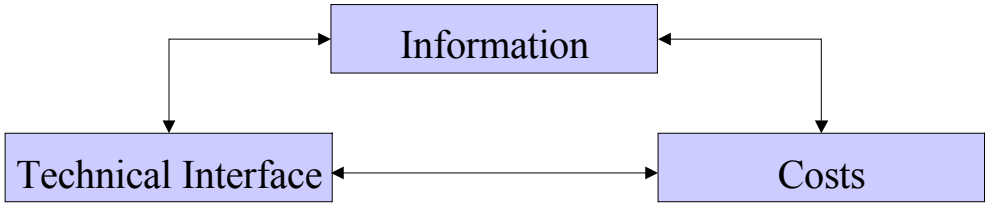

Figure 45: Information, technical interface, and cost are explaining the value created by the interface.

There are interdependencies in the interface. Costs are obviously affected by the amount of information as well as by the technical interface. Similarly the technical interfaces' ability to

retrieve information should have an impact on what is delivered. For example there is no use in sending high quality stereo music to be consumed on a normal mobile phone, but it is perhaps necessary to stay competitive when delivering digital music to fixed Internet computers.

5.3.1 Technical Interface

Technical interface means in this case everything that affects the utility of the service: The terminal's look, weight, and interface, the download times, and the interface to the service. All of it effects the customer value, and all of it needs to be analyzed before one can decide whether a service has greater or smaller chances of being successful.

Telecom productivity increased in average with 5% per year between 1988-1998, according to Porter and Van der Linde (1995 p. 98). However, aggregated there was virtually no change in the efficiency of the companies, but instead all of it came from technological improvements, (Uri 2001). That means as well that the technology can affect the trade-off for a customer requiring an information good.

The interface technology can also directly affect the customer value. For example, according to Griffith et al. (2001), physical print medium is more effective than an Internet-based interface in stimulating customer involvement with retail offerings and a positive customer response. Mobile phones favor, according to Forrester Research (2000) only purchases of low-cost goods that are timely, simple, and location-based, and TV are better for audiovisual, contextual, and entertainment related purchases.

It is preferable to think of information as storage and transmission of data, rather than the more vague expression content or information, since these engineering measures directly relate to the cost of obtaining the wanted information for the customer. One of the most appropriate models for communication in the mobile information industry is therefore, according to Lawrence (1999), also one of the oldest. Shannon’s information theory from 1948/1949 involves precise engineering measurements of quantity and technical quality of data.

Shannon’s mathematical communication model can be depicted as a one-way model of communication.

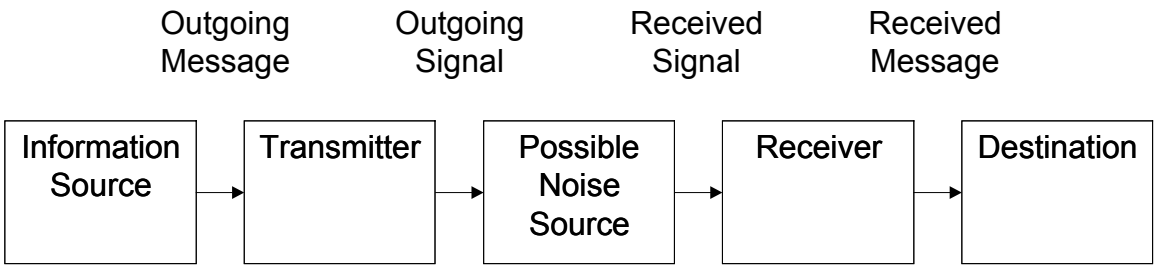

Figure 46: Shannon and Weaver's (1949) mathematical communication model (Source: Shannon and Weaver 1976).

The above model can also be enhanced with a correction system (Shannon and Weaver 1976 p. 80) explaining resending of for example distorted IP packages in a TCP/IP based mobile Internet network. According to Robertson (1971 p. 123) the shortcomings of the one-way model is that it suggests that most messages get through to customers, which is from a technical point of view true when a customer is for example "ordering" a service and then gets it "delivered", but not true from a marketing message, or sales perspective. Two-layered and different multi layered communication models have been introduced to study also the pragmatic influence of (mass-) communication and not only the syntactic level, which Shannon is primarily addressing. General pragmatic influence of information is however outside the scope of this thesis.

Media richness theory tells us more about the technical communication channel once it is established. An actor must consider the interface's good and bad properties and choose the appropriate channel according to his message, or in this case adapt the message so that it fits the technology on the sending, and more importantly, on the receiving side. Knowing the interface between the company and the customer, and adapting the service to it, is necessary to deliver as good a service as possible and to make the information as accessible as possible. Chae et al. (2002 p. 38) even go as far as to claim that because customers have to deal with "awfully cumbersome devices" they demand higher quality information from the mobile, compared to the fixed-line Internet.

There is, and will continue to be, an interdependence between mobile operators, terminal manufacturers, and mobile service providers. Without a terminal to access the offered services, there will be no customers and service providers will wait until there is a sufficiently high penetration of terminals before they offer any services. Without services though, few customers will invest in expensive terminal equipment. Telephones with integrated cameras as well as PDAs are available from all bigger suppliers. Phones with integrated games have as well been on the market for a long time and now game consoles with integrated phones are launched.

The providers will face the problem between multipurpose terminals, which can get a higher reach, and proprietary solutions that can be optimized to a service making the utility of that special service higher for the customer, while at the same time creating barriers of entry.

News, entertainment, sport, and other media used to be delivered in print, radio or on TV. Now the media giants deliver the same content on several different platforms. Depending on the terminal and connection, a customer can receive streaming media, text or a combination of text and pictures. The content is fundamentally the same but the interface decides how it is presented. New companies combine other services in innovative ways to achieve growth with the help of ICT. Amazon has a huge selection of goods, easy to find and to order when the customer realizes his need. Amazon's content would not suit a catalog and the interface would not be reproducible. Similarly newspapers have different ways of presenting their content on the web compared to their print edition.

5.3.2 Information

All services in the mobile information industry are simply information. That is, the good delivered, is digitized information. Evaluating the information means evaluating the service provided for the customer. However the service as such is not the only information exchange between the different parties. As has been said above there is plenty of technical information that can be collected by the service provider.

Customers engaged in e-business might find it not only acceptable, but also enjoyable, to shop or surf a round in an e-business store and thereby receive additional value than from the pure service as such, according to (Chesher et al. p347). The same thing applies also for mobile information services. The interface as such can create value and not only costs and this is added to the overall customer value of the information good.

If we concentrate on the actual information delivered, O'Reilly (1983) can give us hints on what needs to be considered to make users want the information. According to O'Reilly (1983) decision makers have a tendency to use information depending on, its source, if it is conflicting with anything, and on how it is acquired. See **Appendix 2** for a complete table. More than anything else we have a tendency to be lazy or time efficient, depending on how one sees it, when it comes to information use. Information should, in order to have greater chance of being used, be easy and quick to grasp, without costing us too much effort, reflecting the customers wish to minimize all kinds of transaction costs.

Since this thesis is not investigating company internal processes, a typical mobile information service would arguably mostly depend on the five propositions dealing with information acquisition. However, that would oversimplify things. If we assume that O'Reilly (1983) was correct in his propositions, a mobile information service is more likely to be used if the information cannot be retrieved from any other source, if it is ready accessible, and if it takes no time to use it. Furthermore, it should not be cumbersome to use it and the company providing it should have a good reputation.

Although probably already erroneous then, Prahalad & Ramaswamy (2000) claim that nearly all the free services on the Internet where based on a compulsory customer registration. The user supplies information about himself so that the provider can sell commercials to advertisers more expensively. It is true that there is a higher value to companies if their commercials can be directed to better specified customer groups that are more willing to respond to the message. This is however only one of the reasons why there will be an information flow in both directions.

A problem for many companies is that customers change their minds and thus their demands quickly and companies that try to serve them, can loose a lot of money if they are developing the wrong products. Von Hippel (2001) believes the best way to avoid costly ways to understand users' needs is to have the customers when possible to co-develop the services. Since, according to Singh and Kundu (2002 p. 696) the importance of information and knowledge flows in the industry cannot be overestimated, the management of customer and company information that the mobile information service company is receiving can become extremely important.

Chae et al. 2002 have instead tried to develop a model, which already from the beginning can give hints about perceived customer quality of the provided information and the way the information is provided. Since information also depends on the technical interface, the total customer value of an information good becomes rather complex to evaluate.

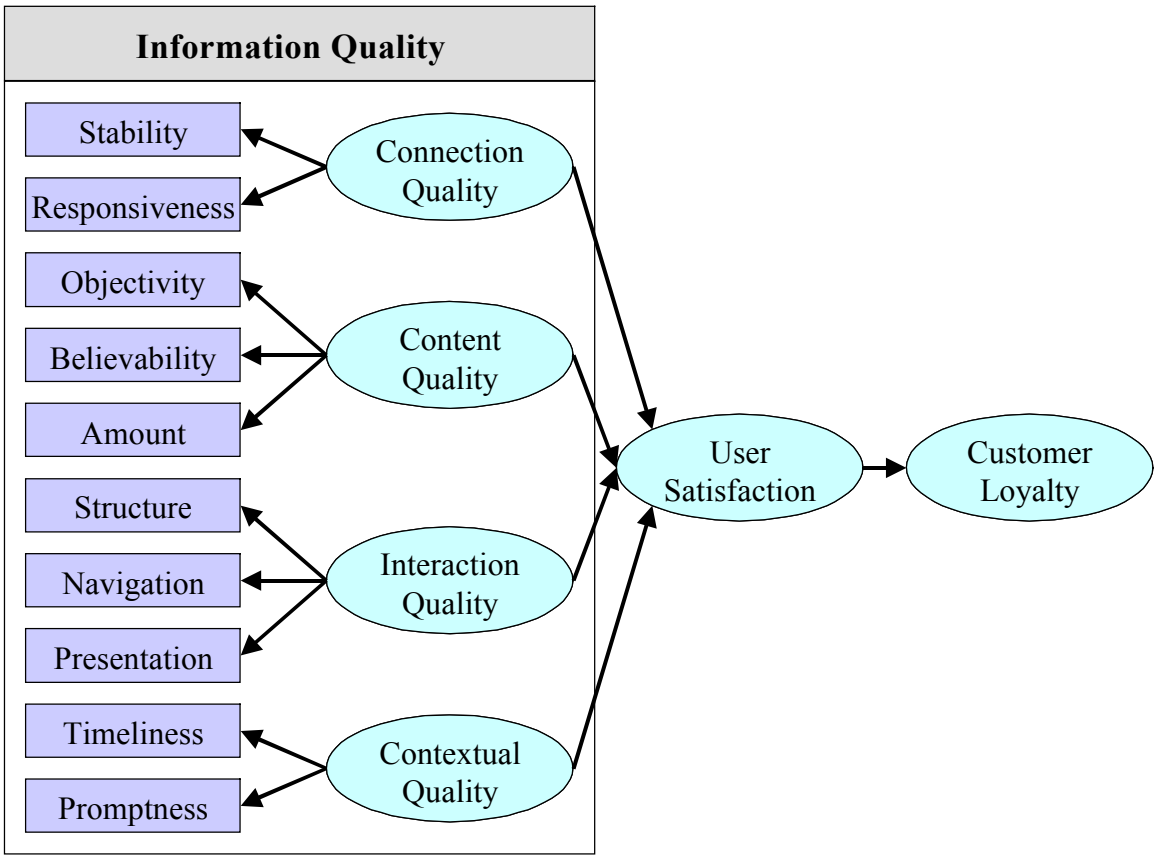

Figure 47: Information quality for mobile Internet services (Source: Chae et al. 2002).

In validating their model Chae et al. 2002 find that the interaction quality is the most important issue followed by connection quality. Differences in content and contextual qualities affected user satisfaction to a lesser extent, although the importance of content according to Chae et al. (2002) increased when analyzing those who where primarily seeking information. Also customer loyalty among the information seekers were slightly higher than those primarily looking for entertainment, which is also in accordance with what intuitively would be expected.

Information in the industry is not only information produced by a content provider. Information can also be a simple MMS message sent from one customer to another, but enhanced in one or another way by a service provider. One customer is connected to another and the company fulfills a mediating role. The technical aspects of the information become in this case even more important: How can it be decoded and enriched, what are the delays for the operation, and how much capacity is the information demanding in order to reach whatever preset technical parameter.

Information flowing in the direction from the customer to the service provider can also have a cost component integrated. Prahalad & Ramaswamy (2000) claim that many customers would rather go without the service or pay a fee instead of providing a lot of information about them-

selves. How much this would be is questionable, but it is interesting to note that information given away can be seen as costs, in the same way as we are paying for information received.

5.3.3 Costs for Companies and Customers

To enjoy an information good a customer needs to have the right equipment to access it, he needs to know how to access it, and he needs to get the good as such delivered. This is related to different costs for the customer. The company has costs for transferring the good, marketing costs, and it would need to cover some of the initial investment costs to produce the good.

In order to make a good durable in the long term, monetary revenues obviously need to be higher than the total costs. The revenues are easy to group but of course harder to quantify. Revenues for customers are the difference between the total costs, including all transaction costs, and the perceived value of the good. For companies it is normally the monetary flow that originates in the information exchange, but it can be anything that builds value in the company.

A company has to get a direct monetary surplus or build something that has a value, in order not to be copied, and to be worth investing in. This can be a technical solution, patent, software or hardware. It can also be a large customer base. Building critical mass in a network often means heavy investment and fixed line Internet companies seemed to compete around the millennium shift for whom could invest most in the network before being profitable.

The danger in this is pretty obvious. Investing in a network can be seen as a transaction specific investment that often has no rest value if the service is discontinued. That means if the customer base does not reach critical mass and if the customers do not create revenues before the companies have run out of capital, there is little or no value in the investment. Education about the product, commercials, and marketing about the service is also a kind of asset specific cost in order to communicate with the customer. I include such activities under costs since they contribute significantly to neither customer nor company value.

It is clear that attention on cash flow and cost need to be prioritized in order to reduce risk and initial investments. It is as well clear that once these networks are established they offer enormous barriers of entry for the successful company due to the established asset specific investments.

Costs are harder to group and display since they come in so many different shapes. Customers have search costs and “uncertainty” costs as well as companies have an array of production and governance costs. To use the interface as such costs money and time. Customers need to

learn how to use services in an optimal way, companies try simultaneously to improve them according to customer wishes and future demand. All of it is related to different costs. The monetary costs on the other side are probably easier to quantify.

For many companies who used to rely on other distribution channels, having a direct relationship will also mean that they need to develop competence in charging for their service. Before they have relied on their channel partners to do so according to Prahalad & Ramaswamy (2000). This might not be easy and as said before the mobile operators will probably try to get a key-role seeking a de facto monopoly of the billing relation with the customer.

Cash Flow

Making sure that the customer pays for "new" value is essential to create a profitable company and a good business model. After recognizing the likely market price, or what would be a price that gives you the wanted market, Kim and Mauborgne (2000) believe that with answering the three questions about cost target, possible partners, and price model, will make it possible to find out whether the service has a chance to be profitable.

It is necessary if one wants to create company value is that in the long run there should be a significant positive cash flow. This seem to be the most obvious comment made in this text but it is necessary to pay attention to cash flow, for three reasons:

1. An information good can bring a lot of value to the customer but for different reasons it is impossible to charge customers for the value delivered. Competitive situations, also for differentiated products, may have established a price in the customers' minds that is very difficult to change. It has for example proved almost impossible to charge for news on the Internet. Some brokerage and most community services would also fall into this category. Demand side economies of scale can increase the utility for many products but it can be hard to charge customers for this increased utility. Bohlin et al. (2001) even claim that the value created when a network grows is given away for free.
2. It is possible to charge for the service but another industry player has a stronger position and takes most of the revenues. Most of the business ideas, which depend on mobile operator revenue sharing, fall in this category. This is why the industry structure discussed in chapter 2 is important.
3. Regulation enforces a maximum price. Routed calls between two different carriers or a fixed network have maximum prices in, for example, Sweden. Many services are expected to be of local monopoly character, regulation can therefore become important

also for services. Customer location determination as well as many other future services, which have managed to get a local monopoly position, might fall in this category.

When developing a new service it makes sense to, in addition to the compulsory customer and competitor market research, investigate in other factors that decide what could possibly be charged for the service. Which part(ies) can be charged how much, who will charge, how much will I be able to keep, etc.

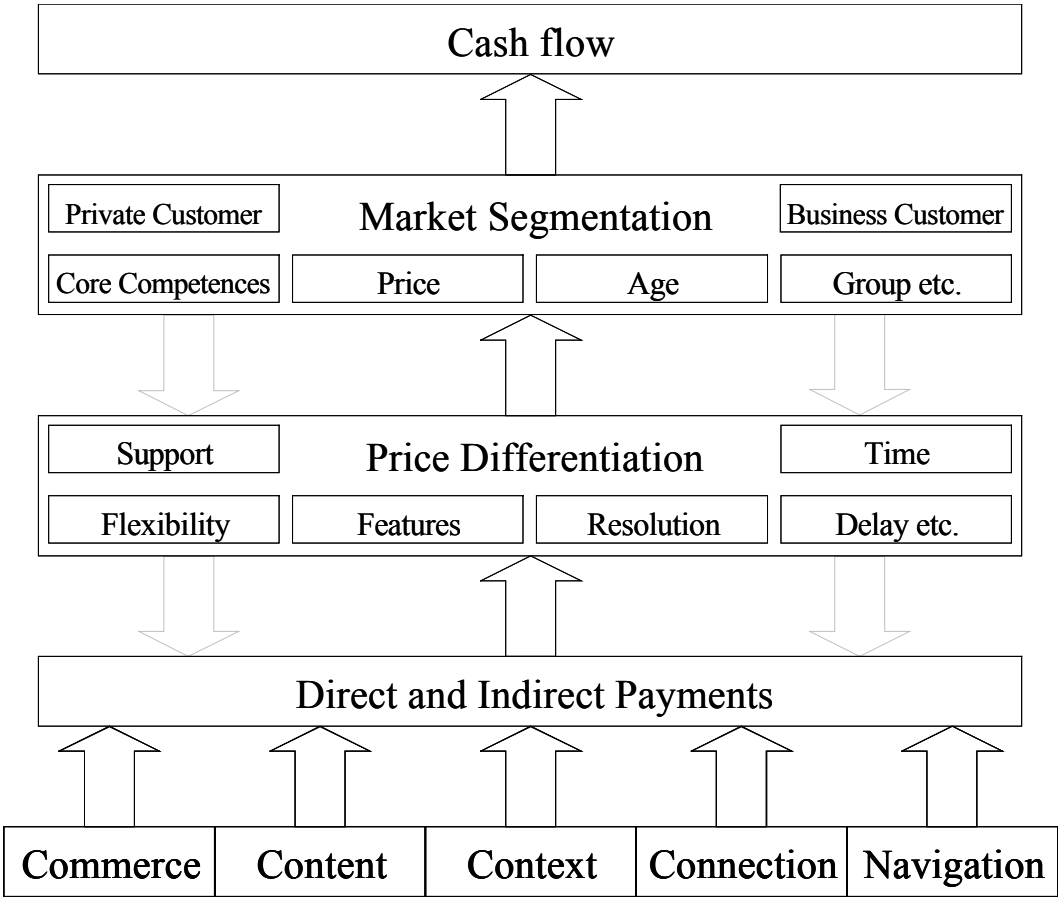

Figure 48: Foreseen (4CN) cash flow, depending on pricing and segmentation as well as service offered (Compare: Chae et al. 2002, Clement 2002, and Varian 1997, 1999).

The capital gains flow, like information, bi-directional. The big current trend in information technology is, (WSJ March 15-17 2002) to increase customer efficiency and to help them save money. This means that vendors and customers do not fight for an amount of money that flows from the customer to the vendor. Both can earn money and customers can save time by using some of the services offered.

5.3.4 Strategic Aspects Covered Only Partly in the Tools

Reducing transaction cost between the company and present, as well as future customers is one of the most important factors for increasing profit per user. One of the major ways to achieve this goal in the mobile information industry is to create trust and relationships (Leamer and Storper 2001). Creating trust between the company and its customers, (Yang et al. 2003 , Kimery 2002, Lee and Turban 200, Dayal et. al 2001, Piller et al. 2000) but also with its collaboration partners, (Seifert 2002) and within the company, (Galtford and Drapeau 2003), are seen by many as the most important factors for business success and the way to reduce the transaction costs related to uncertainty and asset specificity (Liang and Huang 1998).

Trust is explicitly not expressed in the tool presented above (figure 43: The mobile information industry depicted). Part of it lays in the information exchange part, which can be analyzed in the cost and revenue layer. However, the intangible trust-relation that years of experience have created is not implicitly there.

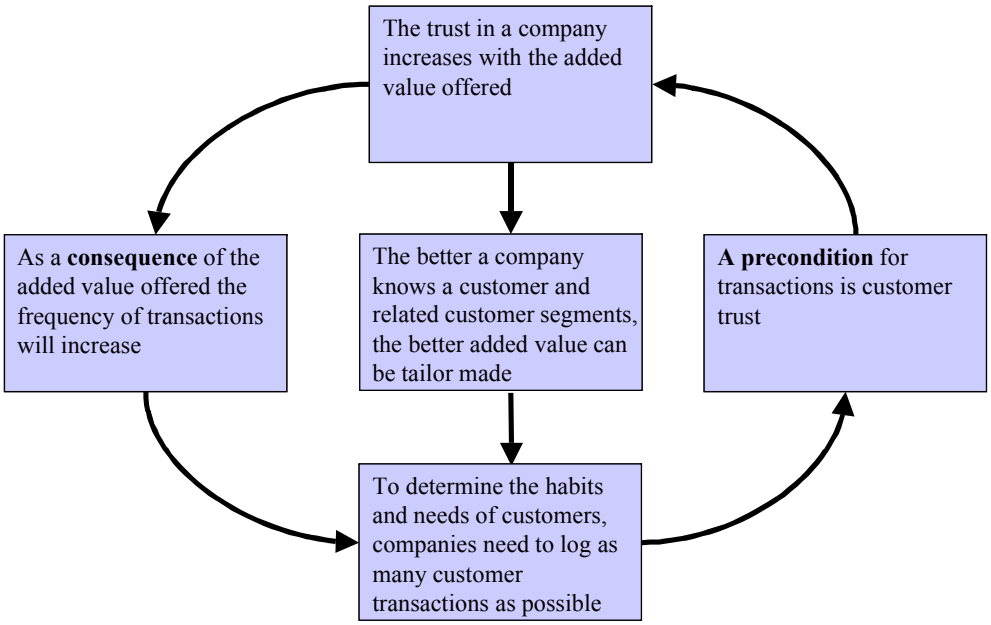

Figure 49: Interplay between transaction, added value, and trust. (Source: Birkhofer et al. 2000 who are citing accordance with Hagel and Rayport (1997) Harward Business Review, pp 53-65).

Building trust is not only intended to lower the churn of customers, but also to promote and enhance the network, which the company is a part of. That means that trust can as well be seen as a part of service efficiency, since its main goal is to reduce costs of the exchange. Summarizing and depicting the importance of trust in electronic business in order to get transactions is done by Birkhofer et al. (2000) above.

Trust in companies is more important in some parts of the mobile information industry. For commerce-based business, trust and convenience is most important to retain customers, and for content, context, and connection companies free services for the customers seem to be most important (Wirtz and Lihotzky 2003). The stakes, that is the total costs, are for content, context, and connection lower and therefore the need for trust equally so.

Trust has deliberately not been included since it mainly is a mean to accomplish something else such as decreased transaction costs or lowered churn. However it is important to be aware of it and to not forget its importance.

The model above does also not take time into consideration. Revenues from services will not be constant over time but decrease after the initial investments as the product ages, (Dixit et al. 1975). Many scholars have therefore identified constant innovation as an important if not the most important criteria for company success, (see for example Hult and Ketchen 2001, OECD 2000, Porter and Linde 1995, or Robertson 1971). Combining the falling prices of hardware and information's tendency to become a public good, constant innovation plays most likely an even bigger role in the information industry.

Successful companies will therefore be those who have the capacity to continually improve and innovate, according to Porter and Linde (1995). A majority of works has, according to Martínez-Ros and Labeaga (2002), found that innovation activity increases more than proportionally with the firm's size. Despite that François et al. (2002 p. 249) claim that "innovation capacity depends more on a company's organization than on its size" and that it is important to organize for innovation immediately.

Organizing for innovation, or for better marketing or higher efficiency, has been excluded from the main focus of the thesis. It is simply a company-intern activity related to important processes but not directly associated with the interface.

5.4 Conclusions From Chapter Five

Especially problematic for a market coordination are:

- When asset specificity increases, the transaction cost associated with market governance increases.
- When asset specificity is present to a nontrivial degree, uncertainty raises the cost associated with market governance.

- When both asset specificity and uncertainty is high, market coordination is the least attractive choice compared with hybrids and hierarchies.

Physical specificity plays an inferior role in the mobile information industry, since transportation and inventory costs are diminishing due to digitization. One could however consider different standards and interfaces to artificially created physical asset specificity. Human asset specificity, can play an important role for the efficiency of the company and the internal transaction costs, but for business development it plays an inferior role since the asset specificity occurs when an employee is trained on a company specific matter with limited use outside this company. Location specificity does not play a major role depending on the basic properties of information. Time specificity both can play an important role and can be completely irrelevant. Due to basic properties of the mobile information industry it will be better equipped than any other industry to minimize it negative influence on being able to be traded on a market.

From a transaction cost perspective there is nothing that makes it impossible for a market to form.

Existing value chains for information in general and mobile goods in particular have had several weaknesses. Separate activities are treated as if they linearly increase the value of a service when in fact some of the activities are taking place simultaneously and others not at all, - or repetitively.

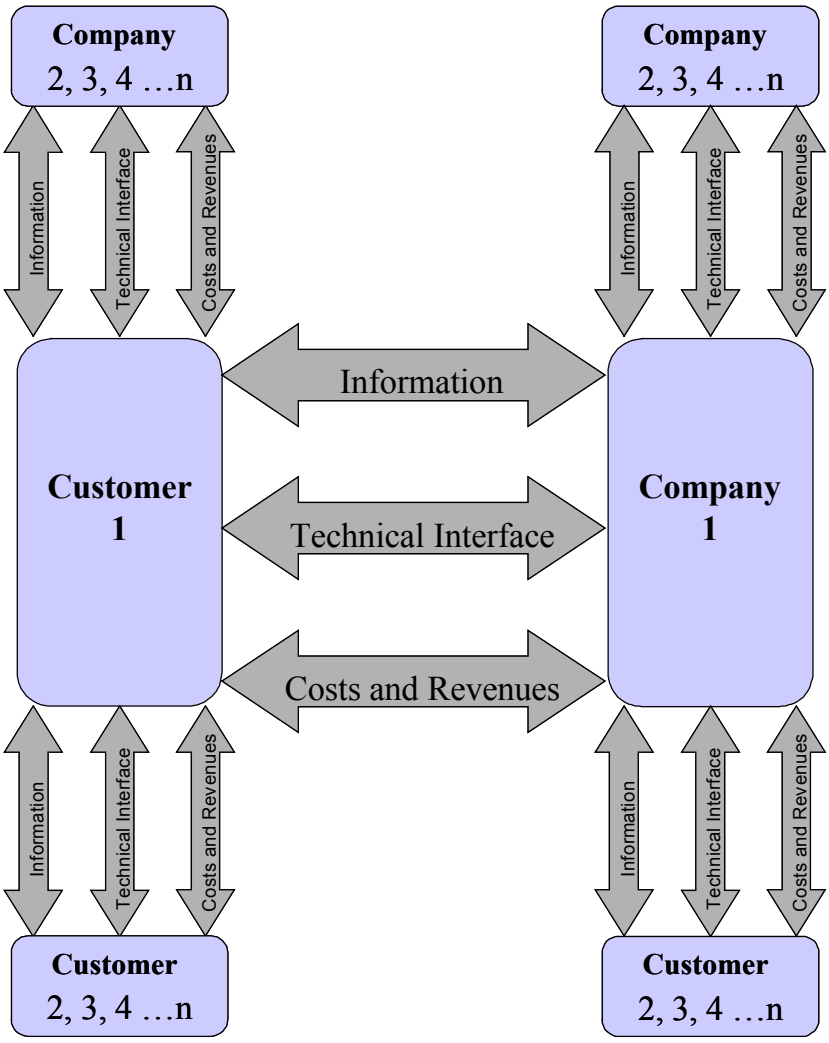

Figure 50: The mobile information industry depicted.

To better understand the industry a tool in was introduced that can depict the actual dependencies, information and revenue streams. Since there is interdependence between information, technical interface and cost and revenues, depicting the industry can considerably ease the analysis.

6 Evaluation Examples

In this chapter different evaluation methods will generally be discussed. These methods can all be used together with the two tools presented in this thesis. One could even claim that the supplement each other to gather good enough decision support information.

Additionally, three very simple ideas from real companies are tested in order to show how one can work with the tools.

6.1 Different Evaluation Methods

To be able to judge whether a mobile information service has a chance of being successful we are mainly interested in the evaluation and selection phase of the new information good. However to be able to select the best mobile information good we need to consider the whole chain of activities.

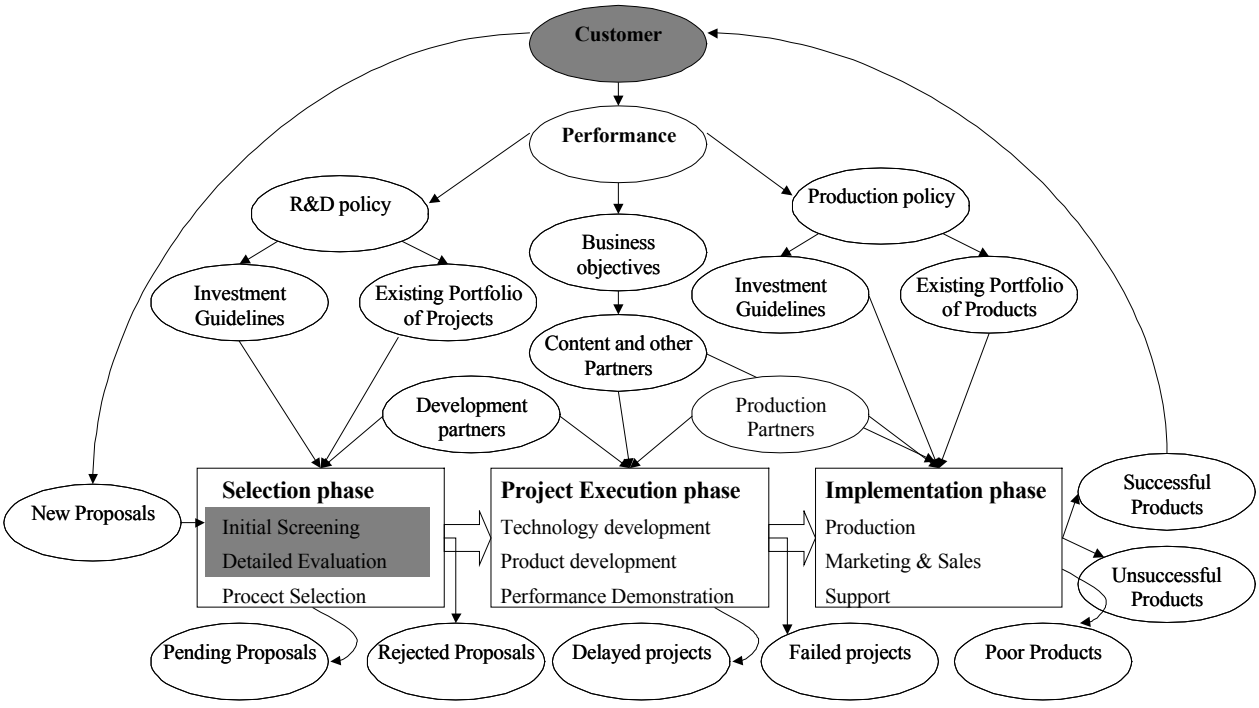

Figure 51: Success of an information good depends on several activities, factors and relations (Source: Pillai et al. 2002).

Pillai et al. (2002) separate the project in several different activities and create a performance index based on the activities that have been completed and the expected merit of the project. The index can then be evaluated during the development phase and an information good can be

discontinued, changed, or in any other way altered depending on the change in performance. This could even be considered “a universal principle” of working (Akalu 2001 p. 375).

6.1.1 Economic Valuations

Making economic calculations in order to predict success is inevitable. Capital investment appraisal techniques based on discounted cash flow, DCF, has been used since the 1970’s according to Akalu (2001 p375). One of the more common DCF methods used, is net present value, NPV. The problem with NPV is that it requires and assumes equal class of risks for inflows and outflows of cash during the project (Akalu 2001 p. 377).

Internal rate of return, IRR is the rate of return where the NPV equals zero. This provides information about the maximum cost of financing of the project but has the same drawbacks as NPV.

To cope with some of the drawbacks of traditional DCF, more advanced methods have been developed. According to Pillai et al (2002) a typical development project has a project evaluation phase (screening evaluation and selection), a project execution phase (technology development, product development, performance demonstration), and finally an implementation phase (production marketing sales, support). The three levels must be evaluated together to see the complete risks and costs. Following the importance of being able to change the course of the project during the development and its lifetime, this leads to real option analysis. In real option analysis, investments can be regarded as future options, which entail the right, but not the obligation to take a certain action in the future. The major drawback of real option analysis is that it has not extensively been tested in industry and it constantly value projects higher than NPV, which might lead to acceptance also of projects that should have been rejected[31].

Focusing on shareholder value, SV, when calculation investment options is also popular in appraisals of investments. According to Akalu (2001 p. 380) shareholder value is:

SV=NPV-ß

Thus shareholder value from a project is equal to the net present value minus the market value of debt to finance the project (ß). However this is very sensitive to all assumptions that need to be made. Financial models cannot be better than the assumptions put in.

A general problem for the mobile information industry with regard to DCF methods is that they usually do not account for R&D, existing know-how, and many of the fixed assets of a firm according to Akalu (2001 p. 378). Neither do they take non-monetary (qualitative) aspects such as legal, social, or political changes into consideration (Mohamed and McCowan 2001 p. 232). If the total uncertainty about the assumed factors is significant, and that will most likely be the case in completely new developed mobile information services, not recognizing it will according to Mohamed and McCowan (2001, p. 231) often totally distort the predictions. Therefore, making any decision based on them will be highly suspect and meaningless (Desmet et al. 2000).

6.1.2 Multi Criteria Decision Making and Scoring Models

The simplest scoring models add a few factors together, score them separately and the one with the highest score is the best. This type of model is common when similar product characteristics should be measured. Slightly more complex is the model where the important factors are scored and then weighted with relevance. The weighting could build on algebraic, absolute, or squared differences. This methodology, when correctly executed, works for most cases. The problem is that it is hard to estimate when it is correct, that is to know when the weighting is correctly estimated.

Survey based

In deciding, which architect to involve for a certain project Ling (2003) has developed a long list with factors important for the selection. Each factor has received a mean value of importance derived from a survey, significant on the 95% level, and a weight value derived from separate expert interviews. The factors were clustered and assigned a weighting and together with the rating of the different candidates a score was calculated for each and every one. With similar methodology Dvir et al. (2002) measure relations between project planning and project success.

Sanders and Boivie (2004) have analyzed different factors in a corporate governance structure and found that a couple of factors were positively related to market value of new firms in new industries.

[31] The opposite is of course as well true. There might be several projects, which would not pass a NPV calculation but that could objectively have been very profitable.

This methodology can be used for repeated projects of similar nature also in the mobile information industry, but it is less useful when trying to evaluate an idea where there is no existing product or service to compare it with.

Relation based - Analytical Hierarchy Process

The analytical hierarchy process, AHP, has according to Khalil (2002) been developed to solve unstructured problems ranging from simple personal decisions to complex capital intensive ones. The application is carried out in two stages, hierarchic design and evaluation. In the hierarchic design relations are depictured, for example project characteristics might be depending on time, price, schedule complexity etc. In the next level price can be dependent on currency, interest rate, etc.

In the evaluation phase each factor is pair-wise compared with the other factors on the same level, creating a matrix with all the comparisons and a relation between them. From this matrix a normalized priority ranking can be computed using the eigenvalues of the matrixes[32]. To simplify things, software exists to handle the whole process (Al-Subhi Al-Harbi and Kamal 2001).

The problem with AHP for the mobile information industry is that it is a prerequisite that we have some two or three different but similar alternatives to choose from, and it can estimate the best alternative. It will not give an answer on whether to invest in a specific mobile information service.

Special purpose

For evaluations that are frequently repeated exist standardized methods. According to Yammarino (2003) WABA, it is for example ideal to acquire information aiming to "formulate development strategies" for organizations based on employee appraisals. Its weakness though is that it focuses on personal characteristics on for example a manager or an employee, rather than economical features sought for the business development model. Different analytical data techniques such as r_{WG}, item response theory (IRT), differential item functioning (DIF), confirmatory factor analysis, structural equation modeling, within and between (WABA), logistic regression, polynomial regression, and response surface methodology can according to Yam-

[32] $A \cdot W_j = k \cdot W_j$
Where: According to Cagno et. al. (2001)
A = the pairwise comparison matrix
W_j = the vector of the absolute values of the importance weights
K = the highest eigenvalue in matrix A

marino (2003) enhance our methodological understanding of multi-source rating. However no matter what rating methodology used, the rating source effect are no stronger than the individual raters effect according to Yammarino (2003).

That means that also when trained personnel uses tests that continuously have been improved and which are repeatable, the subjective influence is still stronger than the objective. Understanding of the industry and being able to estimate the right parameters to feed the economical calculations with, is far more important than selecting a certain economical measurement rather than another.

6.1.3 Statistical Methods

Statistical methods would be all surveys and other measurements presenting the result based mainly on statistical analysis. These methods can be used in an array of fields, for example measuring company performance based on some differentiating factor (for example McMullan et. al. 2001, Chrisman et al. 2002).

Desmet et al. (2000) suggest that a value analysis should be based on DCF methods buttressed by microeconomic analysis and probability-weighted scenarios. Valuation of a fast growing company can be made "in the future", that is when it has reached the assumed sustainable growth rates. Then one can calculate with a DCF method the present value (Desmet et al. 2000) and would get rid of some of the problems of accurate forecasting. "Short hand valuation approaches, including price-per earning and revenue multiples, are meaningless when there are no earnings and revenues are growing astronomically", Desmet et al. (2000 p. 3).

It is better to repeatedly make calculations for different scenarios and, with probabilities assigned to each scenario, calculate a mean value. To be able to do the scenarios one needs according to Desmet et al. (2000) also understand the business models of the companies and pay attention to such things as average revenue per customer, total number of customers, contribution margin, average cost of acquiring new customers, and the customer churn rate. Here the framework and the two tools can help.

Unfortunately many factors in the mobile information industry and similar industries do not fit with the axiomatic basis of probability theory simply "because the uncertainty is caused by the inherent fuzziness of the parameter estimates rather than with randomness" (Mohamed and McCowan 2001 p. 232).

Mohamed and McCowan (2001) suggest a method where net present value calculations are combined with possibility theory and Monte Carlo simulations to calculate the most likely value. The result is a possibility graph. Non-monetary aspects can according to Mohamed and McCowan (2001) be treated similarly. Instead of putting a monetary value they introduce a continuous scale (0-1) ranging from not supporting the objectives to supporting the objectives to a maximum degree. To deal with non-monetary factors of different importance they need to be weighted preferably according to Mohamed and McCowan (2001) by using AHP as described above. A similar possibility graph as for the monetary calculation is then obtained. When the monetary graph has been normalized too it is possible to combine the two graphs, usually by applying some weighting. The resulting graph can according to Mohamed and McCowan (2001) be used to rank similar projects.

Business ideas in the mobile information industry are in general to diverse too be treated with the same methodology, but similar, or variants of the same idea can be tested also with this methodology. Ideas with similar economic inputs and outputs can be compared with the non-monetary risks associated with each of them, which might make one look more favorable than the other. Risks or possibilities, such as changed legislation regarding for example ownership of location estimation data, still need to be considered when evaluating a business idea.

6.2 Examples and Comments on the Business Development Models

> *It is no use saying, "We are doing our best." You have got to succeed in doing what is necessary.*
> Winston Churchill

This chapter will include three companies that will be evaluated using the tools introduced above. The examples give the readers valuable examples on how the model can be used, which makes own analyses easier. The companies' business ideas are deliberately chosen to be easy to understand and reflect the flexibility and usefulness of the models rather than being examples of good business models.

6.2.1 BeamGate, What's The Name of the Tune?

BeamGate[33] offered a very simple service to its customers. Whenever a song was playing on the radio the customer could send an SMS to BeamGate mentioning the radio station. BeamGate then answered with the name of the artist and the track. At the same time the customer was offered to buy the CD featuring the same song. BeamGate can best be described as a value shop, or a very short value chain starting with radio station and ending with BeamGate or the record shop.

Mentioning radio station "BeamCode" | Send SMS to: | Answer with the name of tune played, and the price for the CD

Figure 52: Explaining BeamGate's service to find out which song is being played on the radio.

This service was nothing that mankind will stand or fall with. But it does offer a solution to anannoying problem most people have had. Whenever there is a really good song played on the radio, the name of the artist and record is not mentioned. BeamGate provides value because the mobile phone interface offers additional functionality compared to the radio. - It can communicate, and independent on customer location. The value of this service is thus mainly derived from the technical interface and the situational aspects.

[33] http://www.beamgate.de

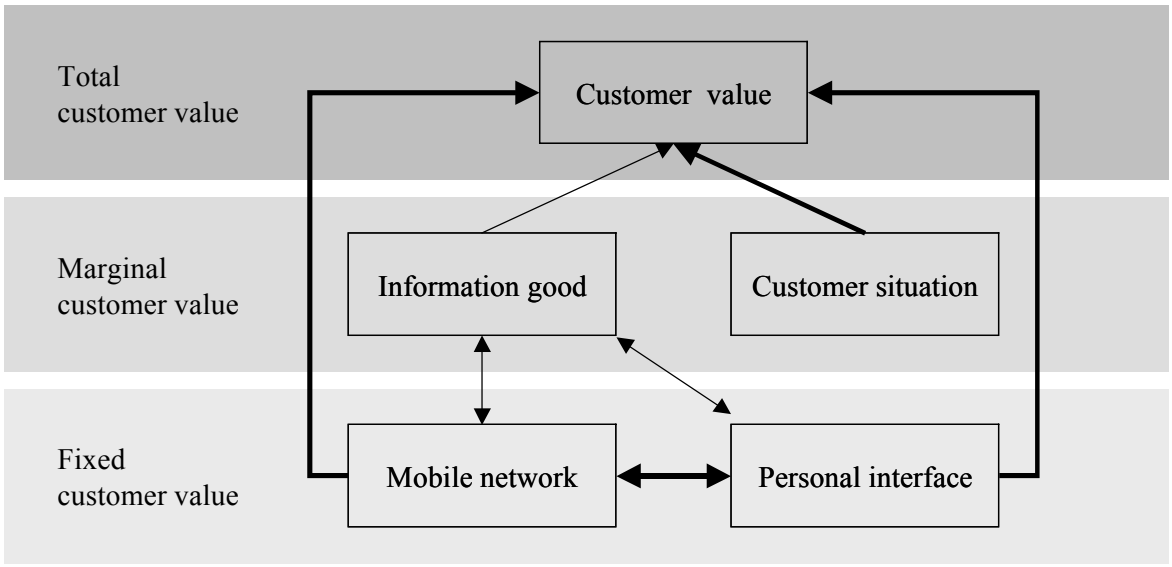

Figure 53: BeamGate create value through transactual emmediacy.

6.2.1.1 Industry Position for BeamGate

Initially the possible industry network is depicted. Beam gate needed to have contact with the radio stations as well as with a record selling company or it need to start own logistics regarding the record sales. Beamgate has decided not to have the record sales in-house and therefore a business contact is added (they had a cooperation with BOL). The customer has of course also contact to the radio station, where he heard the song that he is interested in and he has contacts to several different competing record shops including the same one BeamGate is using (BOL). Below the industry position of BeamGate between radio stations, record shops and customers is depicted. Observe that the customer has contacts with several different record companies and also with friends. The interfaces between all actors can now be analyzed.

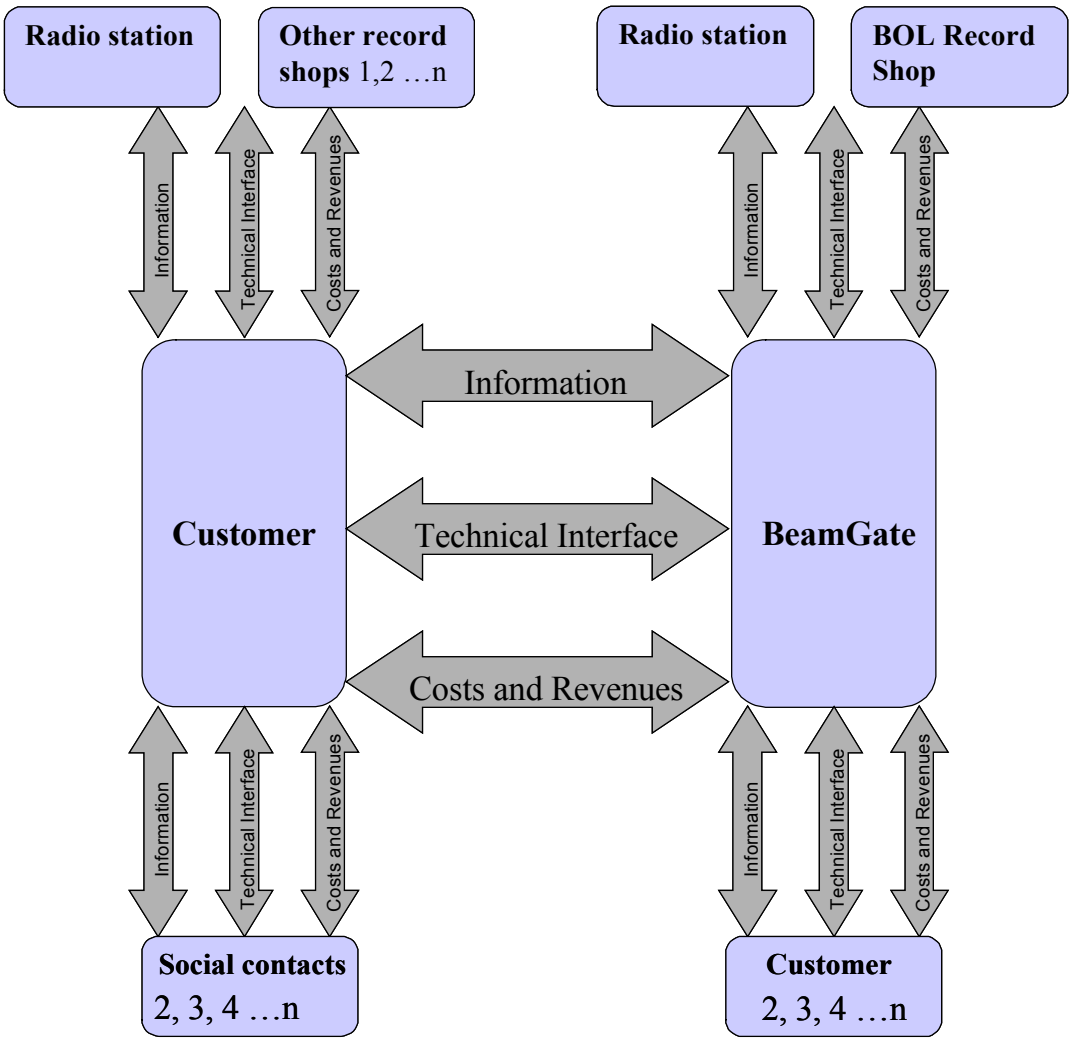

Figure 54: BeamGate's Industry Position between radio stations, record shops and customers.

Interface between BeamGate and other companies

BeamGate has a far from ideal position in the industry, even though it partly depends on whether the information broadcasted should be seen as a public good or belonging to the radio stations.

The *technical interface* between BeamGate and the other companies should be less problematic. The radio stations have no additional costs for providing title and artist information, since all play lists programmed with this information are already available. It can by the radio station, be provided free on air, and can be detected on any RDS or DAB radio[34]. To be able to pro-

[34] RDS is a narrow-band digital channel, which is broadcasted simultaneously as normal FM radio. DAB Eureka 147 is a full digital radio system which has been implemented in most European countries but without having sold many receivers it still attracts a very, very little crowd.

vide BeamGate's SMS information service, BeamGate can either receive the content from air, or having some agreement to get it by wire in advance or simultaneously from the radio station.

The *information* BeamGate gets from the radio station will most likely be available only so long as the radio station cannot make more money with it in another way. BeamGate's position is dependent on whether the information will be a public good or belonging to the radio station.If the play list, which is most likely, is seen as a private good, BeamGate becomes fully dependent on the radio stations, which can give them a difficult situation. As soon as the content supplier, that means the radio station, sees that there are chances to make money they can make sure that they get a large part of it, either by increasing the prices or by starting a competing service. Compare the discussion above regarding location based services.

Cost and revenues for BeamGate's contacts can in this example be simplified. Costs occur possibly in form of payments to the radio stations and for SMSs. The revenues are proportional to how many records are being ordered. Most if not all of BeamGate's revenues must come from selling records. During 2002 they were brokering the records from bol.com[35] and got a commission from that. The problem, as said before, is that they need to persuade the customer to buy a CD, which has become increasingly difficult due to decreasing CD sales overall. Internet provides basically any song downloadable for free to everyone who feels like stretching the intellectual property rights a bit. If the customer is at home then BeamGate has to fight against the fact that a downloadable song is available directly whereas a CD must first be delivered. The relation with the record store is not so crucial, since there are most likely several similar companies and there should be not so much differences of what provision BeamGate can get from them.

Interface between BeamGate and customers

To use the service takes the customer less than 30 seconds and costs him regular mobile operator SMS charges, which is usually not considered much to find out whatever. There are no time gains and no valuable information for neither the customer nor BeamGate, which is transferred apart from the name of the songs and artist. Possibly could the radio station be interested in customer profiles and responses. BeamGate can in that case produce reports for the radio stations as a part of their potential payments to them.

[35] www.bol.com

By analyzing the interfaces one immediately notice that the customer needs to have two different receivers, one for the radio and the other one for the mobile network. Without having analyzed all business segments, the majority of customers is assumed to sit in a car, possibly be at work, or is at home. Customers are usually carrying their mobile phone with them and use it personally. That means that the interface supports the service but of course it is a drawback that two different terminals need to be utilized. Since both technical interfaces are very easy to operate, and BeamGate does not charge for the service, it goes very fast to analyze the interface.

To be able to analyze the costs one needs to know the cost for BeamGates infrastructure as well as their agreement with the other companies involved. A weakness of the business idea is of course that the service will only generate revenues if the customers buy a record.

Not depicted above is that both customers and BeamGate need to have a phone subscription. The cost for an SMS needs to be paid by both customers as well as by BeamGate and this is regardless if any record is sold. The customer needs to pay for two SMS if he wants to buy something. It would of course be possible, although less likely, that BeamGate instead of paying for sending their SMS gets money from the telecom companies since BeamGate is driving SMS traffic in their nets. If so the business case looks quite different. Instead of stimulating people to buy records it might be better to market the increased traffic in the SMS channel.

Economies of scale

There are economies of scale mainly on the supplier side. The major costs for BeamGate are fixed costs, which are costs to install and operate the system. After that they can to a very low marginal cost serve more customers (once again depending on which type of agreement Beamgate has with the mobile operators). For customers it is good to have only one SMS number that they need to remember, which BeamGate should try to exploit. It is problematic that the radio stations can of course simply air a message regarding a competing service with a different number. Still if a customer knows that he can get track information from any radio station remembering only one phone number it is possible that demand side economics of scale can work for BeamGate since they can exploit first mover advantages. To build this awareness through marketing in order to achieve future barriers of entry would be very costly though.

6.2.1.2 Customer Value of BeamGate's Information Good

From our customer value matrix we find that BeamGate provides customer value by addressing a real or imaginary spiritual need. After that they provide the possibility for increased customer productivity when offering the customer to buy the product.

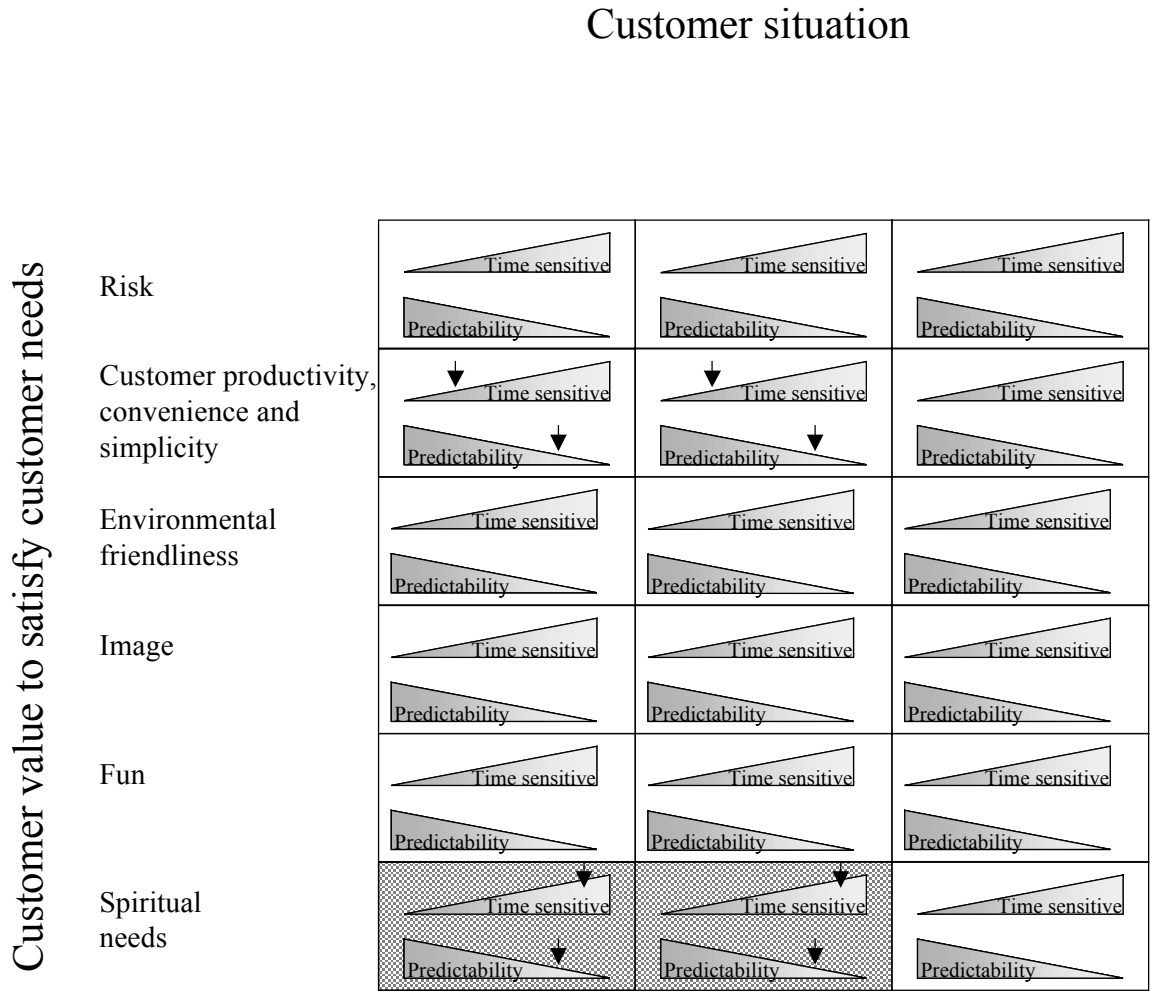

Figure 55: BeamGate's services mapped in a customer value matrix.

It is also important to notice that the predictability that the customer will hear a song of which he does not know the name of and were he would like to know more about is low (0.2). And at the same time it is time sensitive to find it out (0.9). This is in general a good ground for offering a mobile information service. Both stationary and mobile customers can use the service. That is good, especially the mobility part since there are few other possible sources to get the wanted information.

When it comes to buying the record it looks worse. Low predictability (0,2) here means most likely a small market. Low time sensitiveness (0,2) combined with customer productivity makes it possible to look for other vendors, or possibly even more common in BeamGate's target group today, find the track downloadable for free on the Internet, or ask a friend, which he has contact to, to burn it on a CD or send it as an MP3 file regardless if this is legal or not.

6.2.1.3 Strategies For BeamGate

Beamgate is in a difficult position because they offer value for which they hardly can charge. At the same time their revenues from sales of records are uncertain. If they would be profitable there is very little value built and it would therefore rather easy for one of the radio stations to take over this business. BeamGate need to close detailed contracts with many radio stations to create economies of scale. Furthermore beamGate needs to take large marketing investments and additionally rely on viral marketing to get their customers to remember a special phone number.

In order to create trust among the other business partners and reduce the chance of someone else copying the service as soon as it becomes profitable it might be a good idea to offer joint ownership of some kind. Transaction costs for users are on an acceptable level, however to create customer awareness is expensive.

BeamGate needs to concentrate on efficiency to lower all possible costs and to see how their customer knowledge can create more revenue streams. If they would manage to get revenue sharing for the SMSs from the mobile operators and simultaneously solve the long-term cooperation with the radio stations there could be a future for BeamGate. If not, the future will be considerably less bright.

6.2.1.4 How did it go?

BeamGate tried to expand horizontally and use its system also for ordering books. Lately they have moved into all kinds of information services such as information about traffic jams, weather, speeding cameras etc. The service now also cost 29 euro cents including the SMS and they get their payment from this fee which the phone company operators are collecting.

6.2.2 It's Alive! Location-Dependent Games

It's Alive is a Swedish company that develops location based games. One of their games was called Supafly, a wireless location-based soap opera or virtual location based community. In short, the player creates an alias, which can be anyone or anything living in the same city as the player. Based on SMSs and Internet, the player "lives the life of his alias". The player can chat with other players mobile or stationary, can be tracked when he or she is moving around, gets into an on-line newspaper, or tries to meet someone in real life. Once again, a mobile information service, which does not make the difference between life and death, but that tries to capitalize on especially the youth segments social needs.

6.2.2.1 Industry Position for It's Alive!

The customers are supposed to communicate via their Internet service provider (not depicted) and/or via Telia, a Swedish mobile operator. Telia is also the actual service provider since they have purchased a license to use the game. It's Alive! hosts the service but has no direct billing capacity. The business idea is to drive traffic in operators' mobile networks and to get revenue shares for this. Additionally It's Alive! charges the mobile operator a fixed license fee to be able to at all deploy the service plus hosting fees if It's Alive! is hosting the game.

It's Alive! is mainly performing a mediating role and the different users or participants are creating most of the content. The customers have contact with Telia, who is marketing the service and they go through It's Alive! when they are using the service and communicating with other users. It's Alive! has contacts with different mobile operators in this case Telia as well as with all other users.

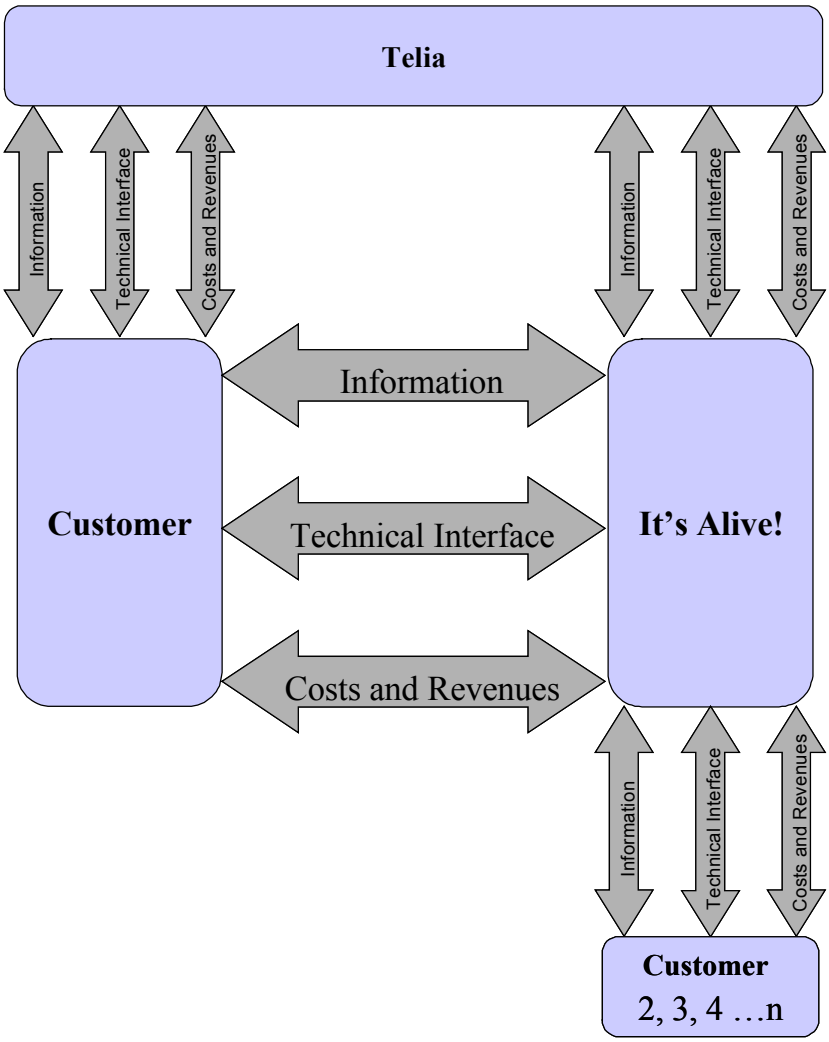

Figure 56: It's Alive's industry position between the mobile operator Telia, and customers.

It's Alive! is, based on the definition of location based services, somewhere in between a service provider and a content provider. They do have a direct information flow from customers but revenue streams go via Telia. If they would have a service which Telia easy could copy this would be vulnerable, but multiplayer game development is most likely not what most mobile operators see as their core competence.

It is also immediately possible to see that there are plenty of demand side economies of scale. A large part of the utility comes from other players' availability of and their behavior.

Interface between It's Alive! and other companies

The shortcomings of the technical interface of mobile phones solved It's Alive by making it possible to use the fixed-line Internet for some tasks. For other tasks where mobility is required or preferred by the user, the mobile phone becomes the interface.

The information flow in the Supafly game is very different from BeamGate since it is mainly the customers themselves who create the utility. It's Alive can create a "newspaper" in which the most "heavy users" or the most successful once are honored, but apart from that it is a community game. This means as well that the utility of the game is very individual.

Regarding costs and revenues, It's Alive! is in a difficult situation. The first problem is mobile operators' reluctance of revenue sharing. So far it has been possible for It's Alive! to convince a few mobile operators that it is in both parties' interest to drive more mobile phone and SMS traffic.

The second problem is of course that games go in and out of fashion. They need to be constantly updated if customers should return. It's Alive! needs first to sell it to the operator before it can get any income, but to be able to do that they need a product, which is basically ready, which means that there might be considerable development costs with uncertain returns.

Relying on several different revenue streams such as license fees hosting fees and revenue sharing is of course wise, but since they all come from the same company it must be considered more differentiated pricing than different revenues streams. Somehow charging the end customer must be tempting for It's Alive! at the same time as this would risk to decrease the amount of users and thereby decrease the networks total value.

Community games are very dependent on demand side economies of scale. To be interesting there need to be a lot of players connected. If not, there is no value for the user. The econo-

mies of scale are possibly even greater. A technical community platform is once produced and then it can be reused as often as there exist a demand. Since the user themselves are creating the content the marginal cost to add yet another player is approaching zero.

The network effects are the strength as well as the weakness in the concept. There must be quite some marketing to make the game known to the potential players to be sure that it reaches critical mass. At the same time, the game has probably only a limited lifetime before it needs to be changed. Each time it should be renewed there might be a new discussion with the mobile operator about revenues and other contractual details.

It is not necessarily so, that a mobile operator has the same patience with a loss making game like the movie industry needs to have with loss-making movies.

6.2.2.2 Customer Utility of It's Alive's Information Good

Pure communication is the biggest service over mobile communication systems. Combining it with the possibility to use it both stationary as well as mobile seems to attract a large possible crowd. So far all well.

Supafly can be played at home with the stationary computer were you can chat with other players and it can be played with the mobile phone communicating via SMS. This means as well that one cannot say whether the service is very time sensitive or not. It depends both on the interface and the user. In general it is of course time sensitive if one wants to have a conversation, but it is also possible to stay out of the game for several days.

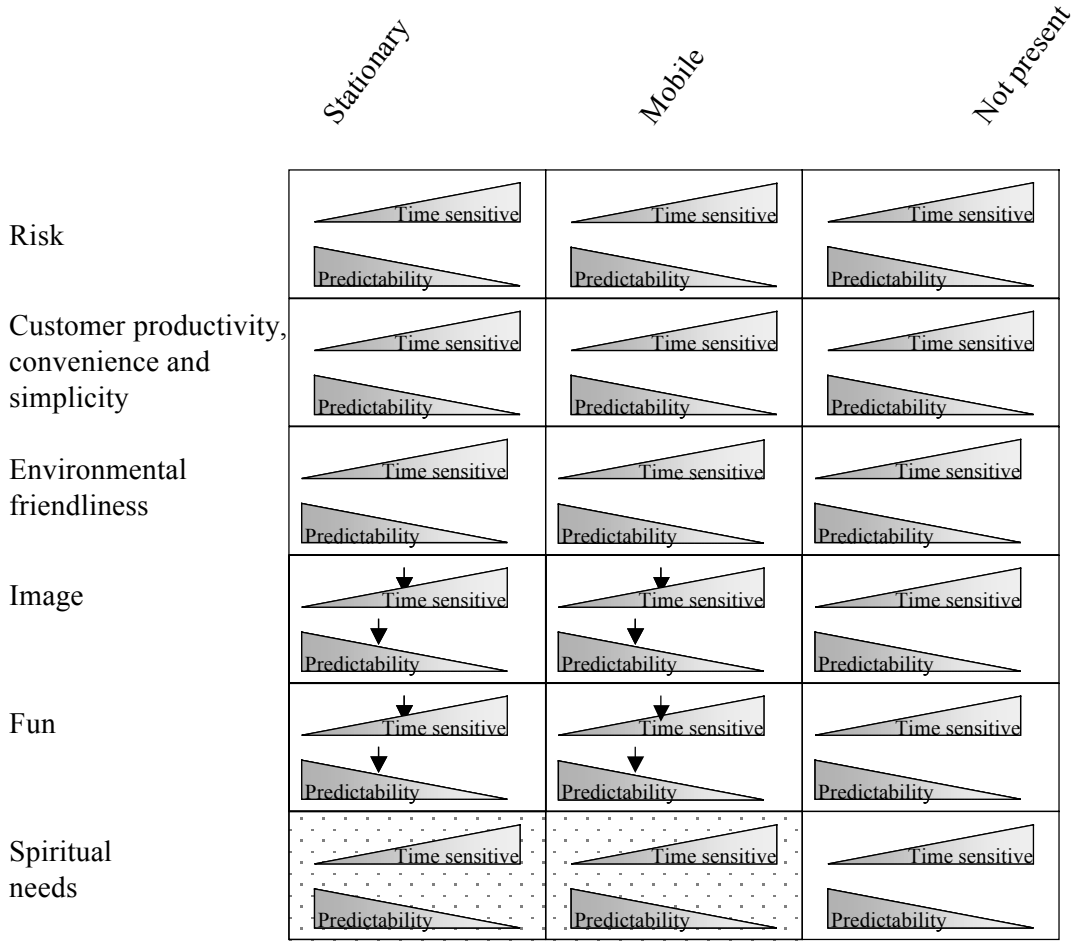

Figure 57: It's Alive's mapped in a customer value matrix

The Supafly game tries to capitalize on the target group's need to communicate, however the main utility it is bringing is not ease of communication, but rather image building for the user at the same time as it is simply fun to take part of it. To a lesser extent it satisfies some spiritual needs. It is exciting for users to see that other players are very close to them, maybe in the same room, which highlights the utilization of location information through the service. The search for knowledge is primarily made over the fixed-line Internet. The service is not really time sensitive, people use it more when they have too much time and want to have something to do. Therefore, there is lesser importance of predictability. Competitors to this service are apart from similar Internet activities, TV, meeting friends in a cafe, as well as all other social spare-time activities.

Furthermore, the service has a mobile component, and that is what makes it interesting here. The mobile component is a lot more time sensitive than the fixed-line counterpart. However, also here are differences due to the interface observable with regard to costs for the customer

and user friendliness. When used for chatting or to place a message on a message-board it is mainly an expensive and cumbersome replacement for fixed-line Internet. On the other hand, coupled with location recognition, finding friends or chatting with other mobile owners becomes suddenly both very location sensitive and as well time sensitive. There are no real competitors other than possibly other mobile community services to this part of the service.

6.2.2.3 Strategies for It's Alive!

Obviously the ability to innovate becomes very important since they need to launch more games to get more revenues. Avoiding loss-making games without sacrificing creativity is the balancing act that It's Alive! has to manage successfully in the same way as the movie studios. Unfortunately, It's Alive! has bigger problems. Where the studios have a lot more market power than the different theatres, it is the opposite for It's Alive!. To be able to ease the sale to the operators they need to have a brand name. The same is true for the sales to customers. In order to decrease the initial marketing of a new game they need to be already known so that customers want to find out when the next release comes. If there is a demand for their services, not only from customers but also from mobile operators, It's Alive! will prosper given the fact that most of the costs are already accounted for in the development phase. If too much efforts and price discounts need to be given to the mobile operators it will probably be hard to be profitable.

The focus on the product once it has been sold to ensure it becomes profitable and also that it is prolonged as long as possible to get the most out of it becomes a necessity. Several lessons can be learned from the moving picture industry.

6.2.2.4 How Did it Go?

Supafly still exists. It was awarded the grand prize "Best Mobile Application" at the Ericsson Mobile Application Awards in Zurich 2001. During 2003 they have also entered the Russian market. July 2004 however they merged with a local Swedish game development company and thus shifted major owner.

6.2.3 Own Business Development, the Mobile Translator

The two examples above are real companies. Deliberately any information, such as revenues and mobile operator resistance that cannot be known at the time a decision is made to proceed with the business idea, is left out. A financial investigation must follow and the tools presented above ease the approximations that need to be done. The tools can also be used to further develop an idea inside a company.

Many tourists and business people come into situations where it is necessary to understand a foreign language. It can be in a restaurant reading the menu, or perhaps in contacts with the local authorities. A mobile translator would be easy to construct and probably useful for the customer. In this example the user could send an SMS with the language and the text that needs to be translated, or he can browse through a WAP service. Seconds later, the customer receives a SMS with the text translated to his language of choice.

6.2.3.1 Industry Position for The Translator

The user is probably willing to pay for the service making it possible to both for third party service providers and mobile operators to run the service. There could be different levels of service and perhaps a possibility also to speak with a call center that have bi-lingual staff speaking both the customer language and the language spoken on the customer's location.

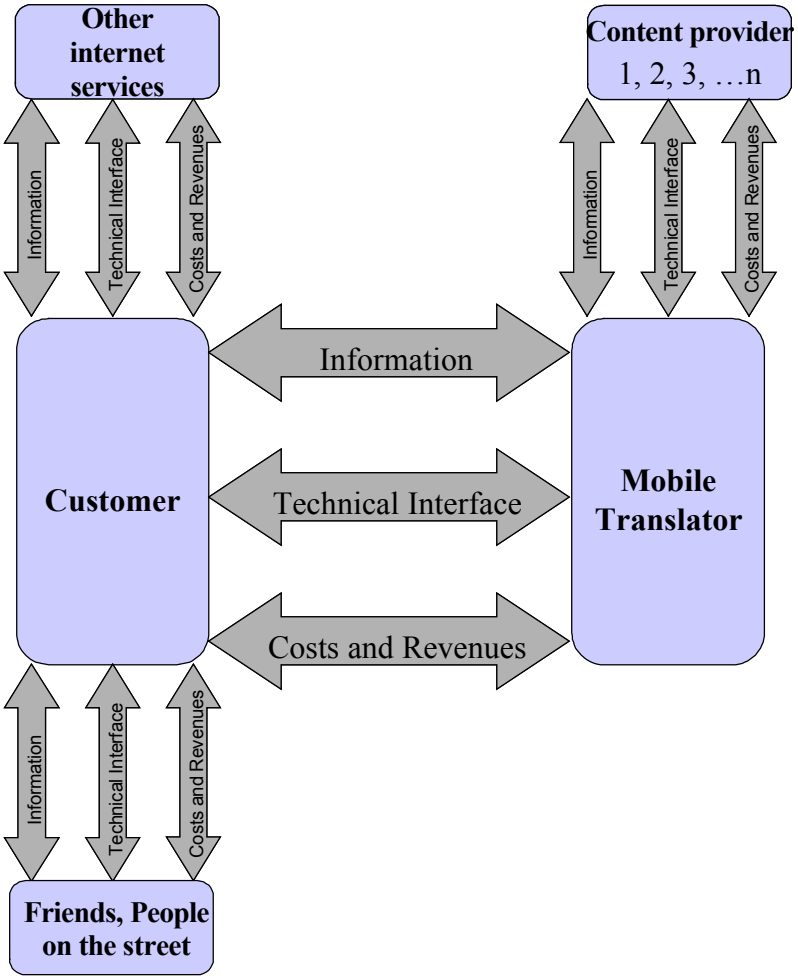

Figure 58: Mobile Translators possible future industry position.

It is possible to imagine three different kind of suppliers to the Mobile Translator: software developers, hardware suppliers as well as dedicated content providers. The company could

have a few suppliers of dictionaries as well as freelancers that stand by for a direct oral contact with potential customers. Additionally, there might be some automatic translation software etc. Suppliers of such goods are not crucial with regards to market power since there exist several different vendors for all items, which also implies that there is no high barrier of entrance. Additionally, there is a contact to one ore more mobile operators, but it has no influence on market power since it is only transporting a service in this example. Possibly it would be necessary to use the billing capacity of an operator.

The interface is probably the most important aspect. It has to be easy and quick enough to use and so simple that people do not instead use one of the many dictionaries that are available online. Although SMS can support all characters many terminals cannot. Today for example a service would most likely be limited to the same languages that the mobile phone can handle when writing an SMS. That is very likely only the Latin alphabet, possibly including the Cyrillic and/or Greek. Languages that are based on other alphabets can therefore not be served. For PDA-like phones it would probably be hard to get people adopting it since they could use existing free dictionaries at least for the common languages. Cost and information sent should make no difficulties.

The information between mobile translator and the customer are not valuable. The customer asks a question and gets an answer. This type of information has very little value to any other party. The customer has other information possibilities. He can if he doesn't have a dictionary use a lot of existing Internet translation tools, which are free, but require that you can browse HTML pages. Today very few phones can do that, but in the future it will certainly be more common, which in that case would lead to severe competition from substitute services.

Costs have to be figured out but it should present no difficulties to estimate them. Revenues need to be estimated based on price and expected market size.

There are considerable economies of scale for good and bad. Once again the supply side economies of scale are huge since the automated service's marginal costs is approaching zero. There need probably to be a fairly large user base to be able to offer the oral direct communication. One could perhaps as well think of a speech to text recognition software which produces a translated text, which the user could receive via SMS.

6.2.3.2 Customer Utility of Mobile Translators Information Good

It is hard for a customer to predict when the translator is necessary, but if it is necessary it is often quite time sensitive. The biggest market would probably come from the segment "cus-

tomer productivity". A considerably smaller but probably more demanding and with a higher willingness to pay would be the security segment. When a customer for whatever reason needs to make himself understood or understand a sign and has no other means to accomplish this such as through dictionaries, friends or available interpreters, this could be a valuable and highly appreciated service!

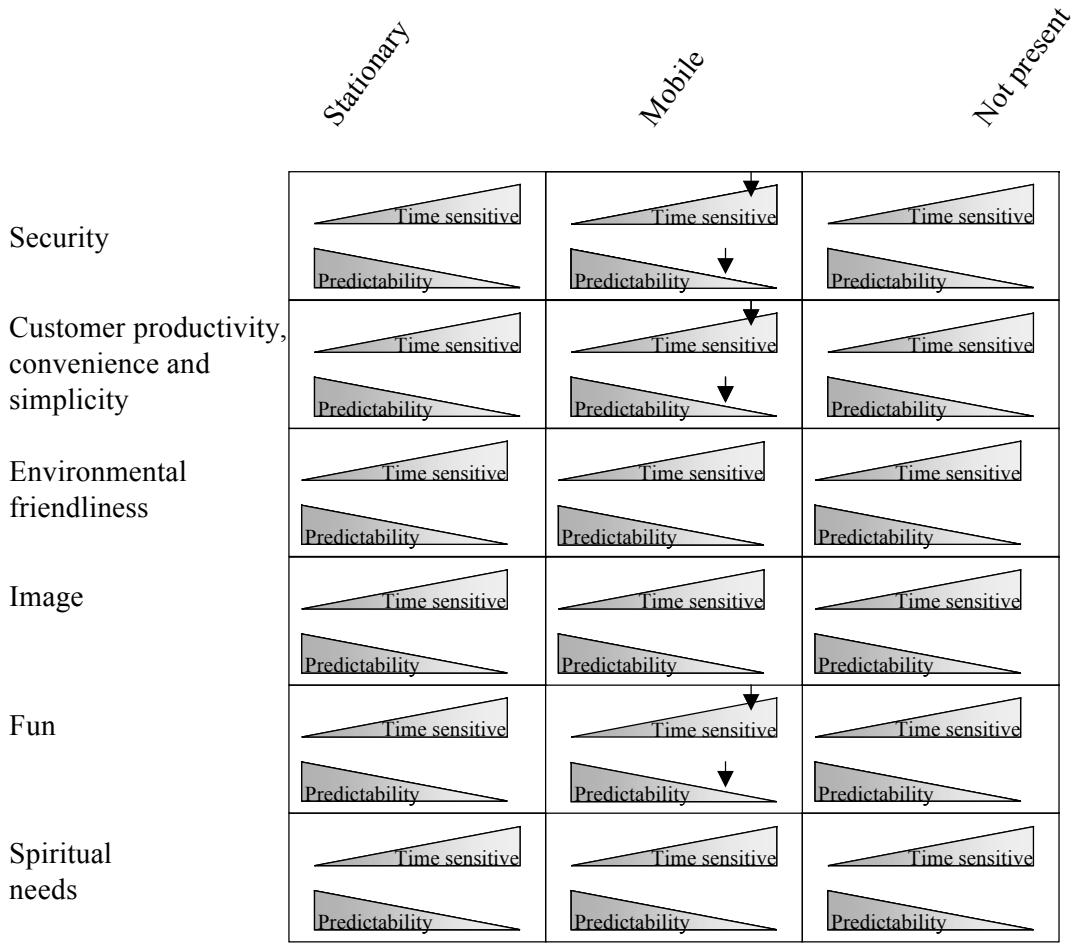

Figure 59: Future translator services mapped in a utility matrix.

The service as such would be best described as a value shop. Concentrating on solving the customers' problem provides possibilities in separating the services depending on the above-described segments in basic and premium services. There are a few additional services that one could attach to it, such as ordering a taxi, finding a telephone number etc. These services though would most likely be very expensive and require quite some economies of scale.

6.2.3.3 Recommendation for Mobile Translator

I hope someone will start the service, mainly because I could use it myself every now and then. However, it is very questionable if it can be run profitably. The short analysis above sees no immediate hindrances, but also not the possibilities to earn money on short term. On already medium term most terminals will have internet capability probably destroying a dedicated mobile market. Efficiency and marketing for customer acquisition is probably what need to get highest priority in the beginning, as well as perhaps partnering with some mobile operators to ease the marketing budget and to allow for simpler payments for customers. On a medium sight the growing amount of HTML enabled phones probably means that one need to utilize both channels. Later finding additional revenue streams become also important.

6.2.4 Concluding Remarks on the Business Development Examples

There are two major advantages in using the models presented above. The first is that it is made evident how customer value is created in the mobile information industry. Adding a way to include customer location and interface when assessing the value of an information good leads to more accurate calculations. This accuracy will range from size of the total market to price estimations, making it possible for more accurate go/no-go decisions.

The second reason is that advantages and disadvantages of different business models are easier to detect. This ranges from a company's position inside the industry to the ways customer can receive value in the specific niche where the information goods is positioned. This leads to better risk assessments and a more straightforward strategy execution.

Additionally, it is possible to make these calculations without major investments. It is therefore possible to assess more ideas and at an early stage in the development process be able to disregard non-successful ones.

Above has been shown three examples on how the two tools can be used to quickly analyze a business idea. Before a new business idea is launched one would of course go a lot deeper into each factor. How many phones are available in the potential market? What is the market willing to pay? How much does it cost us to produce the service with 10 000, 50 000 and 500 000 customers? What would be the NPV with different costs of capital?

These tools have also been used to explain the utility of business development. The information goods offered by BeamGates and It's Alive's have deliberately not been tested to avoid a biased analysis. Instead the analysis was based mainly on information from company representatives and written material. One needs to observe that the tools as such do not evaluate the ser-

vice as such but only the idea. A good idea can be better or worse executed. Some hints can be given regarding information sent, time. and technical interface, but in general it is outside the scope of the models.

Finally, it is once again important to emphasize that the tools describe the market forces in the industry especially with respect to customer value. The tools give hints on how an idea can be positioned, if customers are likely to adopt it and if companies have chances to be profitable. Operations on the other hand, that is to fill the idea with proper content, layout, pricing, marketing, and other aspects important for a successful launch of a new developed good is as the reader has realized up to the company to implement in a responsible way.

6.3 Discussion/Further Research

The thesis has shown that there is a need for models and frameworks explaining the mobile information industry and to provide tools for business development in this industry. This work has better than before explained how customer value is created in the industry. It has brought a customer-situational perspective, opposing the traditional value chain for mobile information goods. Before customer location has only been connected to why customer changes preferences (Flint et al. 1997).

The concept of evaluating customer value with respect to time and location and its dependence on other industries can be exported to other industries. Above there is a first “industry specific” evaluation on how value is created in the mobile information industry. To better understand how value is created we still need the more general discussion started by Stabell and Fjeldstad (1998) about chains, shops and networks. However it is also necessary to simultaneously study specific industries to increase the level of sophistication and better be able to construct tools for practitioners to use in the daily work.

Investment decisions in the mobile information industry rely mainly on organization and marketing theory. There is a lot of secondary data available from different industry organizations, but only on a very aggregated level, which is not always so beneficial for the study of something specific. The differentiation of customer situation has therefore been kept at a very high level that is, to “mobile”, “non-mobile” and “not present”. When predictability of an event as well as time sensitiveness are added enough information is provided to differentiate mobile information goods from each other with acceptable resolution. The tool could probably gain more from an even more detailed sophistication level. When researchers can work closer with service providers I expect that it is possible to reach a more detailed level in explaining the situational aspects of customer value.

The customer value aspect is derived to cover all existing mobile information goods and to be different enough so that it is possible to clearly identify where a good can create customer value. This is done presenting six areas. They are derived from prior work based on both tangible and non-tangible goods. As the mobile information industry matures it will be possible to "fine tune" these areas and thus to receive an even better fit with what is demanded.

7 Summary

The thesis shows that there is a need to explain how customer value is created the in mobile information industry and to provide tools for business development in this industry. This work explains better than previous works how customer value is created in the mobile information industry. It has brought a customer-situational perspective into the industrial value creation, opposing the traditional value chain approach for mobile information goods. It presents a framework for value creation in the mobile information industry. Together with two tools also introduced it easier and quicker can estimate the success of new mobile services

7.1 Information Markets

There are many differences between physical and information goods. The costs to produce information goods are mainly fixed, and both marginal production costs and transportation costs to the customer can often in absolute terms be considered low. Different to most tangible goods is that:

- Information is an experience good.
- Information usually has huge return to scale.
- Information is typically non rival and sometimes non excludable

There are additional aspects one needs to consider when transforming information to a good accessible through a mobile network.

- Information can be made available when you need it, and the entire accumulated stock of relevant information is available all the time, not just new offerings.
- Information can be constantly updated at little extra cost.
- Information flows can easily be individualized
- Customers can select and use part of an extensive information load.
- Information can be interactive without capacity constraints.

Perceived customer value, a function of perceived quality and perceived price has won support as being one of the most important factors when creating a company strategy. It has been found to be a powerful predictor of purchase intention. How value is created, and how the customers anticipate this, becomes a vital part to understand the industry. To capture the meaning of total customer value it is also necessary to understand the costs, the trade-off, associated with the transfer of information goods.

Especially problematic for a market coordination is:

- When Asset specificity increases, the transaction cost associated with market governance increases.
- When asset specificity is present to a nontrivial degree, uncertainty raises the cost associated with market governance.
- When both asset specificity and uncertainty are high, market coordination is the least attractive choice compared with hybrids and hierarchies.

Physical specificity plays an inferior role in the mobile information industry, since transportation and inventory costs are diminishing due to digitization. One could however, consider different standards and interfaces as artificially created physical asset specificity. Human asset specificity can play an important role for the efficiency of the company and the internal transaction costs, but for business development it plays an inferior role since the asset specificity occurs when an employee is trained on a company specific matter with limited use outside this specific company. Location specificity does not play a major role depending on the basic properties of information. Time specificity both can play an important role and be completely irrelevant. From a transaction cost perspective there is nothing that makes it impossible for mobile information market to form.

The Mobile information industry can be segmented in several different ways: Depending on how it gets financed, the core competences of the involved companies, or how well it solves customer needs.

If one analyzes the core competences of the participating firms it is possible to identify competitors as well as estimate the industry position for a company. Access to valuable market relations and/or information can make a business idea viable or not.

7.2 Customer Needs are Situation Dependent

It is not where, how, and when the offer is available for purchase that need to be analyzed, but rather where, how, and when the customer is using it, reflecting that customer value is situational and changing from time to time and between locations.

Information services can be used to save time, to find a location, or to get the most out of a location. Prior studies have often had a supply side focus when analyzing the value of a location. Since the customer is free to use a service independent of where a supplier is located, the focus of an analysis need to be shifted to the demand side.

In general customers have material, social, and spiritual needs. These needs cover all aspects of live and customer value can occur in any domain of customer behavior, be it economical, social, artistic, or spiritual. If one describes the industry in customer value terms, with focus on satisfying needs, it is possible to develop a framework describing how customer value is created in the mobile information industry. It also allows us to start making predictions about demand of future services. By establishing a Hotelling-type utility space it is possible to differentiate the different services better than existing information value chains.

7.3 Results of the Thesis

The thesis concentrates on building value in the mobile information industry. When it is known how customer value is built one can easier draw conclusions whether or not a business development idea has the prerequisites for being successful.

A framework explaining customer value creation in the mobile information industry is developed in chapter 3. Customer value in the mobile information industry is dependent on two fixed factors, the mobile phone (personal interface) and network, and two marginal factors, the information good itself and the customers' situation when using it. This explains how value is created in the industry better than existing so-called "information value chains" where often unrelated activities are connected without possibilities for iterations.

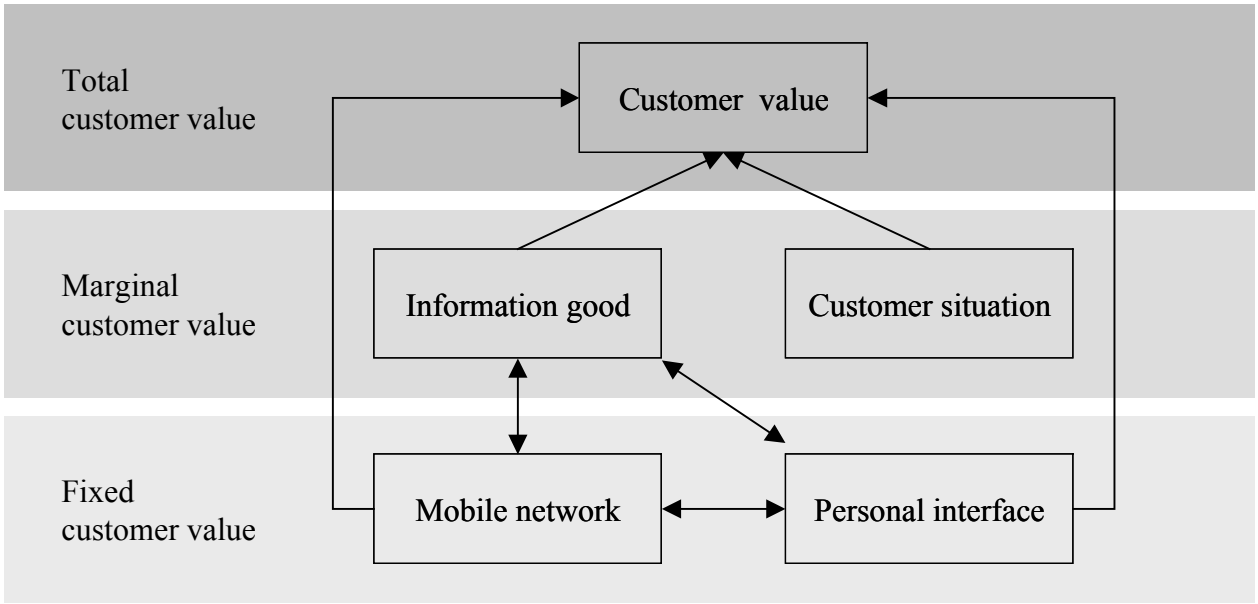

Figure 60: Framework for customer value creation in the mobile information industry.

Based on this framework two powerful tools for business development are presented in chapter four and five.

The first tool identifies situational dependent customer value of a mobile information good. It is possible to estimate the size of the market and its competitive position compared to substitutes.

The tool analyzes how well a service is bringing customer value. It is closely related to the marginal customer value level of the customer value creation framework. Therefore it mainly concerned about customer location and the mobile good in itself.

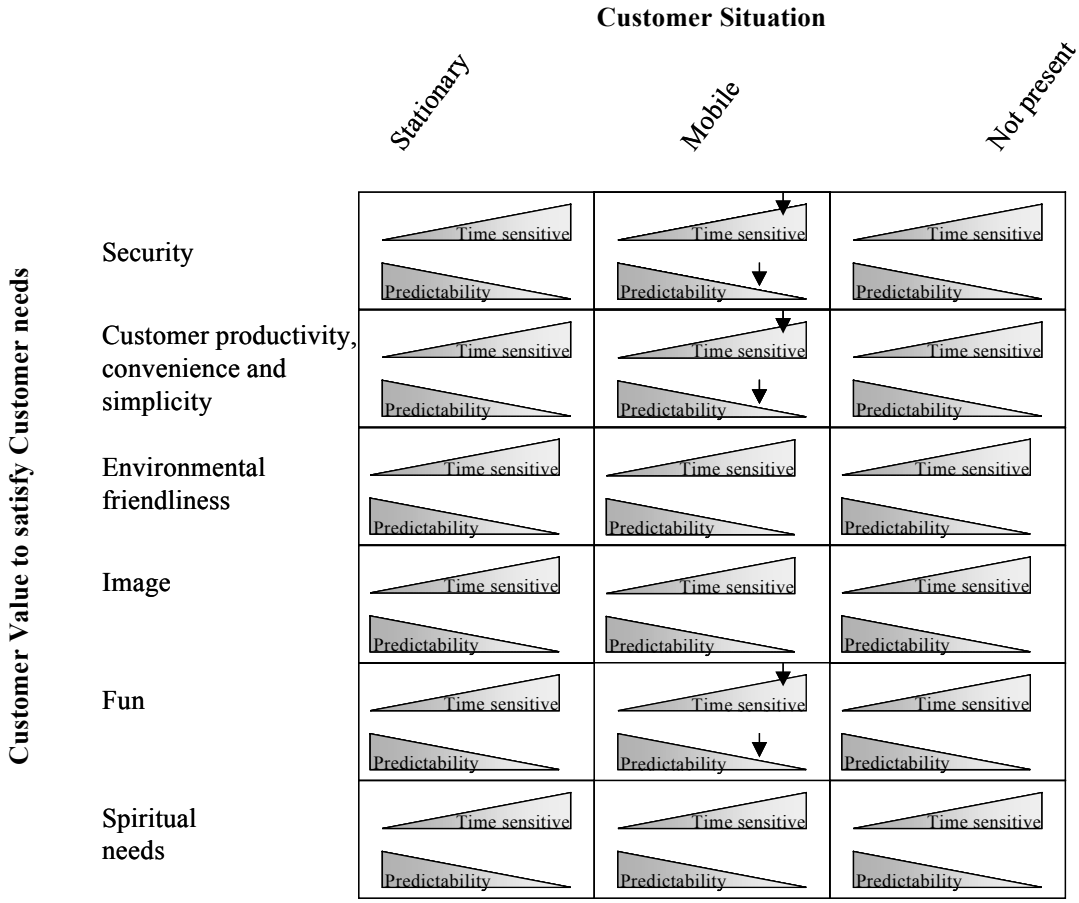

Figure 61: Utility matrix for mobile information goods.

The last tool is depicting the industry to be able to better understand the competitive pressure from inside as well as outside the industry.

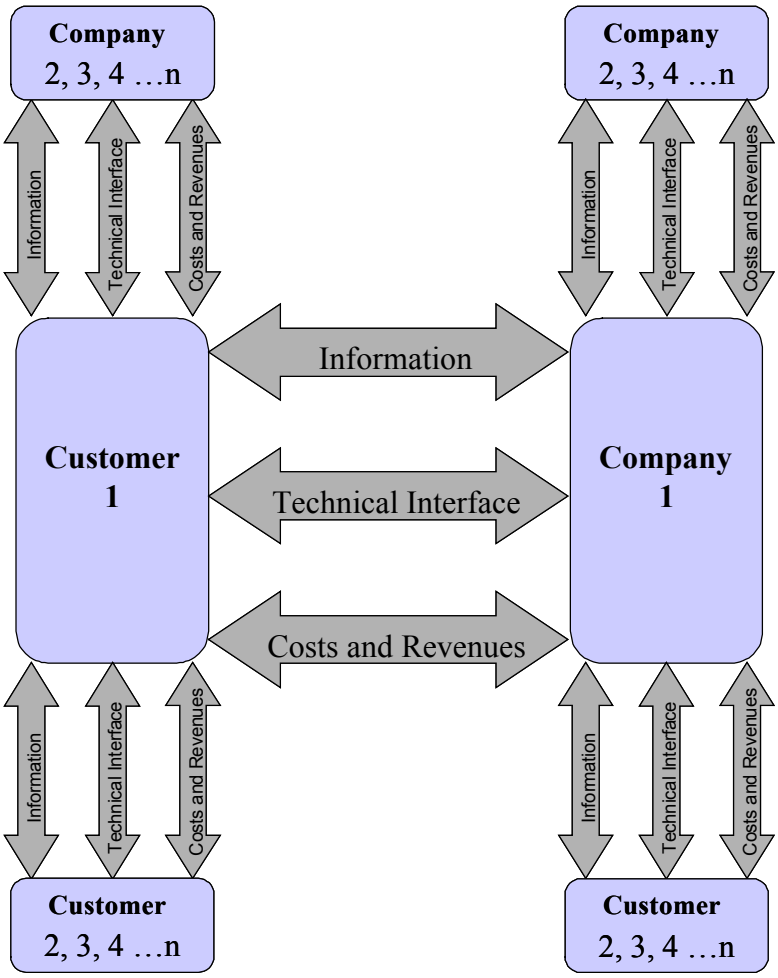

Figure 62: The mobile information industry depicted.

This tool is related to the fixed customer value level of the customer value creation. It analyses the interface between customer and company. The tool can also estimate importance of network effects and market power inside the industry.

An idea might have the prerequisites to be successful, but fail due to bad management or any other aspect. In e-business it is more important to understand the "key drivers of success in a particular business model" (Chen 2003 p. 33). These tool will help the practitioner to depict the structure of the industry, to ease investigation, and to identify possible obstacles.

For the scholar the tool is flexible enough to depicture information and revenue streams in value chains, shops and networks.

Together the framework and the two tools, are capable of cost efficiently identify and differentiate potentially successful new mobile information goods from the non-successful ones.

There are two major advantages in using the models developed in this thesis. The first is that it is made evident how customer value is created in the mobile information industry. Adding a way to include customer location and interface when assessing the value of information goods leads to more accurate calculations. This accuracy will range from size of the total market to price estimations, making it possible to make better go/no-go decisions.

The second reason is that advantages and disadvantages of the business model are easier to detect. This ranges from company positioning inside the industry to the ways customer can create value in the specific niche where the information good is positioned. This leads to better risk assessments and a more straightforward strategy execution.

Additionally, it is possible to make these calculations without major investments since one can, at an early stage in the development process, disregard non-successful ones.. It is therefore possible to assess a greater number of ideas.

Appendix 1 - Localization Technologies

Most of the information in Appendix 1 comes originally from Samsioe and Samsioe (2002b).

Existing Technologies on the Market

Broadly speaking localization technologies can be divided in network based positioning, device enabled positioning methods, and a combination of both. The following technologies are standardized by the ETSI: Cell-of-Origin and Timing Advance (COO + TA), Up-Link Time of Arrival (UL-TA), Enhanced Observed Time Difference (E-OTD) and Assisted GPS (A-GPS). Beside these ETSI standards IEEE has developed standards for short-range radio pairing technologies. Private vendors offer proprietary localization technologies. Ericsson has SIM-Toolkit (COO + RxLev), which enables the location to be done in a normal GSM terminal using network information. Cellvision has developed calculation methods based on the actual, rather than theoretical, cell-planning information of the mobile operator to improve the location estimation Cell-of-Origin and Timing Advance. Below, I give a short description of existing technologies as well as references to where more information can be obtained.

Cell-of-Origin and Timing Advance (COO + TA)

With this technology the network parameters Cell-ID and timing advance (TA), are evaluated in order to determine the position of a mobile device. This type of positioning works with all existing mobile terminals, since the mobile systems network does the location calculation.[36] Due to the fact that the Cell-ID information is always known by the system for every individual user the investment for the mobile operators are very low. However, these methods provide only a very rough positioning accuracy of about 100m to 30 km dependent on the cell size.

Time of Arrival (TOA)

Time of Arrival is measuring the propagation time of a signal from a mobile device to at least three Location Measurement Units (LMU). The measurements of the LMUs are used by the location center to triangulate the position of the mobile terminal. TOA is designed to meet the requirements of the FCC E-911 service (emergency positioning in the U.S.) and lies therefore at about 125 meters.[37]

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[36] ETSI specification GSM 03.71 and 3PP specifications UMTS TS 22.071, UMTS TS 25.305

[37] For further reading please refer to the following ETSI specifications GSM 02.71, GSM 03.71 and the following 3PP specifications UMTS TS 22.071, UMTS TS 25.305.

Enhanced Observed Time Difference (E-OTD)

Enhanced Observed Time Difference (E-OTD) requires the measurement of signals from different base stations to determine the observed time difference of the signals. In the case that the base stations of a mobile network are not synchronized, Location Measurement Units (LMU) have to be installed in the system to enable an accurate determination of the mobile device.

This method requires software modifications in the terminal. The time difference is measured in the terminal and the location is determined either by the terminal or by the network. The accuracy is dependent on the environment and the amount of LMUs and bases stations installed and lies typically between 60-200m.[38]

Assisted GPS (A-GPS)

The service quality of standard GPS solutions, which is especially classified by poor indoor coverage is improved by establishing a GPS reference network, with defined positions of the GPS receivers. A-GPS requires SW & HW modifications in the terminals. The location is calculated either by the terminal itself or by the network. The accuracy is about 10-50m.[39]

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Short Range Radio Pairing Technologies

Other technologies enabling location-based services are short-range radio pairing technologies such as wireless LAN and Bluetooth. Since these technologies are meant to cover a limited area only, they are complementing the mobile network based location based services. For indoor positioning, where cellular and GPS-based positioning technologies are not working optimal, these can play an important role. Since their usage, in general, is for free and since they can deliver both a localization estimation as well as the actual service, they are seen from the network operator as a competing technology.

A wireless LAN is one, in which a mobile user can connect to a local area network (LAN) through a wireless (radio) connection. An IEE standard specifies the technologies for wireless

[38] For further reading please refer to the following ETSI specifications GSM 02.71, GSM 03.71, GSM 04.35 and the following 3PP specifications UMTS TS 22.071, UMTS TS 25.305.

[39] For further reading please refer to the following ETSI specification GSM 03.71 and the 3PP specification UMTS TS 25.305

LANs. The standard includes an encryption method for secure communication, the Wired Equivalent Privacy Algorithm.[40]

Bluetooth is operating on the free 2,45 GHz frequency band and is capable of transmitting voice and data. The radius of a Bluetooth cell is approximately 10 meters with data rates of up to 1 megabit per second. Encryption and verification is provided. IEEE standardizes Bluetooth.[41]

Comparison of the Different Technologies

The following table gives an overview of the advantages and limitations of the different technologies used for localization. Observe that the investments mentioned are for mobile network operators and there could be other parameters, which decide, in which technology to invest than only accuracy and costs.

Technology	Technology	Indoor Coverage	Investment for network operator	Terminal modifications required?
COO +TA	100m - 30km	Yes	Low	No
UL-TOA	60 - 150 m	Yes	High	No
E-OTD	60 - 200 m	Yes	Medium	Yes
A-GPS	10 - 50 m	Limited	Medium	Yes
W-LAN	0- 100 m	Yes	na	Yes
Bluetooth	0- 10 m	Yes	na	Yes
Not standardised: SIM-Toolkit (COO+RxLev)	50 m - 200 m	Yes	Low	No, but new SIM

[40] IEEE specification IEE 802.11
[41] IEEE specification IEE 802.15

Appendix 2

Information will more likely be used by decision makers when:	
Organizational Power	The originating source is powerful compared to the user.
	The information is not available from other sources; that is, the control of uncertainty is not substitutable.
	The information is central to the users functioning
Goals, Incentives, and Control Systems	It can be used to assess achievement of quantifiable goals
	It is fed into a well-articulated and operating control system which includes an effective set of intensive; that is measured performance can be sanctioned
	It does not recommend actions which are incompatible with the existing control system's ability to monitor and sanction
	It originates from sources who have a vested interest in the continuation of the project.
Information Acquisition	The information is not available from other sources; that is, the control of uncertainty is not substitutable.
	Readily accessible
	Summarized
	Presented orally
	From a source deemed as creditable, that is, trustworthy
Information Sign	Is supportive of the outcome favored by the decision maker
	Does not lead to conflict among the set of relevant actors
	Cannot be attacked by those in opposition
	Information is more likely to be used when vivid concrete illustrations of the conclusions are available

Table 4: Likelihood of information usage (Source: O'Reilly 1983).

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