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Juha Munnukka

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ABSTRACT

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Traditional pricing research has focused on analysing price setting procedures and cost or competition based pricing strategies. Customer- or perception-oriented pricing strategies have been left on little attention among business practitioners and academics. The need for development and investigation of these new pricing strategies has occurred after the emergence of new electronic and mobile services; traditional pricing strategies have resulted unsatisfactory results. With this study we have concentrated on elucidating the unobserved fields of perception-based pricing in mobile services business. The focal point of the study consists of analyses of the customers' price perceptions of mobile services, and the analyses of the differences in the perceptions between the three predefined customer segments: mobile segment, combined segment, and fixed-line segment. Four latent customer-based factors were constructed which were expected to explain and predict the differences in the customers' price perception levels: service satisfaction, price sensitivity, innovativeness, and investment readiness. And for providing practical solutions for pricing problems, the present study examined also the applicability of the bundle pricing strategy for mobile services. These analyses disclosed that customers in the each segment perceived mobile services to be rather expensive, though differences between and inside the segments were notable. Out of the four analysed factors especially customers' innovativeness and the price sensitivity were accurate indicators of the customers' price perception levels. Customers also seemed to prefer acquiring mobile services in bundles rather than separately, and a positive relationship between the customers' bundle preferences and price perceptions were found.

Key words: price perception, bundle pricing, sensitivity, satisfaction, investment readiness, innovativeness

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Jyväskylä, May 2004

Juha Munnukka

FIGURES

FIGURE 1 Types of research design
FIGURE 2 Operator as a service integrator in Mobile Environment
FIGURE 3 Conceptual relationships of price, perceived value, and willingness to buy
FIGURE 4 Perceived value
FIGURE 5 The charges/acceptance function
FIGURE 6 Formation of new pricing methods for mobile services
FIGURE 7 Tripod-foundation for bundle pricing to occur
FIGURE 8 Components of value mix
FIGURE 9 Framework for the dissertation
FIGURE 10 Comparison of customers' age distributions between the customer segments
FIGURE 11 Customers' marital status among three customer segments
FIGURE 12 Customers' average segment specific annual income levels
FIGURE 13 Customers' mean price perceptions and satisfactions to pricing schemes in use
FIGURE 14 Customers' usage frequencies of mobile services
FIGURE 15 Customers' satisfaction to an operator's services
FIGURE 16 Customers' readiness to invest more on mobile services
FIGURE 17 Customers' perceived innovativeness
FIGURE 18 Customers' price sensitivity
FIGURE 19 Illustration on the dynamics of price perceptions of mobile services

TABLES

TABLE 1 Customers' segment-specific demographical characteristics
TABLE 2 Factor analyses for the mobile segment
TABLE 3 Factor analyses for the combined segment
TABLE 4 Factor analyses for the fixed-line segment
TABLE 5 Result table of the factors explaining customers' price perceptions
TABLE 6 Result table of the hypothesis testing

CONTENTS

ABSTRACT
ACKNOWLEDGEMENT
FIGURES AND TABLES

PART I: COMPILATION

1 INTRODUCTION 9
  1.1 Motivation and research rationale 9
  1.2 Methodology of the study 10
    1.2.1 Descriptive survey study 10
    1.2.2 Reliability and validity of the study 13
  1.3 Theoretical background 15
    1.3.1 Background of mobile services business 15
    1.3.2 Pricing and price perception of mobile services 18
    1.3.3 Perceived services quality, value, and price 20
    1.3.4 Price sensitivity 23
    1.3.5 Pricing methods 25
    1.3.6 Bundling of mobile services 27
  1.4 Introduction to dissertation papers 30
    1.4.1 # 1: Formation of price perception of mobile services 30
    1.4.2 # 2: Dynamics of price sensitivity amongst mobile service customers 30
    1.4.3 # 3: Pricing methods as a tool for improved price perception and enhanced adoption 31
    1.4.4 # 4: Through Bundle strategy to Higher Efficiency of Pricing 31

2 RESEARCH DESIGN 32
  2.1 Model construct 33

3 DISCUSSION 38
  3.1 Data collection 38
  3.2 Review of the descriptive statistics 40
    3.2.1 Segment specific demographical characterisation of the mobile service customers 41
    3.2.2 Creation of the latent factors for the study 45
    3.2.3 Descriptions of the latent factors 51
    3.2.4 Results of testing the hypotheses 54
3.3 Business implications 58
3.4 Recommendations for the future research 59

YHTEENVETO (FINNISHSUMMARY) 60

REFERENCES 61

PART II: RESEARCH ARTICLES

PAPER I: Formation of price perception of mobile services

PAPER II: Dynamics of price sensitivity amongst mobile service customers

PAPER III: Pricing methods as a tool for improved price perception and enhanced adoption

PAPER IV: Through Bundle strategy to Higher Efficiency of Pricing

1 INTRODUCTION

1.1 Motivation and research rationale

The mobile industry is facing great challenges at the moment. The phenomenal increase in mobile subscriber numbers, which has fuelled revenue growth over recent years, is coming to an end as the market saturates. At the same time, operators are under pressure to fund new network roll-out and, in many cases, are still paying for expensive 3G licences. As a result, revenues must continue to increase to enable mobile operators to invest on development of mobile networks and mobile services. Customers are restrained from increasing their investments in expensive mobile services.

Therefore across the industrialized world, mobile service providers are testing wide variety of business and revenue models: what would best enhance further development of the business? Two most problematic features for mobile service business models are the complex network of business relationships and the lack of knowledge on customers' purchase behaviour of mobile services. Problems in pricing have concentrated especially on areas of how and what to charge in the mobile environment, and how customers react on price changes (how they perceive mobile service prices).

In addition to aforementioned challenges, mobile carriers are facing so called 'experience-problems' introduced by customers with long (fixed-line) Internet use experience. Internet usage has habituated customers to free-of-charge or very low service charges. It has thus caused reluctance to pay for wireless services more than the fixed-line Internet services. Mobile service prices above the prices of the Internet services are thus difficult to get accepted even though mobile environment offer benefits that are not available in the fixed-line Internet environment.

Those special features and benefits that differentiate mobile services from their fixed-line Internet equivalents have to do with the ability to locate people through their handheld device, the availability of services regardless of time and space, the immediacy of receiving information, and service at hand. Perhaps the most challenging characteristics of marketing mobile services are the distinctive discrepancies of usage profiles, perceptions towards mobile services, and service preferences between customer segments. Special peculiarities like wireless network, constraints of mobile terminals, and usability implications posses extra challenges to mobile operators in addition to wireless environment itself.

Though price is known to be an integral part of diffusion enhancement activities, little is known about the actual effects of pricing on customers' perceptions and decisions in electronic service environments. It is more or less unknown how customers of mobile services perceive the charged prices, and are there specific factors through which customers' price perceptions could be improved or predicted. Therefore, more detailed knowledge on customers' perceptions must be acquired on how customers' perceptions differ and how these differences could be predicted.

This study is about understanding mobile services pricing and the dynamics behind customers' price perceptions of mobile services. The focus of this study is on detailing and examining factors which have a significant role in explaining and predicting the differences in customers' price perceptions. For this reason, customers were divided into three differentiated segments, which were expected to differ in their usage experiences and subjective perceptions of mobile services. Statistical methods and analyses were applied to explain the differences in customers' price perceptions we concentrated on statistical analyses on the customers' subjective characteristics. In addition, the present study also examined proactive solutions for mobile operators' pricing problems in a form of bundle pricing strategy.

1.2 Methodology of the study

1.2.1 Descriptive survey study

Research methodology literature has traditionally separated three basic types of research design: exploratory, descriptive, and causal research (Cooper&Emory 1995). This classification is the most often applied in describing scientific studies though several competing classifications are proposed. For example Goldberger (1973) has proposed that in methodological terms, the models can be referred to as simultaneous equation systems, linear causal schemes, path analysis, structural equation models, dependence analysis, test score theory, multirait-multimethod matrices, and the cross-lagged panel correlation techniques. Behind this diversity of subject matter and terminology, several common features are identified. One in related to the analysis of non-experimental data: the absence of laboratory conditions demands that statistical procedures substitute for conventional experimental controls. A second one has to do with hypothetical constructs: many of the models contain latent variables which, while not directly observed, have operational implications for relationships among observable variables. A third common element in related to systems: the models are typically built up of several or many equations which interact together. (Bagozzi 1980)

Despite that Goldberg's proposition would be also sound research design classification method, to describe the present study the main-line method is used as it is found to best illustrate the study. According to the classifications, the exploration is particularly useful when researchers lack a clear idea of the problems they will meet during the study. Through exploration the researchers develop the concept more clearly, establish priorities, and improve the final research design. Exploration may also save time and money, if it is found over the research process that the problem is not as important as first was thought. (Kerlinger 1973) Causal research is about determining cause-and-effect relationships (Churchill 1995) meaning that in causal study relationships among variables (Cooper&Emory 1995) and their effects on each other are being explained. It is of little value to know the variables which affect the outcome unless we know how they affect it. Research projects designed to investigate these relationships are know as causal studies (Tull&Albaum 1973).

The purpose of descriptive research is to provide an accurate snapshot of some aspect of the market environment, such as consumer evaluation of the attributes of some products versus competing products (Aaker et al. 1995). Best (1970) has defined descriptive research as conditions or relationships that exist, practices that prevail, beliefs, points of view, or attitudes that are held, processes that are going on, effects that are being felt, or trends that are developing (Cohen&Manion 1980). Churchill and Iacobucci (2002) have stated that descriptive research is used when the purpose is as follows: to describe the characteristics of certain groups, to estimate the proportion of people in a specified population who behave in a certain way, and/or to make specific prediction. Descriptive studies require a clear specification of who, what, when, where, why, and how of the research for which reason, also in descriptive research, hypothesis often will exist, but they may be tentative and speculative (Aaker et al. 1995).

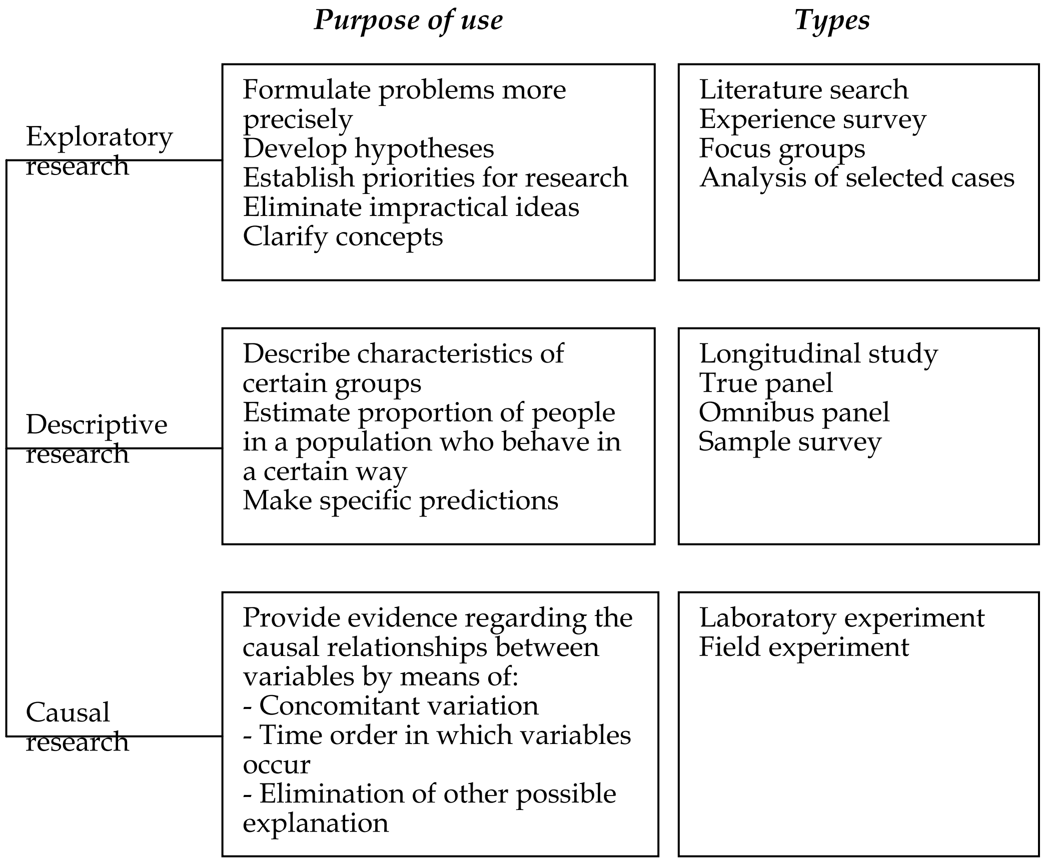
Purpose of use
Types
Exploratory research
Formulate problems more precisely
Develop hypotheses
Establish priorities for research
Eliminate impractical ideas
Clarify concepts
Literature search
Experience survey
Focus groups
Analysis of selected cases
Descriptive research
Describe characteristics of certain groups
Estimate proportion of people in a population who behave in a certain way
Make specific predictions
Longitudinal study
True panel
Omnibus panel
Sample survey
Causal research
Provide evidence regarding the causal relationships between variables by means of:
- Concomitant variation
- Time order in which variables occur
- Elimination of other possible explanation
Laboratory experiment
Field experiment

FIGURE 1 Types of research design (Churchil & Iacobucci 2002)

Basically, two types of descriptive studies can be elaborated: longitudinal and cross-sectional. Longitudinal studies rely on panel data. A panel is simply a fixed sample of individuals or some other entities from who repeated measurements are taken. The cross-sectional study is the best known and most important type of descriptive design, when measured by the number of times it has been used in comparison to other methods. (Churchill 1995, Aaker & Kumar 1995)

The cross-sectional study has two distinguishing features. First, it provides a snapshot of the variables of interest at a single point in time, which provides a series of pictures that, when pieced together, provide a movie of the situation and the changes that are occurring. Second, the sample of elements is typically selected to be representative of some known universe. Therefore, a great deal of emphasis is placed on selecting sample members, usually with a probability sampling plan. The probability sampling plan allows the sampling error associated with the statistics generated from the sample, but used to describe the universe, to be determined. The large number of cases usually resulting from a sample survey also allows for cross-classification of the variables. Thus, a typical sample survey involves summarizing and generalizing the data collected. The analysis of sample survey results rests heavily on the cross-classification table, which is used to report the joint occurrence of the variables of interest. (Churchill 1995, Aaker & Kumar 1995)

In this study we have applied the descriptive cross-sectional study design, which is best suited for examining price perceptions of mobile services and comparing the differences amongst the three customer segments. As our goal was also to enlighten and bring better view on the dynamics behind the customers' price perceptions, the descriptive study was found to fit most accurately. It must be noted that also causal research would be highly useful for studying this topic. Especially as it would be of high interest to acquire knowledge on the actual causal relationships between customers' price perceptions and the factors found to have significant correlative power.

1.2.2 Reliability and validity of the study

The concepts of reliability and validity concern the degree to which the measuring instrument is free of measurement error. Reliability and validity are essential criteria for developing trustworthy information about consumers and their behaviour. It has been argued that most marketers fail to ascertain either the reliability or the validity of the measuring instruments they use. Literature also suggests that the best resolution to the problem of reliability and validity is to verify research findings by quantitative methods whenever possible (Runyon & Stewart 1987).

As Kerlinger (1980) stated, "reliability is the accuracy or precision of a measuring instrument", instruments used and applied in studies should be robust and free from time or condition based errors. And Cooper and Emory (1995) have continued the topic by noting that reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error. Reliable instruments are robust, they work well at different times under different conditions. This distinction of time and condition is the basis for frequently used perspectives on reliability – stability, equivalence, and internal consistency. The most common type of reliability measurement evaluates the internal consistency of items in a scale. Two types of internal consistency can be measured: 1) average inter-item correlation, and 2) Cronbach's alpha, which measures the internal consistency of items in a scale (Garson 1982).

The reliability of the present research was confirmed by Cronbach's alphas of the factors, which measured the internal consistency of items in a scale. Alphas were measured in factor analyses which confirmed the consistency by providing alpha coefficients ranging from 0.6 to 0.9 and remaining thus above the critical level 0.6 suggested by Nunnally (1967). The reliability of this study suffered however to some extent from the fact that sample group was obtained from one customer data base. This caused some problems for the generalization of the results. To enhance the generalization of the research results, the stratified random samples were taken to avoid biased sample groups or emphasize of mobile service customers of certain characteristics. Also the rather low response rate caused dangers of systematic error, i.e. only certain type of mobile service customers have responded. On the other hand, always when studying customer behaviour in new fields of businesses, the respondents', who consist mostly of innovators, characteristics are different from the majority of consumers.

For example Ghiselli (1981) has defined research validity by stating that it refers to the extent to which a test or a set of operations measures what it is supposed to measure. It can be stated that when measuring validity we are concerned that we are measuring what we think we are measuring. The most important classifications are content, criterion-related, and construct validity (Kerlinger 1981).

The content validity of a measuring instrument refers to the extent to which it provides adequate coverage of the topic under study (Cooper&Emory 1995). The theory of content validity also suggests that a measurement has a content validity when its items are a randomly chosen subset of appropriate items (Cronbach 1951). Thus, to improve content validity of the present study the questioners were carefully constructed and revised by experts. Though there was still left some problems which could have been corrected by testing the questioner even more carefully before the actual study.

Construct validity is about knowing more than just that a measuring instrument works. It has to do with the factors that lie behind the measurement scores obtained, with what factors or characteristics account for, or explain, the variance in measurement scores. Construct validity refers to the degree to which a test measures the target construct, or psychological concept or variable, inferred from all of the logical arguments and empirical evidence available. Construct validity is thus directly concerned with the relationship of a variable to other variables. (Gage & Berlinger 1991) One significant contribution to testing construct validity is Campell and Fiske's (1959) procedure, called the multitrait-multimethod matrix, that uses ideas of convergence and discriminability and correlation matrixes to bring evidence to bear on validity. While another method of construct validation is factor analysis, which is a method for reducing a large number of measures to a smaller number called factors by discovering which measures measure the same thing (Kerlinger 1973). In the present study for confirming the construct validity the factor analyses were applied. And to further confirm the validity of the created factors, critical level for the factor communalities (correlations coefficients) was set on 0.5. Thus, each item of the factors was ensured to have a significant and meaningful relationship with the dependent variable.

And finally, for measuring the associations and explanation powers of the latent factors created in the factor analyses with the customers' price perceptions, well tested mainstream methods were applied – linear regression analysis, correlations analysis, and analysis of variances. Though in some instances it has been argued that correlation and regression techniques are not deficient and more advanced tools (e.g. neural networks, comparative analysis) would be more to the point, for describing the customers and their perceptions in the descriptive study, these methods were found adequately accurate (Cooper&Emory 1995, Churchill 1995). As the design of the research variables and their levels of measurement were also based on previous studies, the reliability and validity of the present study can be stated to reach adequate level.

1.3 Theoretical background

Pricing practices has remained largely intuitive and routine-based, and the pricing literature has not produced sufficient new insights or approaches to stimulate most business people to change their methods of setting prices (Nagle 1983). Of many reasons for the lack of creative development of new approaches to solving pricing problems, two are illustrative: 1) for a lengthy period of time the economists' traditional theory of price dominated despite the obvious lack of realism in the theoretical structure, and 2) until recent environmental changes in the markets for goods and services, the seller's problem was not price but rather demand stimulation using promotional activities. Thus, there was little payoff in studying how buyers respond to prices, price changes, and price differences, or how to determine a set of prices that would lead to an optimal position for the firm. (Monroe 1990) Until now, along with new Internet and mobile service environments, price and pricing has emerged as 'Achilles heel' especially for the development of mobile services business.

Providers of telecommunication services have recognised that customers, who are willing to switch service providers, will make their decision firstly on price basis. Innovation management is thus argued to be a question of pricing, which need to be taken into account when planning strategies for mobile services business. (Kollmann 2000) As new services and additional features of mobility and personalization over mobile devices enable new types of mobile services the need for innovative and more efficient methods of pricing has emerged, as well (Jonason&Eliasson 2001). One of the most frequently suggested strategy for pricing fixed-line and mobile Internet services is perception-based pricing (e.g. Nagle&Holden 2002; Monroe 1990). To be able to carrier out the perception-based pricing, a detailed knowledge on customers' preferences, perceptions, and other characteristics are needed. In this study, a special focus has been laid on observing the factors related in customers' price perception of mobile services, and effect of different elements of customers' subjective characteristics on formation of their price perceptions.

1.3.1 Background of mobile services business

Wireless carriers have been generally successful in gaining considerable revenue from customers and have, hence, often been very profitable. This is the Achilles' heel for wireless operators although some operators have gained considerable revenue additions from short message services (Jonason&Eliasson 2001). Unregulated and highly competitive mobile services industry has forced business actors to relinquish from the high profit margins used to obtain in the traditional telecom services. Quality of services and efficiency of business strategies have therefore raised dramatically in their importance compared to traditional telecom services.

Customers in telecommunication industry have preconceived notions about the price and value of telecommunications services. Customers have historically complained about the level of local charges, more than they have about long distance, although local service is frequently offered at a price lower than actual cost. When long-distance service is priced well over cost, and local service is generally priced well under cost, customers expect to pay very low prices for local services and apparently do not mind that long-distance could be less expensive but is not. (Strouse 1999) This experience from telecommunication industry has partly given arise to deeper analyses on customers perceptions in mobile business which however differs highly from the tradition telecommunication business.

First of all, characteristics of mobile business compels close co-operation of different parties to produce high quality mobile services. For players interested in launching new applications and services, alliances can present an opportunity to test the market by shifting the rules of the game. However, the difficulty with alliances and partnerships is their maintenance and management over the long term. (Nordström 2001)

In mobile environment the providers of content and applications contribute value to services, but rely on the network operators to charge the end-user (Jonason, 2002). Thus, operators are to be more or less service integrators in mobile commerce as seen in Figure below in which the content providers bring the richness while the operators bring the reach (Jonason&Eliasson 2001). By providing technical capabilities and environment for the use of service and content providers, the operators play important roles but are not the value providers perceived by customers (Mylonopoulos et al. 2002).

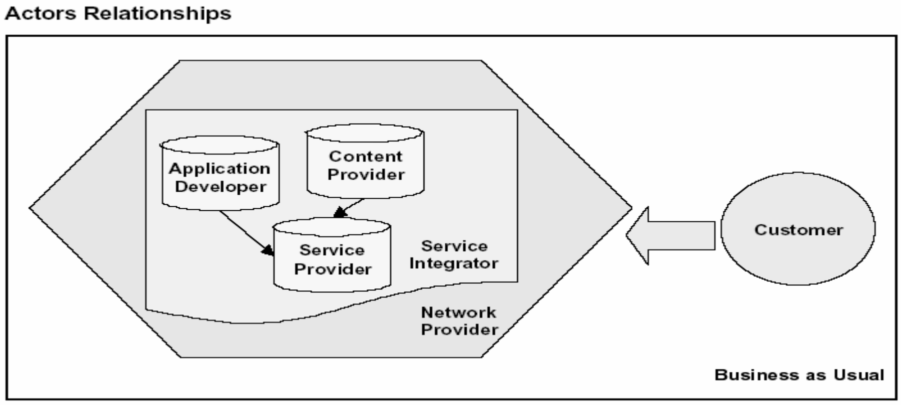

FIGURE 2 Operator as a service integrator in Mobile Environment (Mylonopoulos et al. 2002)

There has also noticed that operators tend to be myopic in their pricing contracts towards the providers and thus reduce their incentives to continue to contribute value. The spill-over in the market, coupled with the pricing base, makes the roles in the market endogenous and subject to dynamics. The operators' decision of how to price their mobile Internet presence will therefore not only be a tool of competition but also a major determinant of which companies they will be able to regard as partners and which will become competitors. (Jonason 2002)

As the most common arrangement is that operators handle the billing towards the end-users, while the providers add value to the end-users in the form of branded services and applications, it is debated how end-users' revenues are to be divided (Jonason&Eliasson 2001). There has suggested that another orientation for creating innovative pricing schemes would the aim to get consumers become so used to the particular features of their services that they would find it hard to change to another system. In any case, and what ever would be the pricing method, as Ross (1984) has stated, the effective price changes must be based on anticipated reactions of customers and competitors, rather than just the firm's own costs and circumstances. (Finch et al. 1998) Therefore old-fashioned pricing schemes could hardly meet the strategic needs of mobile services business.

Argument for using low prices in new services or products is to accelerate the diffusion for achieving the critical mass. Acquiring the critical mass is equally important also in mobile services business. According to observations, mobile services tend to start expand fast after achieving the penetration rate (i.e. critical mass) of 30 per cent (Poropudas 2000). The critical mass brings along also positive externalities for operators (e.g. extra sales in other services and increased network value) which Laffont et al. (2000) have stated to be prominent especially in mobile services sector. These positive externalities are the main source of self-sustained growth appearing after achieving the critical mass.

The special characteristics of the positive externalities in telecommunication and mobile businesses are the declining marginal benefits along with the increase of usage and data volumes. The positive externalities expected from adding more users to the network may be reversed to negative if the marginal user causes congestion. Thus, mobile services cannot be distributed without a charge and moreover this possible congestion should be managed somehow. The optimistic law of Metcalfe stating that the benefit of users grows with the square of the number of other users in the network is therefore only true as long as the marginal user does not cause congestion. (Jonason et al. 2001)

The other special characteristics of mobile services business is the problem of making products chargeable. Jonason (2002) stated that chargeability becomes acute if decision models become subject to uncertainty and continuously change as a result of market dynamics. This situation arises especially when products are multidimensional and the producer has difficulties in determining which dimensions are in demand and which dimensions can be charged for. In such a situation the product or output is not well defined and neither is price (Hayek 1954).

More explicitly, the problem of chargeability arises when the owner of the valuable entity and the owner of the chargeable entity are two separate firms and, therefore, need to agree upon a pricing contract. Technically more complex products are faced with this type of pricing problem such as the delivery of content and applications to mobile devices, typically news, and banking and entertainment services. (Jonason 2002) To deliver more accurate view about the business practice in mobile service industry, below is presented an example case about the Japanese mobile operator NTT DoCoMo's business model:

> The subscriber's bill depends on usage of the I-mode function on the phone, and the number of fee-based I-mode content services he/she subscribes to. There is a basic fee of 300 yen per month to access the I-mode service which is paid via the subscriber's phone bill to NTT DoCoMo. Since I-mode is based on packet-data transmission, users do not pay for the time they are connected to a service. Instead they are charged according to the volume of data transmitted. The most common arrangement is that the operators handle the billing towards the end-users, while the providers add value to the end-users in the form of branded services and applications. It is debated, however, how end-users revenues are to be divided between these third party providers and the operators. (Jonason&Eliasson 2001) Using I-mode to surf Web pagers and send or receive e-mail generates a charge of 0.3 yen per packet of 128 bytes of transferred data. The billing of these services is exclusively handled by NTT DoCoMo costing the content provider 9 per cent of the revenue from the end-user while the remaining 91 per cent of the content charge goes to the content provider. (Jonason&Eliasson 200)

1.3.2 Pricing and price perception of mobile services

The unique characteristics associated with services compared with products include intangibility, inseparability of production and consumption, heterogeneity, and perishability. Since services themselves are intangible, one of the most tangible aspects of the offering is the price of the service. In a study of 323 service firms by Zeithhaml et al. (1984), the average responses across all firms showed that cost-oriented pricing strategies were more often used than either competition or demand-oriented pricing strategies. One of the overriding concerns among service firms is covering costs, as service costs are difficult to calculate. Of additional interest was the finding that most of the service firms in the study do not reduce prices to increase business during slow demand periods. (Finch et al. 1998)

Pricing determines significantly the bottom-line figure on the operating statement. Pricing determines what products will and will not be sold, in what volumes, and with what profit. In more detailed terms, pricing specifies which equipment will be operated, what inventory commitments are to be made, what cash flow can be expected, where sales efforts should be applied, which markets should be approached and penetrated, and, ultimately, what return can be expected on the firm's invested capital. Therefore, pricing should not be given short shrift as an annoying but somehow necessary detail. (Tucker 1966)

Companies with new services and products for which they are trying to build cash flow often make the mistake of building the start-up cost of acquiring and servicing a new customer into a large, up-front fee. Because high uncertainty undermines perceived value, such companies lose potential sales and win sales only at lower prices than they otherwise could. By absorbing the up-front cost in higher monthly fees, the seller communicates confidence that customers will be satisfied and enables customers to pay as they enjoy a known value from product usage. Consequently, the seller should close more sales and, assuming that the product or service delivers the promised value so that the customer continues to buy it, the seller can ultimately expect a greater cash flow and a higher net present value (NPV) per customer acquired. (Nagle et al. 2002)

Dean (1950) introduced the concept of skimming pricing as the strategy of initially setting a relatively high price on an innovation to "skim the cream" of demand. This strategy rests on a general assumption that buyers, who will potentially adopt an innovation (i.e. new product or service) relatively early, are individuals who perceive a very high value in the innovation and thus are prepared to pay a high price for adoption. A number of reasons for a high willingness to pay by the earliest adopters have been put forward in the literature. Early adopters have been characterized as high in social status, venturesome, and eager to try new ideas (Rogers 1983) and consequently lower price sensitivity. There are apparent difficulties in evaluating the benefits of an innovation with respect to its price and inherent qualities, as well as in relation to competing alternatives. This also seems to favour a high willingness to pay by the earliest potential adopters of an innovation (Nagle 1987). E.g. Kollmann (2000) has found in his research of telecommunication industry that there is clear difference in price elasticity between consumer segments.

In the complex pricing environments of services, it is often difficult to use objective price for determining its role. For this purpose there is often proposed to use perceived price. In which, perception basically involves the process of categorization of past and new experiences. And perceived price can be defined as the customer's judgment about an average price of a service in comparison to its competitors. The notion of perceived price is based on the simplistic nature of competitive-oriented pricing approach. The guidance available to customers consists of information about whether they are charged more than or about the same as the competitors charge. Perceived price does not eliminate objectivity; rather it adds some subjectivity with the goal of achieving greater organized pricing structure. (Chen et al. 1994; Monroe 1990)

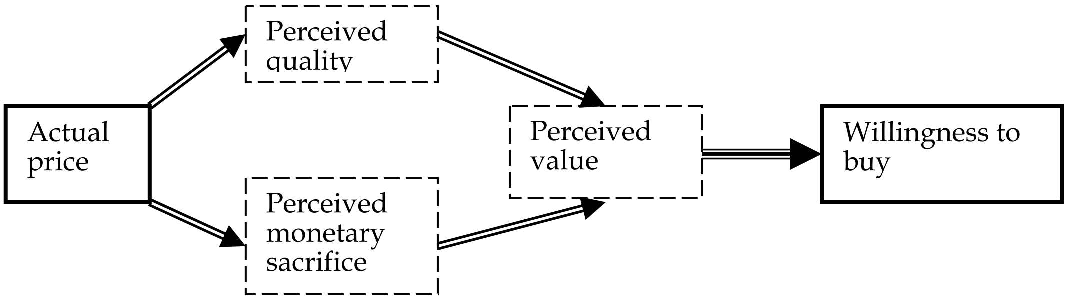

FIGURE 3 Conceptual relationship of price, perceived value, and willingness to buy (Monroe 1990).

Features and development of wireless business makes it necessary to concentrate on pricing in order to develop and invent new methods of pricing that best induce the adoption and development of mobile services. Through pricing there can be obtained significant effects as Kollmann (2000) discovered. His notions are important in creating a true image about the importance of pricing in mobile services business: first, customers of telecom services are generally very price sensitive and make their decisions mainly based on price, and second, there exists clear segments that possess different price elasticity. These two characteristics enable a telecom company to use pricing actively in competing markets.

1.3.3 Perceived services quality, value, and price

Among the several factors that influence buying behaviour, two important ones are “price” and “quality of service” (see Figure 3). Price is the cost of making the purchase, while quality of service refers to how well a customer is being served, including the extent to which the server helps the customer, the manner of the server, and so on. Usually, a low price, while contributing positively to product/service selection, contributes negatively to quality of services expectations (Jacoby&Olson 1977). Hence, a trade-off exists between price and service quality. (Tse 2001)

Chase and Tansik (1983) have classified services based on consumer contact. The extent of consumer contact with the service organizations was used as a means of differentiating types of services. Three types of services identified are:

i Pure service – organizations in which the customer must be present for service production (e.g. fast food restaurant, nursing home, etc.)

ii Mixed service – organizations in which there is both face-to-face as well as back office contact with the customer (e.g. commercial airline).

iii Quasi-manufacturing service – organizations in which there is no face-toface contact with the customer (e.g. credit card, a long-distance phone company, etc.) (Chen et al. 1994)

According to this classification of service types, mobile services can be located into the latter service category as there is no face-to-face customer contact. This notion of no face-to-face contact with customers creates the peculiarity of mobile services and compels researchers to produce more industry specific insight. In this study we have concentrated on price perception and factors affecting to it. Perceived service quality and value factors are examined in this study in a form of service satisfaction. And service satisfaction is expected to possess a strong influence on emergence of price perception of mobile services.

Service quality is the central issue facing the service industry. In Western-world basically all countries are called service economies as over half of their gross national product becomes from service sectors (Kotler 1997). And when observing services or products, quality is of great importance. As Zeithaml et al. (1990) has stated, improving service in the eyes of customers is what pays off. Excellent service pays off because it creates true customers – customers who are glad they selected a firm after the service experience, customers who will use the firm again and sing the firm's praises to other.

"When service improvement investment lead to perceived service improvement, quality becomes a profit strategy" (Zeithaml et al. 1990). E.g. Chen et al. (1994) have defined perceived service quality by differentiating it from actual goods quality with two dimensions: (i) it involves a higher level of abstraction rather than a specific attribute of a product, and (ii) a judgement is usually made within a consumer's evoked set. And Parasuraman et al. (1988) identify five quality dimension that linked specific service characteristics to consumer expectations of quality: (i) tangibles – physical facilities, equipment, and appearance of personnel, (ii) reliability – ability to perform the promised service dependably and accurately, (iii) responsiveness – willingness to help customers and provide prompt service, (iv) assurance – knowledge and courtesy of employees and their ability to convey trust and confidence, and (v) empathy – caring, individualized attention provided to customers. And, when speaking of new and innovative mobile services, the fourth factor (assurance or trust) is according to Siau et al. (2003) of greatest importance.

One of the major ways to differentiate a service firm is to deliver consistently higher-quality service than competitors. The key is to meet or exceed the target customers' service-quality expectations. Customers' expectations are formed by their past experiences, word of mouth, and service-firm advertising. The customers choose providers on these bases and, after receiving the service, compare the perceived service with the expected service. If the perceived service falls below the expected service, customers lose interest in the provider. (Kotler 1997)

Achieving a competitive advantage based on providing outstanding service quality (e.g. Lewis & Kitchell 1993) is a common strategy used by marketers. However, simultaneously maximizing consumers' perception of service quality and minimizing costs is often difficult. So far, no research has been done looking into the exact nature of the trade-off relationship between price and level of service. (Tse 2001) Thus, the present study has taken a step to the right direction by providing additional insight about the interaction between perceived service satisfaction and perceived price.

Attempts to validate the relationship between price and quality have proceeded along two different approaches. In one approach, researchers have attempted to verify that buyers do perceive a positive price-quality relationship. Levitt (1983) found that the subjects were more likely to choose the higher priced brand for a product when the price differential was large than when it was small among the different brands of a certain product. These findings were later supported by Tull et al. (1964), who found that buyers do perceive a positive price-quality relationship. In the second approach, there has been studied whether there is a positive correlation between actual product/service quality and price. Even though there can be generally draw a conclusion that higher price products have higher demand, which might be as result of a superior quality Gerstner (1985) did not found any support to this reasoning. He assessed the degree of positive correlation between quality and price for 145 products and concluded that the relationship between quality and price appeared to be product specific and generally weak. His findings suggest that some products display a positive quality-price association in the marketplace, but others do not. (Chen et al. 1994)

Perceived service value

According to e.g. Kotler (1997) and Nagle&Holden (2002) value is the consumer's estimate of the product's overall capacity to satisfy his or her needs. And the value that is a key to develop an effective pricing strategy is not use value, but rather what economists call exchange value and what marketers call economic value to the customer. This value is determined first and foremost by what customers' alternatives are plus the value of whatever differentiates the offering from the alternative. And in this phase there is explicitly shown that value is of utmost extent dealing with perceptions of consumer. Perceived value has its origin in utility and psychic space and the relationship is depicted in Figure 4. In this study we have concentrated on the perceived utility value and have thus excluded the effects of psychic space values.

		Utility space		Psychic space
Customer's perceived value	=	Perceived utility value	and	Perceived or (unconscious) unperceived psychic value
				Exclusive value domain

FIGURE 4 Perceived value (Groth 1995)

To deliver compelling value for both buyers and sellers, mobile service providers must capitalize on the inherent differences that distinguish mobile business. New service model opportunities introduced by mobile service business means that it will be insufficient for service providers to simply meet the current benchmark of the landline Internet experience. Consumers will expect more from their mobile service providers.

According to Monroe the perceived value of adopting any product is dependent on the relationship between the perceived quality and the perceived monetary price (Monroe 1990). Thus, the perceived value can be increased either by quality improvements or by price reductions. Obviously, an increased perceived value tend to increase the willingness for adoption of an innovation. Moreover, potential adopters might form adoption thresholds with respect to the perceived value, i.e. when the innovation reaches – either by quality improvements or price reductions – a certain threshold level, actual adoption takes place. (Link 1997) And, in other words, customers will pay more for a service that provides more value to them. When the service in question is telecommunications, customers are hard pressed to disclose what that value is. And in comparison to that, consumers of telecommunication services have been very sensitive to the prospect of paying more for telecommunications services and consider the low cost to be a right. (Strouse 1999) This notion is especially important when pricing mobile services – are users of mobile services still comparing the prices to the prices of telecommunication services.

> E.g. the value to the end-users of the I-mode portal is created by the providers of content. The operator does not offer any content services within the portal and although the billing of the services, provided by the operator, is clearly valuable for the content providers it brings little real value to the end user. The increase in revenue can therefore be derived from the value created by the content providers. The ability to charge for this content creates an incentive for the providers to offer these services to the end-user via the operator, since the alternative, to offer the services on a regular Web page or on a unofficial I-mode page, takes away this opportunity to charge. (Jonason&Eliasson 2001)

Kollmann (2000) has continued this to value aspects related to mobile services industry by noting "that the potential subscriber will arrive at a maximum price at which he/she will be prepared to buy into the mobile-Internet system, in the sense of "connecting up". This price represents the value of the mobility, which the potential subscriber hopes to materialise through the purchase and continued use."

1.3.4 Price sensitivity

At an aggregated level, price sensitivity is often equated with price elasticity (Link 1997). In the present study, these two terms are seen meaning the same issue. Elasticity or sensitivity of demand refers to how volume-sensitive a product or service is to change in price. If the percentage change in quantity sold is greater than the percentage change in price, the demand for that service is considered sensitive. If it is less, it is insensitive. Sensitivity of demand is a valuable strategic tool for pricing. Astute managers are aware of the demand sensitivity of their various services and take advantage of this factor in their pricing policies. Demand information requires a constant policing of markets and ultimate consumers. (Tucker 1966)

At the level of an individual potential adopter of an innovation, price sensitivity is equivalent to the degree to which a potential adopter is unwilling to pay a certain price for adoption of the innovation. Accordingly, the willingness-to-pay construct conceptualizes an individual's insensitiveness with respect to a high price for adoption. In fact, price sensitivity at the individual-adopter level appears equivalent also to the concept of price consciousness for a potential buyer of any product, defined as "the degree to which he or she is unwilling to pay a high price for a product and willing to refrain from buying a product whose price is unacceptably high" (Monroe 1990).

As price sensitivity is close related to innovation adoption customers' level of innovativeness and price sensitivity are often perceived to have a direct relationship. Rogers (1983) defines a person's innovativeness as "the degree to which an individual is relatively earlier in adopting new ideas than the other members of adopters. He also sees five adopter groups as differing in their value orientations: innovators, who are willing to try new ideas at some risk, early adopters are guided by respect, the early majority are deliberate, the late majority are sceptical, and laggards are tradition bound. Rogers and Stanfield have also found that in general an innovator is likely to be educated and knowledgeable with a high income, to have a positive attitude towards change and high aspirations, and to be linked to external information sources of media and change agents. (Urban&Hauser 1993)

Kollmann's (2000) key findings are presented in Figure 5. There is depicted relationship between telecommunication usage and price (i.e. price sensitivity). According to the study there can be defined three customer segments which differ in their price sensitivity levels and willingness to use the service at that price. He found that in both ends of pricing (high price/low price) the price-sensitivity was substantially higher. Thus, influencing to these two market segments on pricing would be effective. And therefore, it is possible (and more effective) to pursue a cost/price-focused marketing strategies for these segments. The effect on consumer behaviour is here determined by the necessity of a new purchase. Applying this model into our case, we may expect that users, whose level of usages are very high or low, are more sensitive for price changes than those whose mobile usages are on average levels.

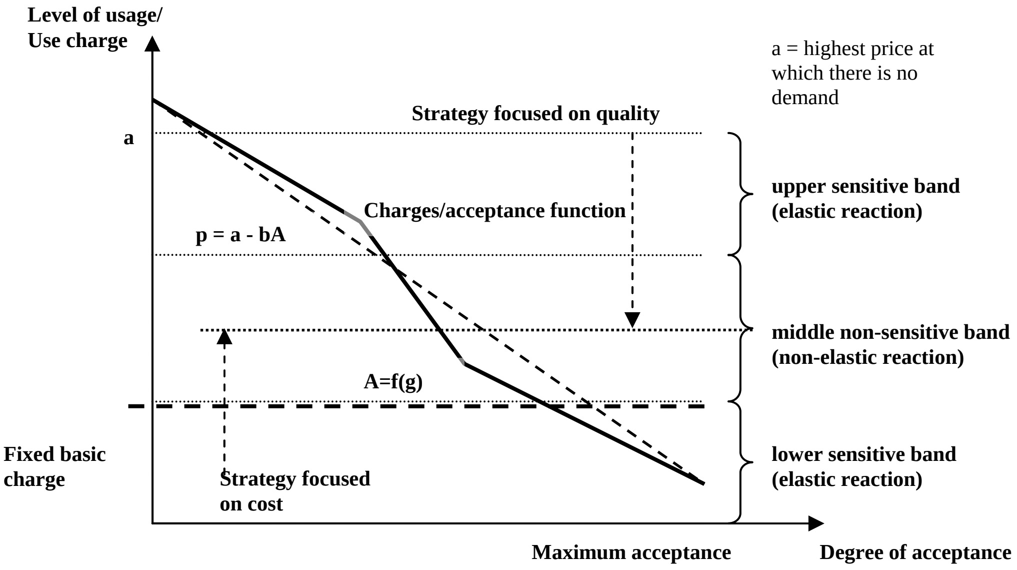
Level of usage/ Use charge
a
a = highest price at which there is no demand
Strategy focused on quality
Charges/acceptance function
p = a - bA
upper sensitive band (elastic reaction)
middle non-sensitive band (non-elastic reaction)
A=f(g)
Fixed basic charge
Strategy focused on cost
lower sensitive band (elastic reaction)
Maximum acceptance
Degree of acceptance

FIGURE 5 The charges/acceptance function (Kollmann 2000)

To conclude, price consciousness is often noted to strongly (negatively) related to the price acceptability level as well as to the width of latitude of price acceptability (Lichtenstein et al. 1988). And individuals who are price conscious are generally not prepared to pay a high price for the product in question. Which addition, the range of acceptable prices is relatively narrow for price conscious individuals. (Link 1997) Consumers tend to be also more price-sensitive at higher price levels; the marketer has the opportunity to make price adjustments that may be viewed as more significant amounts. (Finch et al. 1998)

1.3.5 Pricing methods

Many different pricing methods have been tried and suggested for mobile and internet services. For example following have been mentioned by Cushnie and Hutchison (2000) and Reichl & Haidegger (2002): (i) usage based charging, in which consumer is charged according to realized consumption, (ii) fixed price, is non- or partly metered pricing scheme which does not change according to the usage, (iii) bundle pricing, is used for pricing/billing of bundles of services or products with a lump sum, (iv) Paris-Metro, is a pricing method especially for congestion management purposes, the pricing scheme is mostly self-regulating the congestion with two-piece pricing model, (v) packet charging, is used in new e- and mobile services which uses packet-based technology, and (vi) edge pricing, is characterised by concentrating charging functionalities at the edges of the network (e.g. access routers) and has become one of the central paradigms for charging Internet services.

A mobile service provider must consider different aspects. For example in a case of basic single price strategy two obvious shortcomings exist. First, the firm clearly is leaving excess money on the table for many buyers who are willing to pay more. These high-end buyers may perceive significantly greater value from purchasing this product, relative to other buyers. This excess value that consumers receive by paying a lower price, when in fact they are willing to pay a higher price is referred to by economists as "consumer surplus". The firm would be better off if it could capture some of this surplus by charging higher prices from these buyers. The second problem with a single price strategy is that the firm leaves nearly half of the market unsatisfied, even though it could serve it at prices above the unit variable cost. In industries with high fixed costs, serving those additional customers is very tempting, and possibly very profitable. Moreover, by ignoring these buyers, the firm leaves wide open an opportunity for low-cost competitors to enter the market and establish a competitive presence. When those competitors won a large enough installed base at the low end to establish a reliable service network, they were then able to attack higher-margin markets. (Nagle et al. 2002)

Rather than the monthly fixed charge, it is income from the number of call minutes which determines basic commercial success for network providers (Kollmann 2000). One major improvement of packet-based technology over circuit-switched technology is that users can pay for transport volume rather than time of transport. The network provider can charge the end-user per volume of data transmitted or received, greatly reducing the cost of real time applications. As these two major technical innovations redefine the wireless services that will be offered in the near future, they also create a pricing problem for the operators (Jonason et al. 2001) – how and what to charge in mobile services.

Subscription plans also make it easier to develop close relations with customers. Subscription pricing lends itself to finding out what the customers need, and to customization of offerings. (Fishburn&Odlyzko 1997) For example, in software business there has been employed so called "functionally based tired" –pricing. Clients can select from three tiers: Select, Gold, and Platinum. Select has basic functionality while Platinum has full functionality. This tiered structure comes from traditional marketing practice, which assumes that if a buyer is given a choice of three service levels, the buyer will choose the middle package. This has been a common marketing tactic in the US cellular service market. (Bontis et al. 2000) This pricing method is closely related to Paris-Metro pricing. In which there is created two or three service classes which however do not differ in service functions but only in charged prices and thus in expected service quality.

Pricing methods available for service providers are, as seen, numerous and most likely the methods will be merged into a combination which would best support the business goals of the parties in a question. In the coming chapter we will discuss more in detail bundle pricing method.

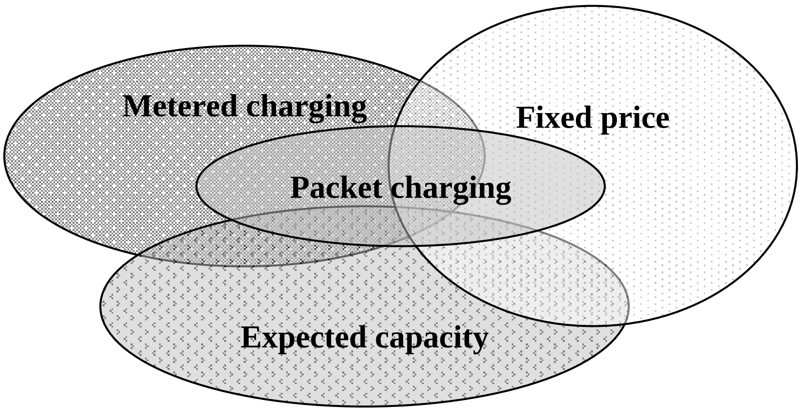

FIGURE 6 Formation of new pricing methods for mobile services (Cushnie et al. 2000)

One of the major incentives for studying and developing new revenue and pricing practices for mobile services business is the fact that there is clear evidence that pricing is a powerful tool in inducing new services or products. But as the business practitioners lack information on customers' perceptions the development of pricing has left behind the technological and service development.

1.3.6 Bundling of mobile services

By definition bundling of telecommunication services is packaging of different telecommunications services for customers. Bundle pricing is a way to present an unambiguous price for the usage of a bundle of services. Bundling is found to increase the amount of pricing tools and choices available for service producers. Usually telecommunications bundling simply refers to local and long-distance services, but it is also used to describe the combination of either or both of those service with Internet access, cable television, wireless, and any other service broadly described as telecommunications. (Strouse 1999) In generally, a seller faces three alternative bundling strategies to offer services (Venkatesh & Vijay 1993):

i Pure components: the seller prices and offers the component products/services as separate items, not as bundles.
ii Pure bundling: The seller prices and offers the component products/services only as a bundle and not as individual items.
iii Mixed bundling: The bundle as well as the individual component products/services are priced and offered separately.

Adams and Yellen (1976) have argued that mixed bundling at least weakly dominates pure bundling. Whereas, McAfee et al. (1989) have shown that, while mixed bundling virtually always strictly dominates pure bundling, the optimal bundle price is sometimes greater than the sum of the prices of the individual goods (Salinger 1995). When valuing pricing strategies for new mobile services, there should be laid few goals, which are expected to be covered. These goals are attendance maximization, service usage maximization, and surplus maximization (Ansari et al. 1996).

In online service area, it is common for customers to pay for larger blocks of time than they used. The reason is that there exists a need for insurance (predictable costs), overestimation of usage, and a hassle factor (whether each call is worth the money or not). In addition to the customers' preference for flat-rate and bundle pricing, there are also reasons for producers, especially in areas where network externalities are important, to like these plans. These notions are part of a general preference by consumers for simple and predictable pricing. (Fishburn & Odlyzko 1997)

As mentioned earlier, information goods are characterized by negligible marginal costs, and therefore arguments in favour of bundling are stronger for them than for physical goods. Bundling arguments show that producers can obtain more revenue by combining disparate items, since that allows them to exploit uneven preferences that consumers have for different goods. In most situations bundling is advantageous to the producers. (Fishburn & Odlyzko 1997)

Adams and Yellen's (1976) also found in their analysis that reservation values for the components of the bundle were negatively correlated. Which made it appear that bundling serves much the same purpose as third-degree price discrimination. A surprising result of Schmalensee (1984) analysis was that bundling can be profitable even when demands are uncorrelated or even positively correlated. His explanation for the profitability of bundling was that it reduces the effective dispersion of reservation values and thereby makes it possible for the seller to extract a greater fraction of the potential surplus. (Salinger 1995)

As Lewin l et al. (1999) has discovered a set of conditions under which price discrimination (i.e. bundling) is profitable strategy, we can state that a company should cover the three necessary conditions for bundling to occur. First, the firm must have some market power[1] which is often the case as many of the mobile operators are old state monopolies. But it is important condition to be estimated especially in a case of new virtual and pure mobile operators. To cover this condition an operator must have a prominent market share which excludes many young mobile and virtual operators. Second, there can at best be imperfect arbitrage opportunities for consumers[2], which is highly important in case of mobile services as e.g. video-clips, music, pictures, etc. could be easily forwarded to other users with lower fees (if not technically restricted). It is thus essential that the resell opportunity is hindered technically or the costs that enable it must be prominent. And third consumers must have different price sensitivity of demand[3]. (Jeitschko 2001)

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[1] The paradigm is to sell for two different prices, at least one of which is above marginal cost, two identical units that can be efficiently produced separately. The separability of production costs makes marginal cost easily observable and the inefficiency of deviating from it obvious. Because it is hard to see how a firm could succeed with such a strategy without the power to affect total industry output. Thus pre-empting the chance of someone else making the sale to the "high-price" customer at a price closer to marginal cost, it is easy to attribute the deviation of price from marginal cost to the exercise market power. (Levin 2002)

[2] This is the practice by which a purchaser who buys at the lower price is able to resell or divert to those who are willing to pay a higher price. In economic terms, the need to prevent arbitrage arises because the competitive solution does not naturally result in separating equilibria in which consumers pay different prices for different product

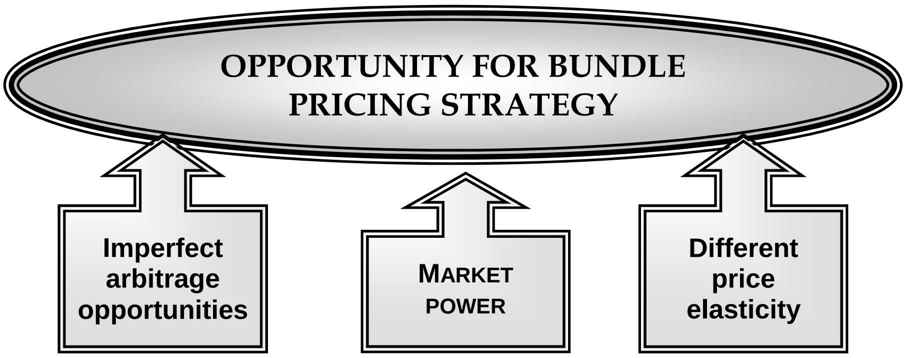
OPPORTUNITY FOR BUNDLE PRICING STRATEGY
Imperfect arbitrage opportunities
MARKET POWER
Different price elasticity

FIGURE 7 Tripod-foundation for bundle pricing to occur.

The context of bundle pricing approach is complex and several aspects should be considered when choosing right strategy. The bundle context includes following areas: price segmentation, price discrimination, and product range restriction, reduction in classification/processing costs, scope economies, consumers' search economies, and risk reduction. (Venkatesh&Vijay 1993)

To conclude, Strouse (1999) has summarized the benefits favouring bundling with the following notions: the preference of customers for a single bill, and for simplicity which bundled services offer, for providers that are currently prohibited from entering certain markets, bundling represents the opportunity to enter new markets without requiring large investments (bundling requires smaller investments in existing facilities), bundling creates an excellent cross-selling opportunity (it is many times easier to sell a new product to an existing customer than to sell existing products to a new customer).

While there are obvious attractions to per-use pricing, the basic economic arguments based on utility theory are not as clear as for bundling, where those arguments strongly support the idea of selling combinations of items. The simple utility maximization argument might favour per-user pricing in a substantial fraction of cases, what we observe in the market are repeated failures of à la carte pricing. (Fishburn & Odlyzko 1997) It is thus suggested that

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configurations. Such a result happens where there is little, if any, cross elasticity between the different product configurations.

[3] It is claimed that there must exist differences in consumers' price elasticities that price discrimination could be profitably applied. Though, according to Jeitschko (2001) "there are many exceptions to this condition and differing price elasticities of demand is not a necessary condition for price discrimination". But generally this can be observed as a basis for price discrimination and if it is not taken as a basic condition the other characteristics must support the discrimination strategy enough strongly that it can be omitted.

à la carte or unit pricing will not be the dominant mode of commerce in information goods. E.g. in the United States, customers want bundling and so do carriers (Strouse 1999). In the end, consumers make their decisions according to their own personal perceptions of expected values and perceived costs of mobile services with often contradictory information.

1.4 Introduction to dissertation papers

1.4.1 # 1: Formation of price perception of mobile services

In recent pricing studies main focus has directed on measuring and analyzing customers' subjective perceptions rather than absolute prices. In this research we concentrated on observing the dynamics of price perception in mobile services business. It was discovered that two out of four factors based on customers' subjective perceptions possessed good indicative powers for estimating and predicting customers' price perception levels. Price sensitivity and level of innovativeness were found to be the most accurate factors while service satisfaction and investment readiness factors obtained results of clearly weaker explanation powers and higher variances. It was also found that even though many common characteristics existed, mobile service customers differed distinctively especially in their price perceptions and investment readiness factors. Notable finding was also that customers' demographic variables did not explain the differences in customers' price perceptions though innovation theory suggested.

1.4.2 # 2: Dynamics of price sensitivity amongst mobile service customers

Little is known and only few studies exist on the price sensitivity of mobile service customers. In this empirical research three customer segments were noticed to differ significantly in their price sensitivities. And the dynamics of price sensitivity of mobile service customers was also noted to differ distinctively from the traditional services or telecommunication business. For business practitioners to be able to predict and explain customers' reaction to price changes at least five factors should be observed: price perception, preference towards service bundles, innovativeness, service satisfaction, and demographic variables. Price perception and attitude towards service bundles were the most accurate factors in investigating customers' level of price sensitivity.

1.4.3 # 3: Pricing methods as a tool for improved price perception and enhanced adoption

Pricing of mobile services is mostly unexplored and little is known how different pricing methods influence in customers' price perceptions of the services. This study concentrated therefore on providing empirical evidence on how pricing methods affect to customers' price perceptions in mobile services business. It was found that by providing customers with charging methods that they prefer most a service provider can obtain significant and positive results in a form of decreased perceived prices. And furthermore, the present study provided clear evidence that, to best benefit from customer/perception-oriented pricing strategy, customers with different usage experiences should be supplied with different pricing methods.

1.4.4 # 4: Through Bundle strategy to Higher Efficiency of Pricing

The bundle pricing strategy is argued to be one of the most potential pricing methods for mobile services business at the moment, it is preferred especially by customers. This study has provided an empirical evidence and support for the service bundling strategy to be applied in mobile service business. According to our findings, customers, in general, possess positive attitudes towards acquiring and paying mobile services in bundles rather than separately, though differences between customer segments were distinctive. It was also discovered that customers who were most experienced mobile service users, were most anxious to acquire mobile services in bundles. Whereas customers with lesser experience were more often better off in acquiring mobile services separately, even though it wouldn't be economically justified. Thus, a mobile service provider should apply the bundling strategy (more accurately, mixed bundling) and bundle services into packages of three to five services (depending on the characteristics of the customer segment).

2 RESEARCH DESIGN

As both Cooper&Emory (1995) and Kerlinger (1973) have stated, research design is the plan, structure, and strategy of investigating conceived as to obtain answers to research questions and to control variance. Research design has two basic purposes: to provide answers to research questions and to control variance. Therefore it is important to emphasize the discussion of these areas and more accurately depict the research outlines. In this chapter we have concentrated on forming the hypotheses and constructing the research model for the present study.

Through research a scientist tries to understand a phenomenon he/she is dedicated to. But as Cohen and Manion (1980) have stated also other methods of understanding the phenomenon exist. In fact, three broad categories can be found through which a phenomenon can be understood: experience, reasoning and research. The experience does itself subsume a number of sources of information that may be called upon in a problem-solving situation. It is most immediately at hand for all people. The second category reasoning consists of three types: deductive reasoning, inductive reasoning, and the combined inductive-deductive approach. And the third category research has been defined by Kerlinger (1973) as the systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena.

As methodological choices have played a critical role in scientific research of all sciences, also Peirce (1931) has sorted four general ways of knowing or, more accurately, fixing belief. The first is the method of tenacity were men hold firmly to the truth, the truth that they know to be true because they hold firmly to it, because they have always known it to be true. A second method is the method of authority. This is a method of established belief. If a noted physicist says there is a God, it is so. A third method is a prior method. It rests its case for superiority on the assumption that the propositions accepted by the "a priorist" are self-evident. But the fourth method is the one of interest method of science. The scientific approach has one characteristic that no other method of attaining knowledge has: self-correction. A scientist does not accept a statement as true, even though the evidence at first looks promising. He insists upon testing it. (Kerlinger 1981 & Christensen 1997)

2.1 Model construct

As this study was concentrated on studying perception-based pricing amongst mobile services customers the basic expectation was that customers differ in their price perceptions. For which purpose, and based on Kollmann's (2000) findings, it was useful to dived customers of mobile services into three segments according to their usage experiences of mobile services and expected differences of price sensitivity levels (the segments are specified and described in chapter 3.1). As there was also hypothesized that price sensitivity affects strongly on perceived prices of mobile services, the segmentation base was found to be well grounded.

For analyzing more in detail the sources of the differences there was examined four customer-based subjective factors that were found to explain significantly the differences in customers' price perceptions in prior studies. Thus, for obtaining knowledge on customer-specific characteristics which might have indicative power in predicting the perceptions, the four latent factors were constructed: (i) satisfaction, (ii) price sensitivity, (iii) innovativeness, and (iv) investment readiness. This construct was mainly adopted from the works of total quality management (TQM) and value analysis/value engineering (VA/VE) researchers (e.g. Kotler 1997&Miles 1989). And for providing some practical solutions for problems of mobile services pricing, the fifth examine research area, bundle pricing, was expected to have a positive relationship with the customers' price perceptions.

The first four factors were derived mainly from the theoretical concept of value mix e.g. by Ho & Cheng (1999). Value mix is conceptualised as the combination of function, quality and price (Figure 8). The concept embraces the essence of the traditional approaches to value and quality. Value mix describes customers' determination of the value of a product or service in terms of function, quality and price. Cost, as not regarded by customers, is excluded. It is these three elements of value mix that every organisation should consider when designing and delivering product and service.

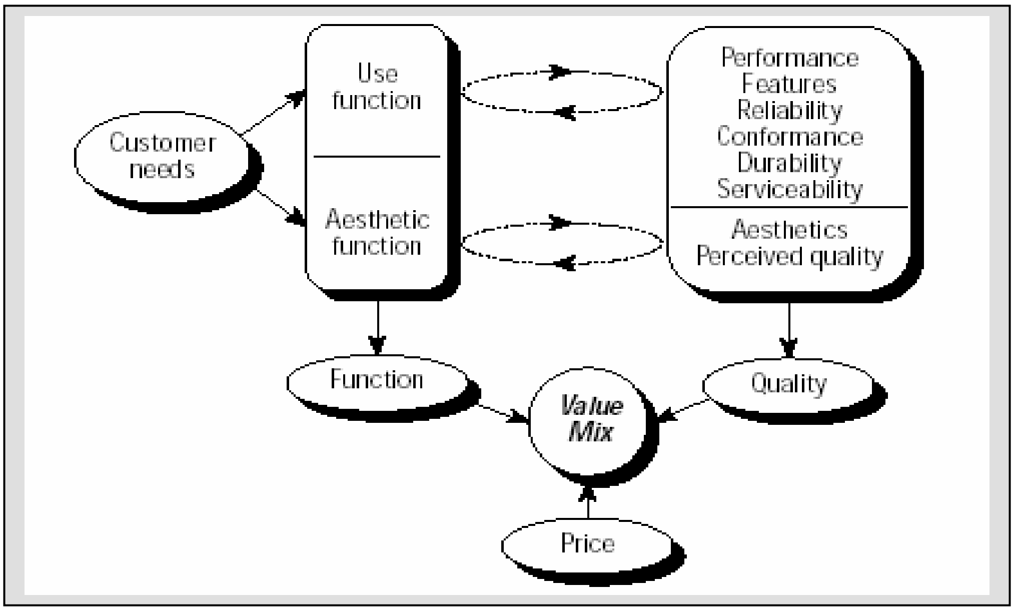
Customer needs
Use function
Aesthetic function
Performance
Features
Reliability
Conformance
Durability
Serviceability
Aesthetics
Perceived quality
Function
Value Mix
Quality
Price

FIGURE 8 Components of value mix (Ho & Cheng 1999).

Also Zeithaml (1988) has found four broad expressions which are the sources of value:

i value is low price,
i value is whatever I want in a product or service, and
ii value is the quality I get for the price I pay, and
iii value is what I get for what I give (Gouvêa et al. 2001).

And to go further, according to Lovelock (1991), value is based on this last expression meaning that value is the sum of all the perceived benefits minus the sum of all the perceived costs. And Chen et al. have defined perceived price as the customer's judgment about a service's average price in comparison to its competitors (Chen et al. 1994) and perceived price will include monetary as well as non-monetary prices proposed by Zeithaml (1988). Gerstner (1985) has also found concrete evidence of clear positive relationship with quality and price. Therefore and on the grounds of the value discussion earlier, perceived value and perceived price can be stated to be closely connected and in many instances can be understood to mean the same phenomenon. In the present study we have thus used perceived price as an alternative to value-mix. Thus, to instead of using value-mix term in Figure 8 we have replaced it by perceived price in order to emphasize the importance of price as an inducer of adoption of mobile services. And, as mentioned earlier, to study customers' perceptions in different segments, the distinctive differences must exist in measured characteristic that the study could provide any concrete results. Thus the first hypothesis states,

H1: Mobile service customers differ distinctively in the levels of price perceptions between the mobile, combined, and fixed-line customer segments.

For analysing more in detail the sources causing the differences in customers' price perceptions, the four earlier mentioned latent factors were hypothesized to explain significantly the differences. Thus, the four additional hypotheses were created. As we were dealing with customers' perceptions it was of our interest in analysing, how satisfied customers were in overall quality of the services and did the satisfaction level explain their price perceptions of the services. The relationship of satisfaction and perceived price is found to exist in multiple prior studies from other fields of businesses, e.g. Jacoby&Olson (1977), and Fornell et al. (1996). In comparison to the Figure above, the function and quality factors were replaced with satisfaction factor. The second hypothesis states therefore,

H2: Differences in customers' price perceptions can be significantly explained by the customers' satisfaction levels to operator's services.

The third hypothesis and the second latent factor expected to indicate significantly customers' price perception levels was the price sensitivity. This factor was found to connect closely to customers' price perception and investment readiness in the prior studies of e.g. Monroe 1990, Kollmann 2000, Lichtenstein et al. 1988. Price sensitivity was also expected to differ significantly between the customer segments based on the findings of Kollmann (2000). In addition, Monroe (1990) stated price sensitivity at the individual-adopter level to be equivalent to the concept of price consciousness for a potential buyer of any product. Therefore it was found appropriate to form the third hypothesis,

H 3: Differences in customers' price perceptions can be significantly explained by the differences in customers' levels of price sensitivity.

The third factor which was found to closely relate to price perception according to theories discussed earlier was customers' innovativeness. Innovativeness was defined for example by Rogers (1983) as the degree to which an individual is relatively earlier in adopting new ideas than the other members of adopters. Roger also specified five adopter groups as differing in their value orientations: innovators, who are willing to try new ideas at some risk, early adopters are guided by respect, early majority are deliberate, late majority are sceptical, and laggards are tradition bound. Urban and Hauser (1993) have also stated that in general an innovator is likely to be educated and knowledgeable with a high income, to have a positive attitude towards change and high aspirations, and to be linked to external information sources of media and change agents. Thus, as the intensive mobile service users were expected to be most innovative ones and the fixed-line users the least innovative ones, assumption that the differences in customers' innovativeness levels would also reflect to their price perceptions was grounded. The fourth and fifth hypotheses were thus drawn accordingly, H4: Differences in customers' price perceptions can be significantly explained by the differences in customers' innovativeness levels.

H5: Differences in customers' price perceptions can be significantly explained by the differences in customers' readiness to invest on mobile services.

As the four previous hypotheses concentrated on inspecting the relationships of customer-based latent factors to the customers' price perceptions, the sixth hypothesis was constructed for providing more concrete solutions for pricing mobile services. In the area of pricing methods, there were first studied overall relationships between different pricing methods to price perceptions. Which after, the focus was laid on analysing one specific pricing method, bundle pricing, that was found to possess high potentiality for mobile services business in prior studies (e.g. Nagle&Holden 2002, Kotler 1997). In bundle pricing service providers combine several of their services and offer the bundle at a reduced price or increased value. In value-added bundling a company offers to price sensitive customers an additional value of a kind that less price-sensitive buyers do not want. In addition, e.g. Venkatesh and Vijay (1993) have stated that the bundle context includes areas of price segmentation, price discrimination, and product range restriction, reduction in classification /processing costs, scope economies, consumers' search economies, and risk reduction. In addition Fishburn and Odlyzko (1997) stated bundle strategy to be very promising for information technology services. Therefore, if a service provider offers services charged through pricing method which is most preferred by customers, it is expected that customers' satisfaction to the pricing method in question reflects to their overall price perceptions. Thus, the sixth hypothesis states;

H6: A significant relationship exists between customers' preference to acquire mobile services in bundles and the customers' price perceptions.

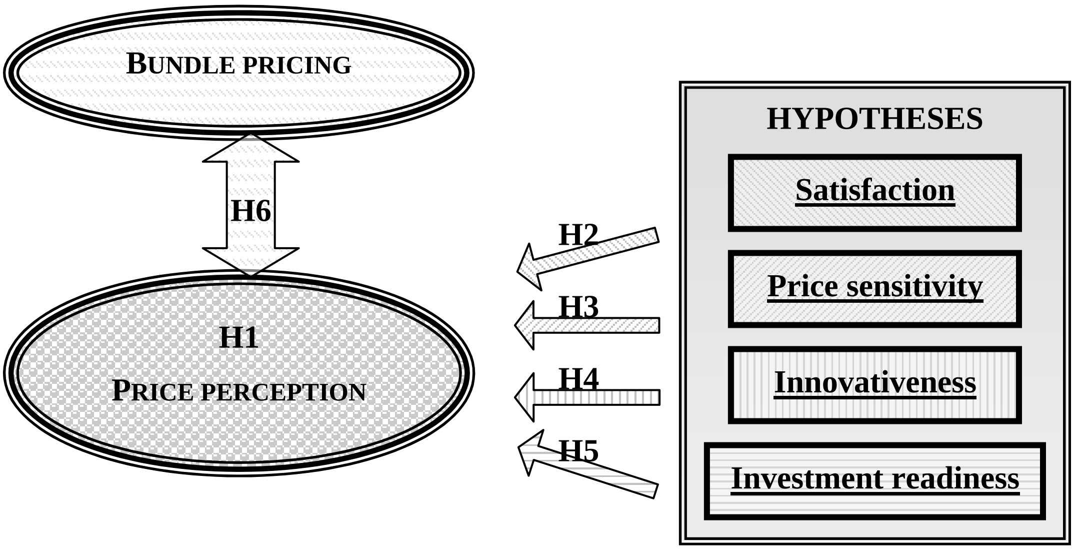
BUNDLE PRICING
H6
H1
PRICE PERCEPTION
H2
H3
H4
H5
HYPOTHESES
Satisfaction
Price sensitivity
Innovativeness
Investment readiness

FIGURE 9 Framework for the dissertation

3 DISCUSSION

3.1 Data collection

For collecting empirical data two basic methods can be applied: monitoring and interrogation processes. The former includes observational studies, in which the researcher inspects the activities of a subject or the nature of some material without attempting to elicit responses from anyone. In the survey mode, the researcher questions the subjects and collects their responses by personal or impersonal means. The data may result from i) interview or telephone conversations, ii) self-administered or self-report instruments sent through the mail, left in convenient locations, or transmitted electronically or through another means, or iii) instruments presented before and/or after a treatment or stimulus condition in an experiment. (Cooper&Emory 1995) On the other hand Curchill&Iacobucci (2002) have classified data collection techniques into two basic groups, non-probability samples and probability samples. Non-probability samples involve personal judgment somewhere in the selection process. Sometimes this judgment is imposed by the researcher. The fact that the elements are not selected probabilistically precludes an assessment of sampling error. Whereas, in probability samples one can calculate the likelihood that any given population element will be included in a probability sample because the final sample elements are selected objectively by a specific process and not according to the whims of the researcher. The objective selection of elements allows the objective assessment of the reliability of the sample results which is not possible with non-probability samples.

Based on the upper mentioned classifications of sampling techniques, this research is considered as probabilistic. The sample data was randomly collected through stratified sampling technique from TeliaSonera's customer data base which consisted of a large amount of mobile services users. The randomness was limited by two ways: first, the sample data was collected from one customer data base, and two, samples were collected separately from three different segments which were classified according to customers' usage experiences of mobile services.

This level of categorization of sampling technique was still inadequate. As mentioned, the target of this research was to explore customers' price perceptions in the three customer segments: mobile segment, combined segment, and fixed-line segment. This characterisation was used as a criterion for more elaborated classification under the probability sampling technique. Churchill (1995) notes that through stratified sample there is enabled the investigation of the characteristic of interest for particular subgroups. It is important that studied subgroup is adequately represented in the sample, stratified sampling is one way of ensuring adequate representation from each subgroup of interest. And more preciously, the applied technique is the proportionate stratified sampling in which the number of observations in the total sample is allocated among the strata in proportion to the relative number of elements in each stratum in the population. From this basis there was taken equal sample sizes from the each customer segments to confirm the adequate representation of the each segment.

Survey method applied in this research was also carefully designed for conducting descriptive study on price perception. And, to obtained insight data on the customers' overall price perception levels and differences between the customer segments, the quantitative data was needed. For that purpose a mail questionnaire survey method was chosen as it was found to be most appropriate for our descriptive study on customers' perceptions. Though keeping in mind the recommendation of both Parten's (1950) and Kerlinger's (1981) who advised to avoid mail questionnaires if possible as "most mail questionnaires bring so few returns, and these from such a highly selected population, that the findings of such surveys are almost invariably open to question". The mail surveys are however amongst the most applied quantitative data collection methods in descriptive studies. Parten's and Kerlinger's statements should be thus viewed as allusions to the dangers of low response rates which is characteristic of mail surveys.

Thus, despite the previous statements, the empirical data was collected through quantitative postal survey in which 3000 questioners (1000 questioners for each customer segment) were sent to the customers of TeliaSonera's mobile services during the spring 2003. Respondents were asked to complete a 7-point scale (Likert scale) on each question or proposition indicating its importance in defining their beliefs, attitudes, and intentions toward mobile services and pricing of mobile services. Every question had also a choice of "I don't know". Three segment-specific questionnaires were prepared and sent. Though most of the questions in the questionnaires addressed the same issues, the differences in usage experiences of mobile services between the three customer segments were taken into account by constructing segment-specific questionnaires. Overall response rate after three mailing rounds reach the level of 25.9 percent (778) which was a bit lower than expected 30 percent.

Characteristics of each segment were following: customers in the 'Mobile segment' were differentiated from the two other segments by not having analogue broad-band Internet connection which why all internet usage was conducted through mobile Internet connection. It was also required that they would have high volume data transfers and heavy usages of data intensive services. And customers in this segment were also required to be active users of mobile services, gprs (general packet radio service) or having regular data transfers during the past six months, 'Combined segment' customers were required to have both a broad-band Internet connection and WAP-connection (wireless applications protocol). Customers in this segment were using some data intensive services and transferred also data through mobile connection but clearly less than customers in the mobile segment. It was also required that they must have usage of data and voice services during the past six months, 'Fixed-line segment' consisted of customers who had a broad-band internet connection and only basic mobile phone connection, no WAP-connection. They were using only some basic mobile services like short messages, ring tones, etc.

3.2 Review of the descriptive statistics

Detailed analyses and results of the present study are presented in the four articles attached to the end of this paper. Therefore, in this section we have merely first concentrated on depicting the basic characteristics of the mobile service customers and then, summarizing the key results of the study. The knowledge on the respondent' basic characteristics and occurring differences are important whence analysing and explaining the differences in the respondents' perceptions. Thus, the coming presentation brings out the basic differences in the respondents' demographical backgrounds between the three segments, and presents results on how well these characteristics indicated the differences in the respondents' price perceptions.

In analysing the research results we have first observed response rates, and described respondents by their demographical backgrounds, as mentioned. The overall response rate of the three segments was 25.9 percent (778). The differences between the three customer segments were however distinctive. While in the fixed-line segment the response rate reached as high level as 31 percent (310) at the same time in the mobile segment the same rate was left to ten percentage units lower, 21.1 percent (211). And, at the same time, the combined segment was left to between with a response rate of 25.7 percent (257). As the customer segments were formed on the grounds of customers' usage backgrounds of mobile services, the response rates seemed to possess a clear relationship with the respondents' usage experiences.

3.2.1 Segment specific demographical characterisation of the mobile service customers

As was the relationship with the response rates and usage frequencies, also customers' ages were found to be connected with the customers' usage experiences of mobile services (Figure 10). The differences were distinctive amongst the customers in the different segments, as was expected on the grounds of the basic adoption theories (e.g. Rogers 1995). It was found in the present study that innovators or first adopters (i.e. the mobile segment) were clearly younger compared to later adopters (the combined and fixed-line segments). In the fixed-line segment the customers were respectively clearly oldest as 32 percent of the customers were between 35-49 years of age and almost 25 percent were aged between 50-64 years. The combined segment consisted of customers who were younger than the fixed-line customers but older than the mobile segment customers. In the combined segment clearly higher proportion (37.9%) of the customers were aged between 25-34 years of age compared to the fixed-line segment, and lower proportion (14%) between 50-64 years of age. The mobile segment was clearly youngest. A distinctively high proportion (2/5th) of the respondents was aged between years 25 and 34. While a clear minority (8 percent) were aged over 50 or over years of age.

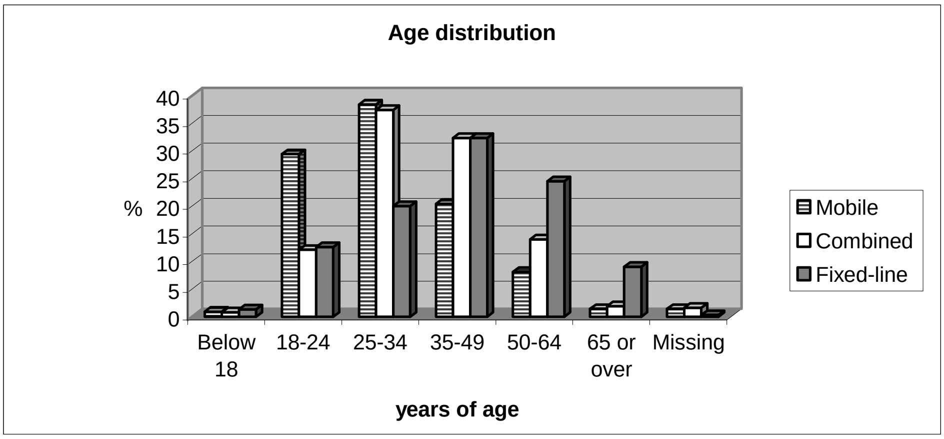

FIGURE 10 Comparison of customers' age distributions between the customer segments.

As customers in the mobile segment were found to be respectively younger than customers in the other segments, it reflected automatically to an average marital status of this segment (Figure 11). Thus, it was no surprise that customers in this segment were most often unmarried (50.5%) and only approximately 1/8th of customers were married. While in the combined and fixed-line segments almost 40 percent were married and only 1/5th were unmarried. These differences might also reflect to customers' purchasing and investment habits as well as to price perceptions. That is, if there is no family requiring financial investments higher proportion of income would be left to other interests.

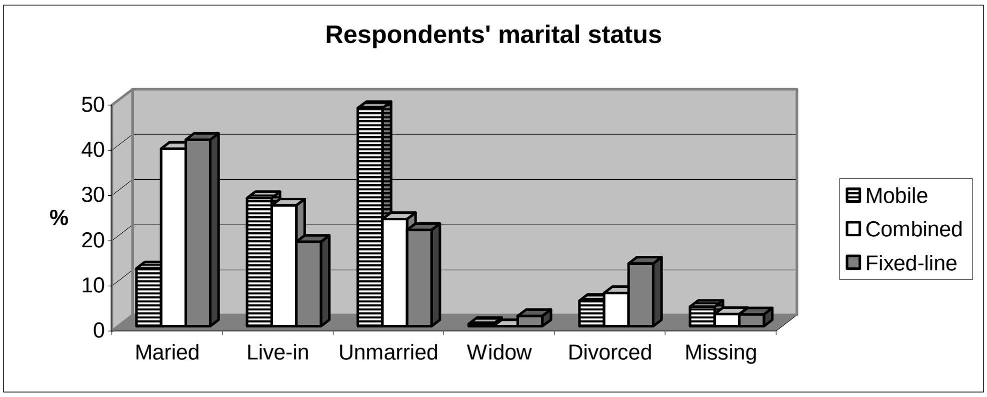

FIGURE 11 Customers' marital status among customers of the three segments.

Contrary to what was expected, customers' level of education was unexpectedly low especially in the mobile segment as over 40 percent (40.5%) of the respondents possessed a secondary level education and only 13 percent had university level degree. Education was not however a variable of high differences as the similar educational background was found in the combined and fixed-line segments as well. In general, approximately 40 percent of the respondents possessed a secondary level and 10 to 15 percent a university level of education. And, as segment-specific differences were rather minimal, it is unlikely that customers' education would have statistically significant indicative power on the customers' usage experiences of mobile services. If the relationship would exist it would rather state that customers with higher education tend to be more causes in taking in use new mobile services, than other way round. However, it should be also kept in mind that in this kind of postal surveys a chance for systematic error exists (especially as the response rates were left to low level especially in the mobile segment 21%).

Another characteristic differing "innovators" from other customer segments, according to the prior studies, was mentioned to be annual income level (e.g. Kotler 1997). It was thus expected that also in this case customers in the mobile segment would differ significantly from other segments by belonging to higher income categories (to be able to fund their investments on new technology services). But contrary, as examination of Figure 12 proves, customers in the mobile segment were fairly average in their income levels. A clear majority of the customers in this segment earned less than 30.000 euros per annum. In fact, it was discovered that the highest annual mean incomes were found from the combined segment, 30.001 – 40.000 euros per annum, while the mobile and the fixed-line segments obtained annual mean income levels of only 20.001-30.000 euros (though the mean of the mobile segment was slightly higher than the fixed-line segment).

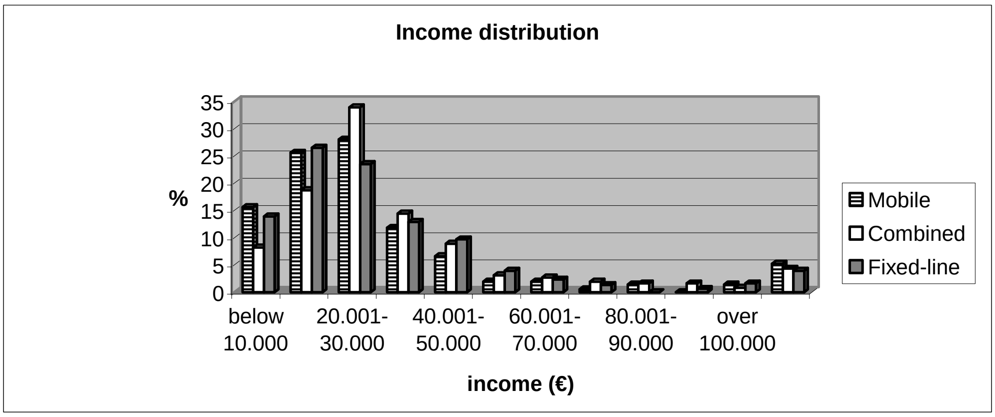

FIGURE 12 Customers′ average segment-specific annual income levels.

In further observations of the customers′ demographical backgrounds a few additional differences were located. One especially distinctive characteristic was found in observing differences in gender distributions. While customers′ genders distributed equally between male and female in the fixed-line segment, in the two other segments female respondents were a clear minority with proportions of 1/5th. The summary of the differences in the customers′ demographical background between the customer segments are presented on the Table 1.

TABLE 1 Customers′ segment-specific demographical characteristics.

	Mobile segment	Combined segment	Fixed-line segment
Response rate, % Tota 25.9 %, N 778	21.1 %, n 211	25.7 %, n 257	31 %, n 310
Male respondents	74.4 %	77.7 %	50 %
Female respondents	25.6 %	22.3 %	50 %
Respondents by age groups:	mean 18-24	mean 25-34	mean 25-34
18-24	29.8 %	12.3 %	12.6 %
25-34	38.9 %	37.9 %	20.1 %
35-49	20.7 %	32.8 %	32.4 %
50-64	8.2 %	14.2 %	24.6 %
Total	100 %	100 %	100 %
Respondents′ mean annual income	20.001-30.000€	30.001-40.000€	20.001-30.000€

As the distinctive differences in customers′ demographical backgrounds were found, differences were found also in the customers′ usage backgrounds, price perceptions, and in the latent variables formed in the factor analyses. Thus, after the multiple differences in customers′ backgrounds, it was no surprise that the customers differed distinctively in their price perceptions as well. In general, there can be stated that customers perceived mobile services expensive, and they also felt that the expensiveness was an important barrier for increasing the usage of mobile services.

For acquiring better understanding on customer-related factors that would influence significantly on their price perceptions and reactions to pricing changes, more detailed descriptions on their usage experiences and the latent factors (created in the factor analyses) were required (see chapter 3.2.2). As mentioned, customers of mobile services perceived the services expensive, though much deviation existed between the customers and customer segments (Figure 13). For example customers in the mobile (mean 2.12, 0=expensive, 6=inexpensive, s.d. 1.59) and combined (mean 1.83, s.d. 1.49) segments perceived mobile services to be very expensive, though they used mobile service most frequently. These two segments were also least satisfied with the pricing schemes in use at the moment. While the fixed-line segment perceived mobile services to be least expensive with the mean 2.43 (s.d. 1.75) though they used mobile services least frequently. And they were also most satisfied with the pricing schemes in use.

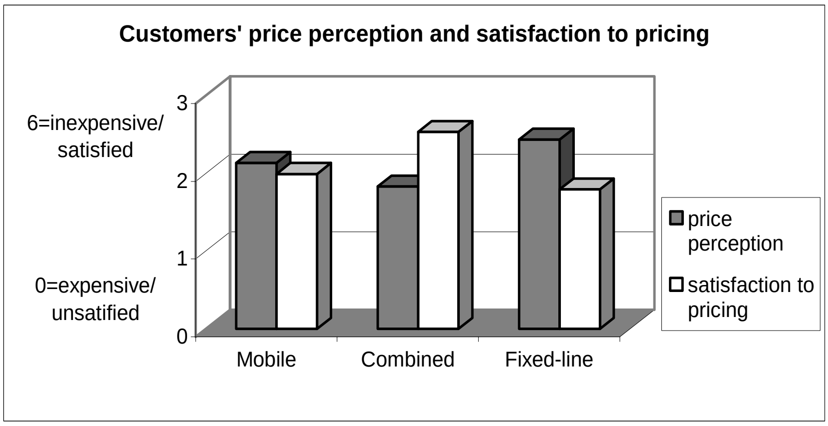

FIGURE 13 Customers’ mean price perceptions and satisfactions to pricing schemes in use.

Another important characteristic necessary to analyse was customers’ usage frequencies of mobile services. Even though customers were segmented according to their usage experiences of mobile services the better insight was needed. In the Figure below segment-specific usage frequencies of mobile services are presented. As the basis of segmentation was the usage experiences of mobile service customers, the differences were expected, and also proved to be prominent between the segments. Customers in the mobile segment were using mobile services clearly the most frequently with the mean frequency of 2.12 (0=seldom, 5=daily, s.d. 1.513) though the deviation between the respondents was rather high. The combined segment had the second highest (mean 1.04, s.d. 1.176) and the fixed-line segment the lowest (mean 0.42, s.d. 0.941) usage frequencies. The notable was that in the each segment there were customers who stated to use mobile services daily as well as customers who stated to use mobile services only seldom.

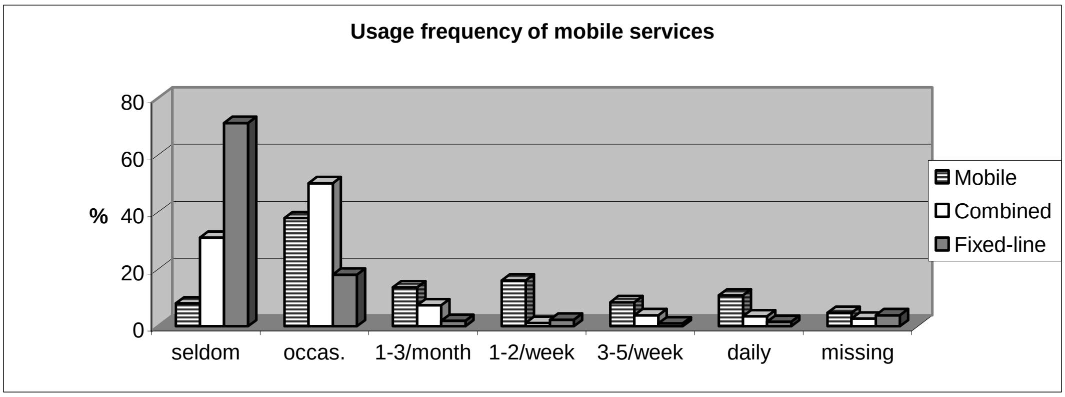

FIGURE 14 Customers' usage frequencies of mobile services.

As the distinctive differences in customers' price perceptions, satisfaction to pricing schemes, and usage frequencies occurred to be remarkable between the three segments, the question of the factors causing these differences was raised. Therefore it was needed to explore more in detail the factors based on the research model and the hypotheses through which we expected to be able to explain and predict the differences in the variances of customers' price perceptions more accurately. Thus, in the next chapter, first, results from the factor analyses are presented for constructing the customer-based latent factors and then, then further studies and analyses on the relationships between these factors and customers' price perceptions are conducted.

3.2.2 Creation of the latent factors for the study

For analysing further the dynamics of customers' price perceptions, the four factors (presented in the chapter 2.1.) were constructed. These factors were expected to possess a statistically significant explanation power in predicting the customers' price perceptions. Furthermore, as these created latent-factors were related to customers' subjective characteristics, those were therefore supposed to indicate well the customers' subjective price perceptions.

Factor analysis was found very useful for our need to construct latent factors from the large amount of variables. For example Kerlinger (1973) has described factor analysis as "the queen of analytic methods". The general purpose of factor analysis is to summarize the information contained in a large number of variables into a smaller number of factors. Factor analysis is referred to a diverse number of techniques used to discern the underlying dimensions or regularity in phenomena. (Zikmund 1991) Factor analysis begins by constructing a new set of variables based on the relationships in the correlation matrix. While this can be done in a number of ways the most frequently used approach is principal components analysis. This method transforms a set of variables into a new set of composite variables or principals components that are not correlated with each other. These linear combinations of variables, called factors, account for the variance in the data as a whole. (Cooper&Emory 1995)

The factor analyses were conducted in this study in order to structure and analyse the variables which were assumed to explain differences in customers' price perceptions of mobile service. The factors were constructed according to factor loadings which suggest the number of factors obtained. Very high factor loadings were suggesting that only one factor was needed. While a factor loading near zero suggested that there are no common factors. If the loading were moderately high (e.g. around .50), it suggested that more factors may be needed. In order to provide critical values for analysing factor loadings we followed the suggestions of Nunally (1967). He stated that the factors with very small loadings (under .30) should not be interpreted and to do best, an approval limit of 0.5 should be applied.

Another criterion for factors is called latent root or eigen-value criterion. The latent roots criterion holds that the amount of variation explained by each factor or latent root must be greater than one. That is, each factor should account for the variation in at least one variable if the factor is to be considered useful from a data summarization perspective. (Churchill 1995) Thus, according to the discussed criterions the four factors were constructed for the mobile, combined, and fixed-line segments.

To further prove appropriateness of the factor analyses and the consistency of the factors Kaiser-Meyer-Olkin (KMO) and Cronbach's alpha tests were applied. The internal consistency of the factors was examined by Cronbach's alpha which is suggested e.g. by Carmines and Zeller (1979). They stated that for examining the internal consistency of statistical tests that include combined or multiple variables Cronbach's alpha is most suitable. Alpha changes between 0 and 1, and the closer to 1 the more consistent is the meter (1976). Nunnally (1967) has also noted that for basic research the sufficient level of reliability is .60.

Kaiser-Meyer-Olkin measures an overall sampling adequacy for each variable. The KMO measure provides means to assess the extent to which the indicators of a construct belong together, i.e. a measure of the homogeneity of variables. The Bartlett test of spherity has also been suggested. But as it is dependent on sample size, it is rarely used (Sharma 1996). No statistical tests exist for the KMO measure, but Kaiser and Rice (1974) suggest the following guidelines in the interpretation: a KMO measure larger than 0.9 is marvellous, larger than 0.8 is meritorious, larger than 0.7 is middling, larger than 0.6 is mediocre, larger than 0.5 is miserable, and below 0.5 unacceptable. As also Norusis (1994) suggests that the KMO test greater than 0.6 indicates that factor analysis was appropriate, the 0.6 level is applied also in the analyses below.

TABLE 2 Factor analysis for the mobile segment

	Factor 1	Factor 2	Factor 3	Factor 4
F1: Satisfaction (α .814)				
My problems are taken care of delicately and confidentially.	.792			
My teleoperator is never too busy for answering my questions.	.765			
Support services fulfil my service needs.	.762			
My problems are solved at the time important to me.	.744			
F2: Investment readiness (α .893)…if				
There were available services with higher quality.		.931		
There were available more versatile selection of services		.909		
There were available services with faster functionality.		.891		
Services would were easier to use.		.835		
A chance to tailor services to meet own needs.		.812		
Services are delivered without delay.		.756		
F3: Innovativeness (α .733)				
Trust on usage of electronic channels in dealing with daily affairs.			.747	
Usage of new technology products is natural and enjoyable.			.726	
Trying actively to learn new things and methods.			.700	
Awareness of different service channels.			.615	
Service quality can be increased with new technologies.			.593	
F4: Price sensitiveness (α .761)				
Not troubled even though new technology services are more expensive.				.864
Satisfied with the current pricing scheme.				.762
Willing to pay more for getting services of higher quality.				.839
				KMO .787

In the mobile segment the four factors presented in Table 2 were created. These factors were approved by the four criterions discussed previously: factor loadings were above 0.5, eigen-value above 1, Crohonbach's alpa above 0.6 and KMO-values above 0.7. All the four factors explained the differences in customers' price perceptions even though measured different aspects of the perception. For naming the factors, first we scrutinized the variables arranged under the factors and then used the pre-assigned terms for the variables or assessed the common elements describing the variables.

Variables in Factor 1 were observed to measure customers' overall satisfaction to operator's services. This factor obtained high explanation power by explaining 44 percent of total variance in customers' satisfaction (44.414%). Variables in Factor 2 measured customers' readiness to invest more on mobile services. The factor was successfully constructed and presented well the measured latent factor as it got explanation power of 66 percent (65.651%).

Factor 3 measured customers' level of innovativeness with the poorest explanation power of 28 percent (27.783%). And finally, Factor 4 measured customers' price sensitiveness which explanation power was on a sufficient level with 41 percent (41.404%).

With the factors presented above the variances in customers' price perceptions can be explained 38 percent (according to the factor analysis). Out of the four factors innovativeness and price sensitiveness received the lowest factor loadings while the satisfaction and investment readiness obtained clearly higher values. The appropriateness and consistency values were adequate in the cases of the each factor.

The similar factor analyses were conducted in the case of the combined segment. The factor analyses provided also four factors as in the mobile segment. The factor loadings and the other three criterion measures rather similar in the each factors and were also on a bit higher level compared to the mobile segment. Only the third factor obtained lower (though sufficient) loading-values compared to other three factors. The Cronbach's alphas differed between 0.781 and 0.953 being, in general, on a very good level. The KMO-value followed the similar deviation than the Cronbach's alphas.

TABLE 3 Factor analysis for the combined segment

	Factor 1	Factor 2	Factor 3	Factor 4
F1: Satisfaction (α .872)				
I get my problems solved at the time important to me.	.805			
My problems are taken care of delicately and confidentially.	.757			
Support services offered by my teleoperator fulfil my service needs.	.756			
My teleoperator is never too busy for answering to my questions.	.718			
Satisfied with operator's web-pages.	.701			
F2: Investment readiness (α .953)…if				
There were available services with higher quality than at the moment.		.941		
There were available more versatile selection of services		.939		
There was available services with faster functionality		.914		
Services would be easier to use		.919		
A chance to tailor services to meet own needs		.863		
A services would be delivered without delay		.767		
F3: Innovativeness (α .807)				
Service quality can be increased with new technologies.			.780	
I am trying actively to learn new things and methods.			.765	
Usage of new technology products is natural and enjoyable.			.728	
I trust in usage of electronic channels in dealing with daily affairs.			.712	

(continues)

(TABLE 3 continues)

I am well aware of different service channels.	.689	
Innovations created amenity devices rather than personal services	.580	
I appreciate more amenity devices than personal service.	.576	
F4: Price sensitiveness (α .781)		
I am willing to pay more for more versatile selection of services.		.913
I am willing to pay more in order to get services and products of higher quality.		.887
I am not troubled even though I have to pay more to acquire new technology services or products.		.803
Price and costs are highly important factors in purchasing new services.		.502

KMO .834

As in the mobile segment, the Factor 1 measured customers' satisfaction to operator's services. And also in the combined segment it obtained good explanation power, 47 percent (47.484%). The second Factor, investment readiness, was clearly best structured factor if measured in explanation powers, with 74 percent (74.185%). Third Factor was created to measure customers' level of innovativeness. The explanation power of this factor was 34 percent (34.321) and was clearly weakest in this segment. The fourth, price sensitivity, factor was also well structured explaining 55 percent of the variation in customers' price sensitivity (54.551%).

Factor analyses in the combined segment produced thus the four qualified factors. These factors explained the differences in variation of customers' price perceptions with explanation power of 48 percent (48.276%) which was notably higher than the same value in the mobile segment. The factor loadings in general were also on a rather high level, especially the investment readiness factor.

In the fixed-line segment the factor analyses were conducted as in the two previous segments. The four latent factors created which were expected to explain and predict customers' price perceptions. The main difference compared to the other segments was the investment readiness factor. As in this segment it was observing the customers' readiness to start to use mobile services rather than the customers' readiness to invest more on mobile services. There was also noticed that Factor 4 obtain clearly weaker reliability results according to Cronbach's alpha exceeding only slightly the critical level. While especially the Factors 1 and 3 were successfully constructed with the criterion values comparable to the factors in the other segments.

TABLE 4 Factor analysis for the fixed-line segment

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
F1: Satisfaction (α .863)				
Problems are taken care of delicately and confidentially.	.775			
Teleoperator is never too busy for answering to my questions.	.760			
Support services fulfil my needs.	.759			
My problems solved at the time important to me.	.758			
F2: Investment readiness (α .746)…if				
Usage equally priced with services in fixed-line connection		.597		
Needed services would not be available in the fixed-line connection		.673		
There was available service bundles tailored to my needs		.724		
F3: Innovativeness (α .804)				
I am trying actively to learn new things and methods.			.749	
I trust in usage of electronic channels in dealing with daily affairs.			.731	
I am well aware of different service channels.			.695	
I appreciate more amenity devices than personal service			.688	
Usage of new technology products is natural and enjoyable.			.688	
Service quality can be increased with new technologies.			.637	
F4: Price sensitiveness (α .618)				
I choose services based on quality.				.650
I am willing to pay extra for more versatile selection of services.				.669
I choose services based on price.				.755
Prices of mobile services are the main barrier for increasing the usage.				.593

KMO .749

In the fixed-line segment Factor 1 was best constructed measured practically in the all criterion values. The factor loadings, Cronbach's, and eigen-values were visibly on best levels compared to other three factors. This factor measured customers' satisfaction to operator's services (as in the other segments) and obtained fairly good explanation power, 45 percent (45.424%). Factor 2 measured customers' readiness to start to use mobile services. This factor obtained very good explanation power, 66 percent (66.492%) and explained therefore the variances in customers' readiness to start to use mobile services very well. Also the factor 3 was accurately constructed. The factor measured customers' level of innovativeness, but despite the good criterion values it received rather low, though still adequate, level of explanation power of 33 percent (32.943%). Factor 4 was measuring customers' price sensitiveness and obtained the second best and fairly good explanation power 39 percent (38.926%).

In the fixed-line segment the hypothesized latent factors that were expected to best indicate customers' price perception levels obtained clearly lowest explanation power in the factor analysis compared to the other two segments, only 23 percent. Therefore, coming analyses might with high probability leave the further analyses to clearly weaker level in the case of this segment as the latent factors provided significantly weaker values.

3.2.3 Descriptions of the latent factors

After constructing the factors which were hypothesized to indicate customers' price perception levels, further analyses were needed. First we have provided general segment-specific descriptions on the factors and then, in the next chapter, we have presented key-results of the further analyses. The first factor created in the previous chapter was the satisfaction to operator's services. In Figure 15 below an overview of customers' satisfactions in the three segments is presented. Two most visible characteristics were found: first, differences between the segments are distinctive, and secondly, the mobile (mean 3.76, s.d. 1.59, 0=dissatisfied, 6=satisfied) and the combined (mean 3.60, s.d. 1.65) segments were found to be least satisfied while the fixed-line segment was the most satisfied with TeliaSonera's services (mean 4.13, s.d. 1.72). This notion seemed to be a clear indication of the fact that customers in the mobile and combined segments were using least personal services provided by the operator, while customers in the fixed-line segment were using most often personal services. Though, it can be interpreted also that the customers in the two segments were using most often mobile services, and thus being more likely to encounter problems and flaws in the services. Either way, personal services are obviously perceived as more satisfying and accurate for customers' needs and mobile Internet services are lacking on some parts in being able to adequately meet the customers' needs.

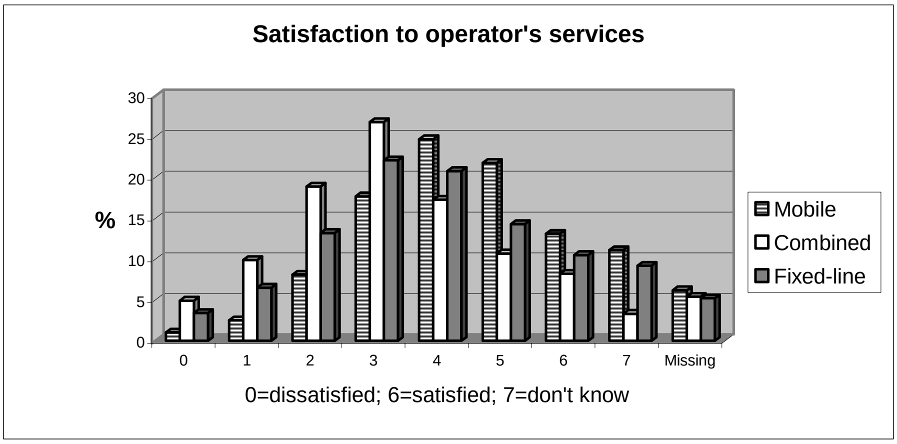

FIGURE 15 Customers' satisfaction to an operator's services.

The second latent variable that was hypothesized to be a significant predictor of customers' price perceptions was the readiness to invest on mobile services. And, as well as the satisfaction factor this factor was also assumed to have distinctive variation between the customers and customer segments (to be able to explain variations in customers' price perceptions). But as this factor was related closely to customer's ability to evaluate the pros and cons of the mobile services, in the fixed-line segment case this factor measured they readiness to start to use mobile services. In comparing the mean values and distributions of this factor between the three segments notable differences were found (Figure 16), which however was in-line with the expectations. As customers in the mobile segment were supposed to be more innovative than customers in the combined segment, they were thus expected to be more eager to invest more on new mobile services (regardless of price). In the mobile segment the mean investment readiness was 4.05 (s.d. 1.59, 0=not ready, 6=ready), in the combined segment the same value was 3.78 (s.d. 1.90), and in the fixed-line segment the intension to start to use mobile services was 4.25 (s.d. 1.93). The results were thus in-line with our expectations, the mobile segment was more ready to invest more on new mobile services than the combined segment. Surprising was however that customers in the fixed-line segment seemed to be very willing to start to use mobile services, perhaps they just don't know how.

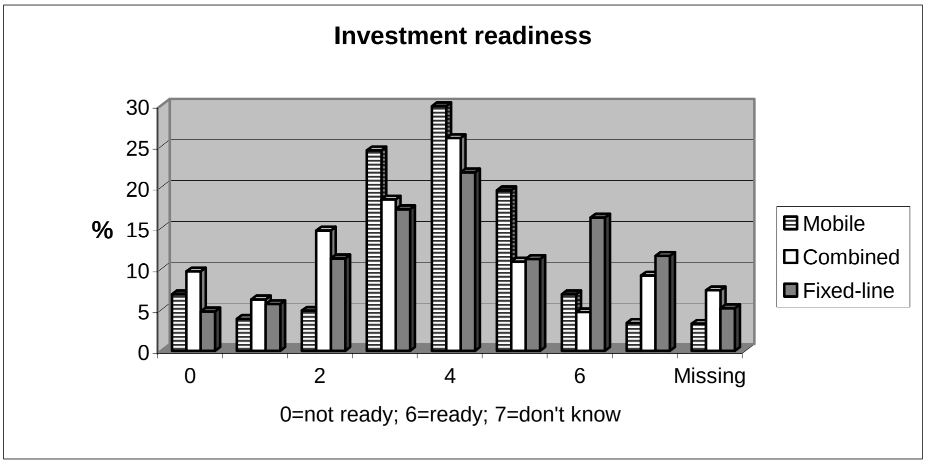

FIGURE 16 Customers' readiness to invest more on mobile services.

The third factor created and hypothesized to have a significant predictive power in explaining customers' price perceptions was the innovativeness. In observing Figure 17 the impression of fairly innovative mobile service customers is created, regardless of segment. Customers seemed to be rather innovative in all of the segments and differences between the segments were small. On the other hand, also these small differences further confirmed the validity of our segmentation and the prior adoption theories (e.g. Rogers 1997), the more innovative mobile service customers were found to be also more intensive user of mobile services. Customers in the mobile segment were the most innovative with the mean value of 4.60 (s.d. 1.08, 0=not innovative, 6=very innovative), and customers in the fixed-line segment were least innovative with the mean 4.10 (s.d. 1.28). And according to this rationale, the combined segment was placed between the two segments with the mean value 4.45 (s.d. 1.08). But as mentioned, the differences between the segments as well as between the customers in the segments were small. It might be one of the reasons that this factor did not obtain high explanation values in the further analyses.

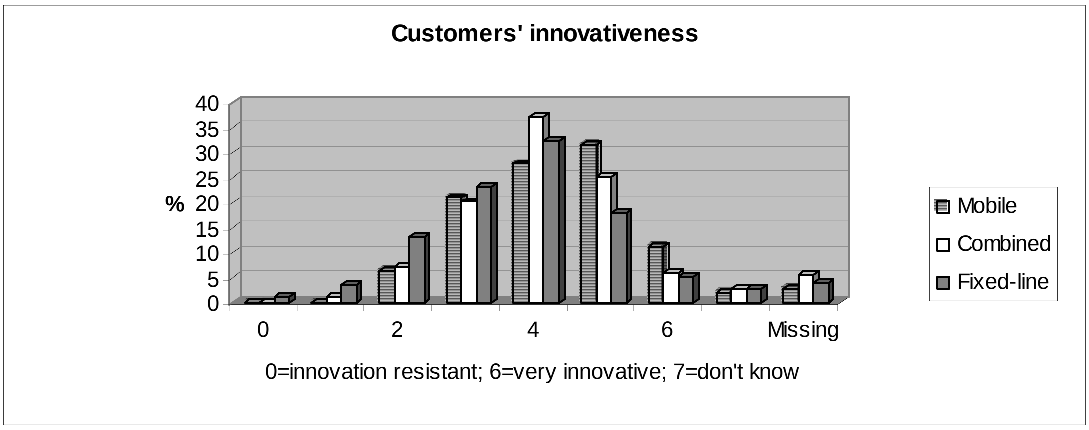

FIGURE 17 Customers′ perceived innovativeness.

The last factor that was constructed in the factor analyses and hypothesized to indicate customers′ price perceptions was the price sensitivity. As the theoretical discussion disclosed, this factor is often stated to be one of the most important one affecting to customers price perceptions and companies pricing decisions. And according to analyses of the present study the theories and findings of the prior studies were confirmed. Customers′ price sensitivity was found to be highly important factor in making pricing decisions also in mobile services business – as the next chapter proves.

First notion in inspecting Figure 18 was the high deviation in customers′ price sensitivity levels, between the segments as well as within the segments. Interpretation of the results is however clear, mobile service customers seemed to be the more price sensitive the higher was their usage of mobile services. This observation was also confirmed by Kollmann (2000) in his study on telecommunication customers. Customers in the mobile segment were found to be the most sensitive to price changes with the mean value of 2.46 (s.d. 1.69, 0=high sensitivity, 6=low sensitivity). Whence, the combined (mean 3.32, s.d. 1.74) and the fixed-line (mean 3.96, s.d. 1.56) segments obtained clearly lower sensitivity levels. The differences between the segments in this factor were most distinctive and it provided us with further expectation of its importance in predicting customers′ price perceptions.

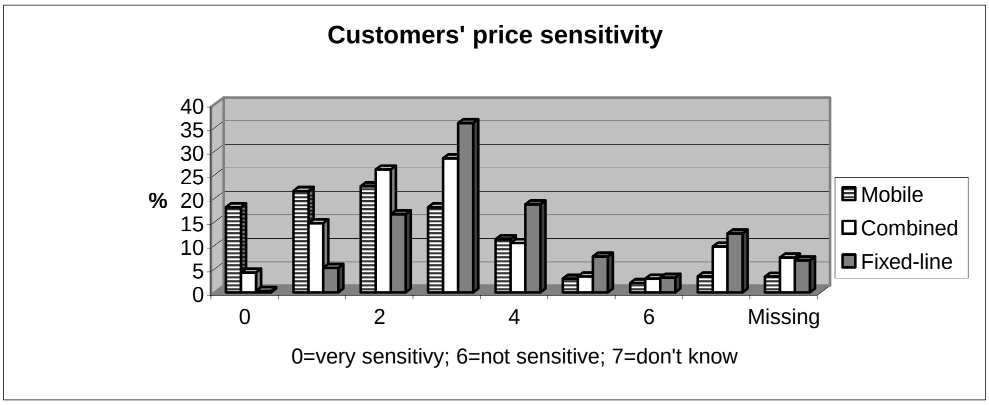

FIGURE 18 Customers’ price sensitivity.

3.2.4 Results of testing the hypotheses

For testing the created hypotheses and measuring their significances and strengths towards customers’ price perceptions, we have applied two basic methods: test for F-distribution and the linear multiple-regression analysis. In addition to these key methods we have conducted also some additional analyses through other statistical methods which are discussed more in detail in the analyses in question.

For testing the relationships between customers’ price perceptions and the latent factors discussed in the previous chapter, the F-tests, regression analyses, and t-tests were conducted. These three methods are connected to each other through multiple regression analyses. The F-test has an overall role for the model in multiple regression analyses, and each of the independent variables is evaluated with a separate t test (Cooper&Emory 1995). Normally F-test is use as a test for the joint hypothesis that a number of coefficients are zero. Large values generally reject the hypothesis, depending on the level of significance required. F-test is therefore perceived as a useful method for our need for testing statistical significance of the created hypotheses. Which addition, squared multiple correlation coefficients are also presented, R^2, reflecting the proportion of variation explained by the regression line. (Zikmund 1991)

The regression analysis in linear regression investigates a straight-line relationships of the type $Y=a+\beta X$ (Zikmund 1991). There has been laid four major assumption for our regression models that they are accounted as valid: 1) *linearity* of the relationship between dependent and independent variables, 2) constant variance of the error term, i.e. *homoscedasticity* assumption, 3) independence of the error terms, and 4) normality of the error term distribution and individual variables, and 5) the predictor variables are not correlated among themselves, i.e. *multicollinearity*. (e.g. Conover 1980, Churchill 1995, Pedhazur&Schmelkin 1991)

The first hypothesis expected that customers’ would perceive mobile service prices differently, and these differences would occur between the customer segments. As noticed in the chapter 3.2.1, customers were found, on the other hand, to perceive mobile service prices rather expensive in the all segments while, on the other hand, there were found distinctive deviations between customers and the customer segment. The mean price perception values differed distinctively between the segments. As the differences existed between and within the customer segments further analyses on the four latent factors was reasonable.

According to the analyses of the four hypothesized factors, basically each of the four factors was found to significantly indicate customers′ price perceptions (see Table 5). Only exception was the investment readiness hypothesis which obtained rather low explanation and F-distribution values in the cases of the mobile and the fixed-line segments. Also in comparing the obtained explanation and significance values of the other three factors, notable differences existed. Thus it confirmed our expectations that customers′ usage experiences of mobile services and subjective characteristics are of high importance in the formation of price perceptions.

Customers′ demographical backgrounds provided opposite results. There were found only weak (if any) significance values in indicating customers′ price perception levels, and only few variables reached the critical significance values. As was expected, based on the findings of Mattila′s et al. (2003) study on Internet banking services, customers′ age addressed some significant relationship with the customers′ price perceptions. Also the customers′ usage experiences and innovativeness levels presented some occasional correlative relationship with the perception factor.

TABLE 5 Result-table of the factors explaining customers′ price perceptions.

Factors	***Mobile*** *(R^2 .238)*	***Combined*** *(R^2 .415)*	***Fixed-line*** *(R^2 .102)*
F1: Service satisfaction			
β-value	.056	-.001	.105
F2: Investment readiness			
β-value	-.044	.011	.247**
F3: Innovativeness			
β-value	.163**	.246**	.067
F4: Price sensitivity			
β-value	.382**	.545**	-.002

Note: *p<.05, **p<.01

Generally speaking factors 3 and 4 were found to be clearly best predictors of customers′ price perceptions. These two factors possessed β-values which significantly higher than the same values in the two other factors: in the mobile (β .382) and the combined (β .545) segments. In the combined segment case also the rest two factors obtained sufficient level of explanation powers further improving the prediction accuracy. The fixed-line segment was left with clearly weakest results as only factor 2 provided a sufficient and statistically significant explanation power (β .247). Though, it must be mentioned that this kind of result was expected after the rather weak results of the factor analyses. It is therefore probable that in the further studies there could be found factors which might be more accurate for indicating customers′ price perceptions in the fixed-line segment.

The hypothesized factors provided us also customer-based information according to which customers can be segmented more accurately into segments with homogeneous perceptions and characteristics. Out of the four factors price sensitivity and innovativeness were, in general, good indicators of customers' price perception levels through which a mobile service provider can direct service offerings and pricing schemes more accurately. Service satisfaction and investment readiness factors provided weak results in cases of the all segments, thus cannot be used for predicting accurately customers' price perception levels. There was found also few other factors presenting (occasionally) significant relationships (e.g. usage of other service channels, usage of specific mobile services etc.). But as these factors were generally clearly weaker in measured values they are discussed only in the parenthesis of the articles.

As the sixth hypothesis concentrated on providing business practitioners with some practical solutions for pricing of mobile services, applicability of the bundle pricing strategy was studied. The testing of this last hypothesis was conducted through product moment correlation (Pearson r) analysis and analysis of variances. It was discovered that, first, customers in the each segment possessed positive attitudes towards acquiring mobile services in bundles (rather than separately). Differences between the segments were also minimal. Customers in the mobile segment perceived service bundles most positively with the mean value 3.89 (s.d. 1.65, 0=not interested, 6=very interested), the mean value in the combined segment was 3.58 (s.d. 1.85), and in the fixed-line segment 3.41 (s.d. 2.00).

Though the customer segments were quite unanimous in their perception towards mobile service bundles, differences appeared when comparing the customers' price and bundle perceptions. In the each segments significant relationships between the two variables were detected. The relationship power was strongest in the mobile segment with correlation coefficient of r .290 ($p<.01$) and weakest in the fixed-line segment, r .145 ($p<.05$). The combined segment was placed between with correlation coefficient of r .245 ($p<.01$). As the correlation coefficients were also positive in the all cases, the results stated that customers who perceived mobile services to be least expensive were the most willing to acquire mobile services in bundles. Thus also the sixth hypothesis was accepted.

TABLE 6 Results table of the hypotheses testing

Hypotheses						
H1	**Accepted:** distinctive differences between and within customer segments exist.					
	Mobile segment		**Combined segment**		**Fixed-line segment**	
	A/R	PR	A/R	PR	A/R	PR
H2	R	weak	R	average	R	average
H3	A	strong	A	strong	R	weak
H4	A	strong	A	average	R	weak
H5	R	weak	R	weak	A	average
H6	A	average	A	average	A	weak

A= accepted, R=rejected, PR=power of relationship

Finally, to present more explicitly and vividly the results of the hypotheses testing we have provided first the comparison table above (Table 6) in which research results are compared between the segments. And then, results of the analyses are embedded in the research model in Figure 19. As the comparison table clearly presents, our expectations of the distinctive differences between the segments were confirmed. It was found that for predicting customers price perceptions (or segmenting customers according to expected price perceptions) different customer-based latent factors should be used and applied depending on the customers′ usage experience of mobile services. In the mobile and combined segments the price sensitivity and innovativeness factors were found to provide most accurate tools for predicting the customers′ price perceptions. While in the fixed-line segment, customers were found to be difficult to classify into different price perception segments though one statistically significant indicator was found, customers′ investment readiness. The result on the analyses of the sixth hypothesis stated that for customers who perceived mobile service least expensive preferred most probably the mobile service bundles over separate services. And a mobile service provider could further improve the price perceptions of these customers by providing them mobile service bundles tailored to their needs.

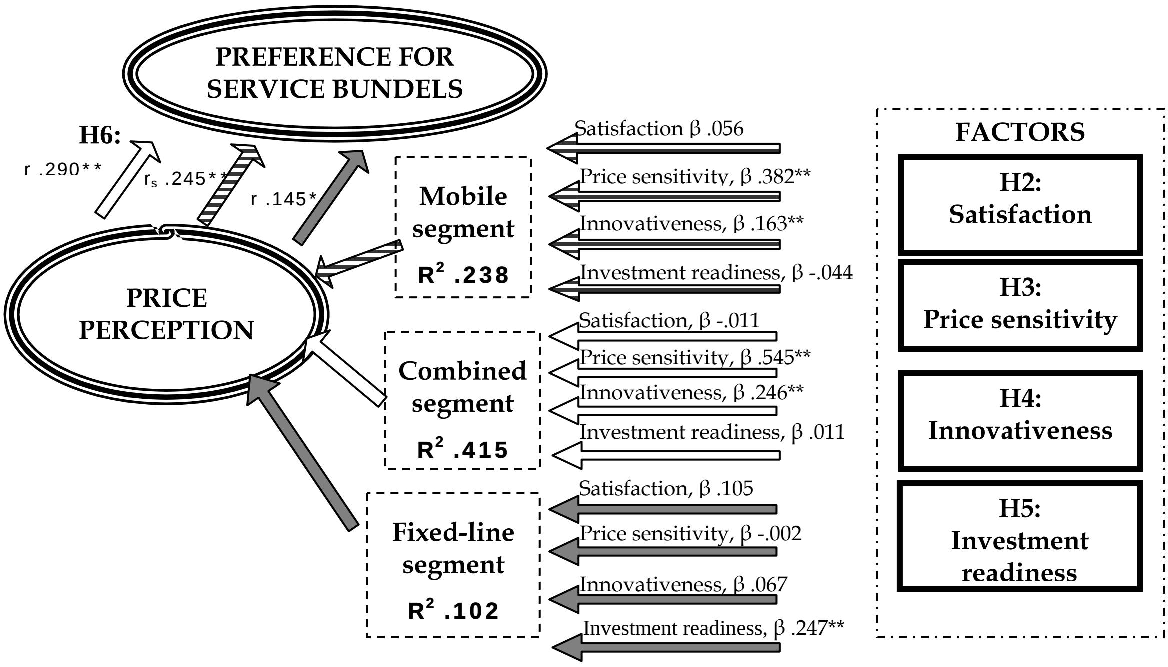
PREFERENCE FOR SERVICE BUNDELS
H6:
r .290**
rs .245**
r .145*
PRICE PERCEPTION
Mobile segment
R2 .238
Combined segment
R2 .415
Fixed-line segment
R2 .102
Satisfaction β .056
Price sensitivity, β .382**
Innovativeness, β .163**
Investment readiness, β -.044
Satisfaction, β -.011
Price sensitivity, β .545**
Innovativeness, β .246**
Investment readiness, β .011
Satisfaction, β .105
Price sensitivity, β -.002
Innovativeness, β .067
Investment readiness, β .247**
FACTORS
H2: Satisfaction
H3: Price sensitivity
H4: Innovativeness
H5: Investment readiness

FIGURE 19 Illustration on the dynamics of price perceptions of mobile services

3.3 Business implications

Pricing of goods and services is traditionally seen as routine operations which are based on straightforward cost-based calculations or follow-up of competitors. Pricing practices based on customers′ perceptions and characteristics is left mostly on little attention. The customers′ perceptions have, however, started to interest business practitioners as in new electronic service environments the old pricing models are found inadequate. Furthermore, as several studies (e.g. Chen et al. 1994, Jonason 2002, Fisburn&Odlyzko 1997, Strouse 1999, Monroe 1990) have shown that service providers could extract prominently higher margins by conducting active perception- or customer-based pricing, these pricing methods have started to gain popularity amongst the business practitioners of electronic service providers.

Despite the importance of pricing issues only few studies have concerned on pricing of mobile service, and even fewer on customer-based pricing of mobile services. The present study has therefore made an attempt to clarify and accumulate our knowledge on customers′ perceptions and characteristics which have important influences on the formation of customers′ price perceptions. The first evidence of the applicability of customer-based pricing, found in this study, was the distinctively differing price perceptions of mobile service customers. These differences were requisites for creating segment-specific pricing schemes and differentiation of service offerings. To conduct efficient pricing, service providers should provide services of right price-classes and preferred pricing schemes to the customers the service provider is targeting.

For segmenting customers according to their price perceptions, this study provided good and accurate tools especially for the customer profiles characterised by the mobile and the combined segments. There was found that two out of four customer-based latent characteristics provided accurate indicators for customers′ price perception levels – price sensitivity and innovativeness. Customers′ investment readiness provided rather good prediction accuracy for fixed-line segment. Through the two most accurate factors service providers are able to direct service offerings and pricing schemes more accurately to right customers. These two factors were especially accurate in the mobile and the combined segments. While, for the fixed-line customers these factors provided only weak prediction accuracy. Customers′ investment readiness factor was the only factor that gave some sufficient indicating power for predicting the differences in variances of the customers′ price perceptions in this segment.

In addition to inspecting the factors, the study provided also some concrete evidences on the relationships of pricing methods and price perceptions. These relationships were studied from the perspective of bundle pricing method. The analyses generated outcomes of positive and significant relationships between customers′ price perceptions and their preferences for acquiring mobile services in bundles. Thus, a service provider could obtain positive results in customers′ price perception levels by providing them segment-specifically tailored mobile service bundles and charging them accordingly. The decreased price perception would affect positively to the customers′ willingness to invest more on mobile services.

For the business practitioners the present study has thus provided detailed market-specific knowledge on the price perceptions of mobile services, how the perceptions differ between and within the customers segments, and which factors best indicate customers′ price perception levels. Through this knowledge, service providers are able to conduct more efficient pricing and marketing schemes.

3.4 Recommendations for the future research

Though, multiple areas of pricing of mobile services were studied in the present research and significant new knowledge was obtained, more detailed studies on few specific areas would be needed. First of all, further studies are needed on the formation of customers′ price perceptions′ as this study was descriptive in nature and provided thus merely a static description on the perception-based pricing in mobile services business. The study presented also analyses and evidences on multiple factors and variables which were found to predict and explain customers′ perceived prices. However, more detailed knowledge on effects of the factors to customers' perceptions and differences of these effects between customer segments would be of great importance.

Especially interesting would be to obtain knowledge on causal relationships between the factors observed in the present study. As there was used in this study methods which did not indicate causal relationships, the actual knowledge on their cause and effect relationships was not obtained. It would be very useful for theoreticians and practitioners to get information on how these factors act dynamically in time, it would further enhance the ability to predict customers' reactions to pricing changes.

Third important research area would be closer inspection of the relationship between customers' price perception and investment readiness. Especially for business actors, the knowledge on how a change in customers' price perception affects to the customer's future investments on mobile services. For this purpose longitudinal research methods would be highly useful as there could be obtained information on the realized effects between the perception and investment factors.

Last and perhaps the most important issue that requires further research is the fixed-line segment, i.e. customers who are not yet using data intensive mobile services. The present study did not provide accurate factors for this segment, only innovativeness factor presented approvable explanation power. Thus, examining more elaborately this segment could provide some evidence on the reasons which are restraining them from starting to use mobile services.

Customers in this segment were not using new mobile services but, in general, they perceived mobile services least expensive. This perception might certainly be caused by the lack of usage experience and knowledge on actual prices of the services, but some verified evidences on this issue would be needed. Following question is thus raised, why these customers are not using more mobile services though they price perceptions are most positive compared to other segments?

TIIVISTELMÄ (FINNISH SUMMARY)

Perinteisesti hinnoittelututkimukset ovat keskittyneet hintojen asetannan ja kustannus- sekä kilpailuperusteisten hinnoittelustrategioiden tutkimukseen. Asiakasperusteisten hinnoittelustrategioiden tutkiminen ja soveltaminen on jäänyt vähälle huomiolle niin käytännön liiketoiminnassa kuin akateemisissa tutkimuksissa. Nämä hinnoittelustrategiat ovat kuitenkin nousseet merkittäviksi tulevaisuuden hinnoittelustrategioiksi voimakkaasti kehittyvien sähköisten palveluiden liiketoiminnoissa, joissa perinteisten hinnoittelumenetelmien tuottamat tulokset eivät ole olleet tyydyttäviä. Tämä tutkimus on keskittynyt selvittämään havaitunhinnan mukaisten strategioiden sovellettavuutta mobiilipalveluiden liiketoimintaan. Erityisesti tutkimuksessa on keskitytty selvittämään eri asiakassegmenttien välisiä eroja hintakäsityksissä sekä, kuinka asiakkaiden hintakäsityksiin voitaisiin vaikuttaa hinnoittelumenetelmien avulla.

Tämä tutkimus toteutettiin TeliaSoneran Suomen mobiilipalveluasiakkaiden keskuudessa kesällä 2003. Tutkimuksessa käytetty aineisto kerättiin kvantitatiivisen postikyselyn avulla, jossa kyselylomakkeet lähetettiin 3000 satunnaisotannalla valitulle TeliaSoneran suomalaiselle asiakkaalle. Kyselyyn vastanneiden kokonaisosuus oli 25,9 prosenttia (778) joskin suuria segmenttikohtaisia eroja esiintyi. Tutkimuksen keskeinen viitekehys liittyy mobiilipalveluasiakkaiden hintakäsitysten sekä asiakassegmenttikohtaisten erojen analysointiin kolmen eri segmentin kesken: mobiilisegmentti (asiakkaat, jotka käyttävät Internetiä vain mobiilipäätelaitteen kautta), yhdistettysegmentti (asiakkaat, jotka käyttävät Internetiä sekä mobiilin että kiinteän päätelaitteen kautta) ja kiinteän-linjan segmentti (asiakkaat, jotka käyttävät vain perusmobiilipalveluita sekä Internetiä kiinteän päätelaitteen kautta). Eivät omista matkapuhelinliittymää, joka mahdollistaisi Internetin käytön mobiilipäätelaitteen kautta).

Hintakäsityserojen tutkimiseksi muodostettiin neljä asiakaspohjaista latenttia faktoria, joiden oletettiin selittävän tilastollisesti merkitsevästi asiakkaiden hintakäsitysten eroja: tyytyväisyys operaattorin palveluihin, hintaherkkyys, innovatiivisuus ja investointivalmius. Lisäksi tämä tutkimus keskittyi käytännön hinnoitteluongelmaan tutkimalla bundle-hinnoittelustrategian sovellettavuutta mobiilipalveluliiketoimintaan. Tutkimuksessa havaittiin, että mobiilipalvelut nähdään yleisesti ottaen kalliina ja hinta oli suurin este palveluiden käytön lisäämiselle. Merkittäviä asiakas- ja asiakassegmenttikohtaisia eroja kuitenkin esiintyi. Neljästä analysoidusta faktorista erityisesti asiakkaiden innovatiivisuus ja hintaherkkyys osoittautuivat parhaiksi hintakäsitysindikaattoreiksi. Lisäksi asiakkaat pitivät mielekkäämpänä jokaisessa segmentissä mobiilipalveluiden hankkimista ja laskuttamista usean palvelun paketteina kuin yksittäisinä palveluina. Asiakkaiden hinnoittelumenetelmäpreferenssien ja hintakäsitysten välillä havaittiin olevan positiivinen riippuvuussuhde. Tällöin asiakkaat, jotka preferoivat mobiilipalveluiden hankkimista usean palvelun paketteina pitivät pääsääntöisesti mobiilipalveluita vähemmän kalliina kuin asiakkaat, jotka hankkivat mobiilipalvelut ennemmin yksittäisinä.

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