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THE MAKEOVER OF MOBILE BROADBAND

...by alleviating the problems of capacity, revenues and churn

Abstract: The future prospects of mobile broadband do not appear all that obvious. We have identified three crucial problems that operators are currently facing –capacity congestion, revenue shortages and immense churn. There is a widespread agreement that the business model of mobile broadband must become value-based and customer-oriented in order to resolve these problems. However, to date, there is an evident lack of knowledge on the values, behaviours and beliefs customers have towards mobile broadband. The aim of our thesis is thus to conduct an exploratory study, from a demand-side perspective, of feasible ways for operators to alleviate the three problems. We use a triangulation of industry-related research, relevant theories and focus group findings to answer our research questions and subsequently to offer important managerial implications. From our study, we can conclude that operators must incorporate customization and cross-service bundling into their business models of mobile broadband in order to resolve the abovementioned problems and achieve long-term profitability.

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Thank you…

Per Andersson for your support and insightful inspiration

Bertil Thorngren for introducing us to the world of telecommunications

The Operator for putting up with our endless number of questions

Ericsson for sharing your technical expertise and widening our perspectives

and

All focus group participants for taking your time to contribute to our study with your values, behaviours and beliefs of mobile broadband

“We are what we think.
All that we are arises
with our thought.
With our thoughts,
we can make the world.”
- Buddha

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1. INTRODUCTION

1.1 PROBLEM AREA

"By 2020, there will be 50 billion wirelessly connected devices worldwide…and already by 2015, mobile PC subscriptions will have grown six times and the traffic generated will grow more than 50 times compared with the end of 2009." This was the key message from Ericsson's CEO Hans Vestberg at the latest Mobile World Congress (Ericsson 2010a). Astonishing numbers for sure, but when contrasted with industry outcries about unsustainable business models (Williams 2009), capacity crunches (Schlautmann *et al* 2008) revenue gaps (Mölleryd *et al* 2009) and immense churn (Wieland 2007), the future prospects of mobile broadband operators do not appear all that obvious.

Mobile broadband usage has absolutely exploded over the past couple of years. Today, there are already 400 million mobile broadband customers globally who subscribe to the service and another 3 billion are expected to join within the next five years (Ericsson 2010d). In Sweden alone, PTS[1] reported 1.1 million subscriptions at the end of Q2 2009 (PTS 2009) –a number that is anticipated to be well above 2 million by 2012 (Mölleryd *et al* 2009). What is driving this incredible development?

Just a few years ago, mobile operators were desperately looking for ways to attract new customers and drive traffic onto their brand new 3G-networks. Consequently, the operators launched attractively priced mobile data packages (Burley 2009). To quickly stimulate usage, the subscription plans encompassed unlimited data usage at fixed prices (Ericsson 2008 and Lomas 2010). The result was an instantaneous rapid growth in the number of mobile broadband subscriptions in Sweden (PTS 2009).

However, the quickly increasing usage of mobile data services has begun to put pressure on operators' infrastructure (Williams 2009). While there is still sufficient capacity in the core networks, operators are facing congestion in their radio access networks (Schlautmann *et al* 2008). During times of congestion, customers may experience poor quality of service (QoS) as more users are competing for the same bandwidth. Simply put, the more people who connect, the slower the speed (Schenone 2007). The fact that much focus has lately shifted to the provision of real-time applications requiring stricter QoS-guarantees makes this development even more problematic (van der Weiden 2009).

Nonetheless, customers are given little incentive to alter their transmission behaviour. Falkner *et al* (2000) state that as long as customers have unlimited usage, they will tend to overgraze, creating congestion and downgraded performance for all users. Flat-rate

[1] Swedish Post and Telecom Agency

pricing schemes for mobile broadband neither reflect actual utility levels nor dissuade usage during congested hours (Falkner *et al* 2000 and Yaipairoj and Hermantzis 2006). Recently, a few operators have introduced both limits on data usage and differentiated prices depending on speed, as means to tackle congestion (Mölleryd *et al* 2009).

However, capacity issues extend beyond congestion. The drastic growth in mobile data communication is also putting pressure on operators to increase total capacity, requiring new infrastructure investments. The problem is how to meet these growing capacity demands while average revenue per unit (ARPU) continues to decrease (Schlautmann *et al* 2008). So far the limited revenue streams from mobile broadband services have failed to support network expansions (Mölleryd *et al* 2009). Recent statistics reveal that, on average, mobile broadband data accounts for close to 80% of mobile network traffic, but only 15% of the subscriber base (Blennerud 2009b). Mölleryd *et al* (2009) claim that mobile broadband users generate 130 times more traffic than voice customers, but they pay only 1% of the price per megabyte compared to voice. Together this means that only 2-3% of an operator's total mobile revenues come from mobile broadband (Mölleryd *et al* 2009). This dilemma is referred to as the revenue gap, in other words, usage of mobile data services continues to increase, but due to the flat-rate pricing schemes, this does not automatically generate more revenues for operators (Mölleryd *et al* 2009).

Then there is of course the problem of being in the midst of an extremely competitive landscape where constant downward pressure on prices absorbs profit margins. Munnukka (2005) claims that the strong focus on price has been inherited from the traditional telecommunication business, where customers have generally been very price elastic. Considering that most customers do not even know what a megabyte is (Lomas 2009), the strong importance of price when choosing a subscription is not surprising. Moreover, focus must be directed at customer satisfaction, in order to depress the problematically high churn presently characterizing the whole industry (Wieland 2007 and Hughes 2008).

"When the usage increases so much that additional capacity investments are necessary, we have to find new strategies that will give us more money" –Kenneth Karlberg, former president of Mobility Services, Telia, explicates challenges that operators stand before today (Ewenfeldt 2010). To summarize the illuminated problems, operators are currently facing serious issues concerning capacity congestion, revenues shortages and immense churn. They must find ways both to manage their existing network capacity more efficiently and to generate enough revenues to finance infrastructure expansions. At the same time, they have to figure out a way to retain and make customers more loyal. Many industry experts agree with Karlberg that there is an urgent need to change the business model of mobile broadband (Augustsson 2009). However, how can the model possibly be changed to simultaneously and successfully solve all of the three identified problems?

1.2 PURPOSE & RESEARCH QUESTION

Delivering a sustainable business model for mobile broadband would certainly be rewarding, but hardly attainable within the scope of this study. Nonetheless, the overall purpose of this thesis is to contribute to its development. According to the aforementioned, we have identified three distinct problem areas: capacity, revenues and churn. While the limited and decreasing revenues fail to support the urgently required capacity investments, the existing infrastructure is not utilized efficiently and operators face issues of periodic congestion. On top of this, operators are stuck in a turbulent business environment with fierce competition and high churn. Hence, our objective is to conduct an exploratory study of feasible ways for operators to alleviate the specific problems. Unlike previous research, we intend to evaluate the identified possibilities from a demand-side perspective and offer valuable managerial implications.

In accordance with the overarching purpose, we hereby state our research questions:

- *What might be alternative ways for operators to solve the immediate issues of capacity congestion, revenue shortages and immense churn?*
- *Which of these alternative ways could, from a demand-side perspective, successfully be implemented in the mobile broadband business?*

1.3 DELIMITATIONS

Due to the scope and purpose of this thesis, a number of delimitations are necessary. While the aforementioned problems are vivid on a worldwide scale, we have chosen to focus on the Swedish consumer market. Partly due to the nation-specific regulations and competitive landscape of telecommunications and partly due to the widespread usage of Internet among Swedish consumers (PTS 2009). Moreover, while there has been extensive research into the potential gains of clever and cost-efficient network design, our intention is neither to delve into these technical aspects nor investigate the underlying cost structures of mobile operators. This study takes a demand-side perspective and explores the challenges from a customer's point of view.

Furthermore, we have chosen to exclude mobile broadband services in conjunction with Smartphones, since operators treat Smartphones as a separate product category in which voice and Internet access services are bundled into the same subscription. Onwards, for a long time there have been talks about the profit opportunities for operators to expand their business models to incorporate the provision and sales of content. On the same note, the business model in relation to both existing content providers and advertisement has been discussed (see de Reuver *et al* 2009). For example, should content providers pay operators for the capacity their applications require or should operators pay content providers for creating network value? Although highly relevant to the development a new business model, we have decided to delimit this study to the core service of providing mobile Internet access.

1.4 EXPECTED CONTRIBUTIONS

The primary expected contribution of our study is to develop knowledge on the viewpoints of customers in relation both to the current state of mobile broadband and to the alternative ways suggested as potential options for alleviating the three identified issues. As many industry experts have stated (see Mörner 2010 and Jallat and Ancarani 2008), the mobile broadband business must become value-based and customer-oriented to obtain long-term profitability. However, to achieve this prerequisite, it is necessary to first have a good understanding of the values, behaviours and beliefs of customers in terms of mobile broadband. To date though, representatives from both Ericsson (Mar 2010) and The Operator (Mar 2010) allude to the lack of customer-oriented qualitative studies. Thus, it is our intention to fill part of this knowledge gap with a qualitative study and to use our findings to offer a few relevant managerial implications and suggestions for further research. On the side, we expect that our collaboration of industry-related literature will contribute to a clear understanding of the developments to date of the options operators have at hand to handle the problems of capacity congestion, revenues shortages and immense churn.

1.5 DISPOSITION

Now that the introduction has been presented, the rest of the study is structured as follows. Chapter two presents the method applied, chapter three describes the chosen theories, chapter four reports on the literature review, chapter five accounts for our focus group findings, chapter six contains our analysis and finally, chapter seven concludes the study and offers managerial implications as well as inspiration for further research.

2. METHOD

2.1 RESEARCH DESIGN

To date, there is little collective research published about the future of mobile broadband. Today, industry experts only provide an incoherent myriad of possible solutions to the operators' most immediate challenges. We believe that an effective collaboration of these individual efforts is required in order to shed light on the future of mobile broadband. Moreover, there is, as confirmed by The Operator (Mar 2010) and Ericsson (Mar 2010), an evident lack of qualitative consumer-oriented studies within the field. This is alarming considering the widespread agreement that the key to future success for operators lies in creating a value-driven, customer-centric business model. Hence, we have employed a qualitative research method, designed both to fill the aforementioned knowledge gap and to aptly match the exploratory nature of our research questions.

More specifically, we have chosen a qualitative research design where the main focus lies on conducting focus group sessions, rather than a quantitative method with questionnaires as the primary source of data. According to The Operator, this is the approach that would contribute the most to solving their challenges today. While operators frequently and easily conduct quantitative research as well as have access to enormous databases of usage-related information, there is little effort and time directed towards obtaining a deeper understanding of the individual customers. Besides, due to the complex nature of some of the concepts that we aim to present to our respondents, more explanations than is possible through a questionnaire will be required. In order to achieve our overarching purpose of contributing with an understanding of the demand-side perspective through exploration of customers' values, behaviours and beliefs, it is thus essential to create a qualitative setting that will enable dynamic interaction and discussion with customers (Bryman and Bell 2007, p.426).

Due to the limited amount of academic research published on the demand-side of mobile broadband and the lack of an applicable theoretical framework, we have settled for an abductive structure. According to Alvesson and Sköldberg (1994, p.42), abduction is a mixture of the two more common methods, induction and deduction. It most often starts with a real-life observation and then employs an ongoing interaction between empirical findings and suitable theories. Dubois and Gadde (2002) call this process 'theory matching' or 'systematic combining'. The primary aim of an abductive approach is to develop an understanding of an existing phenomenon through examination from new perspectives (Kovács and Spens 2005). Accordingly, our study takes off in the observable challenges presently facing mobile operators. We have selected two independent theories that adequately link demand and customer perspectives to the issues of capacity, revenues and churn. However, their actual applicability and usefulness when it comes to generating solutions is developed and evaluated in collaboration with our findings. In the end, it is a triangulation of the industry-related research, customer-based findings and theories that allows us to answer our research questions and achieve the overarching purpose (Figure 1). It is through this multi-faceted qualitative analysis that we are able to offer an examination of the observed phenomenon from a new perspective.

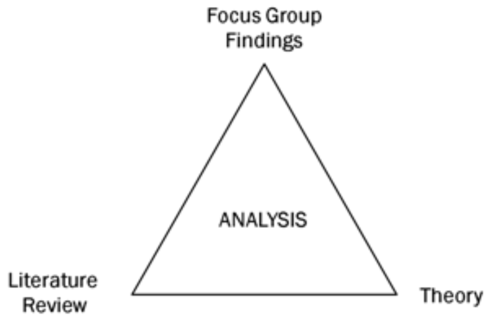

Figure 1: Triangulation

2.2 THEORY SELECTION

While most effort and value lies in the findings generated during our focus group sessions, theory will help leverage this data and enhance our understanding of the customers even further. Considering the strong focus on price within the whole telecommunication industry and the operators' struggle to make money off the mobile broadband business, it is coherent to select price-related theories. Besides, since we have delimited our study to the demand-side perspective, price rather than costs becomes the key factor when tackling revenue shortages. Also, as mentioned in the introduction, the fierce competition in this industry relies primarily on price-pressing strategies, which results in diminishing margins and an uncertain future. Hence, by focusing on price-related theories, we hope to identify new ways of using price as a means of alleviating the three abovementioned problems.

First of all, *Yield Management* is particularly powerful in simultaneously handling two of our problem areas, namely capacity and revenues. Looking to other industries, it is possible to witness successful implementations of the principles of yield management as a means of maximizing revenues while restrained by fixed capacity. Having identified similarities between these industries and the mobile broadband business, we see potential applicability as a means to tackle today's challenges. Secondly, the *pricing theories* that we have selected are broader in nature and adequately address churn in conjunction with the other problems. It is here worthwhile noting that even though churn has been identified as one of the main problems; we assume, alike The Operator (Mar 2010), the causal link between satisfaction and churn. Further information about this association is provided in Chapter 3, where an extensive presentation of the chosen theories follows.

Naturally, the scope of this study has forced us to make delimitations also in the selection of theories. Below follows a list of theories closely related to our topic of research but for the indicated reasons, we have opted against them. First, in accordance with our choice to delve neither into the cost-structure of operators nor the technical aspects of the product, we have omitted any theories that attend to the supply-side of a business. Secondly, we have opted against bundling theories because of our delimitation to focus solely on the product of mobile broadband as a source of Internet access for computers and not how this could be combined with other offers. Thirdly, we could have included models on the decision-making process, but have opted away from this because of our narrow focus on price, which is only one small component of this process. Lastly, we could have successfully incorporated loyalty theories to deal specifically and solely with the problem of churn. However, our selected theories are superior considering their potential to simultaneously address more than one of the three identified problems.

2.3 DATA COLLECTION

A combination of techniques commonly used in exploratory research has been employed for the collection of a wide range of relevant data.

2.3.1 *Literature review*

We have gathered secondary data from a number of different sources, including academic publications, trade magazines, industry reports, market statistics and newspapers. During the first scan, the aim was to be open-minded and pick up on anything written about mobile broadband and its business model. In the second stage, we conducted a more thorough screening of the collected data and discarded all material relating to subjects outside the scope of this thesis. During the review, it became apparent that alternative ways to alleviate the acknowledged problems could not naturally be allotted to only one of capacity, revenue or churn. Instead the remaining findings were categorized into three more meaningful solution-oriented dimensions, *Quality of Service*, *Congestion Control* and *Value Creation & Satisfaction*. Overall, the literature review both provides answers to the first research question and serves as a condensed report of the industry-related developments to date.

2.3.2 *Interviews with industry experts*

In order to confirm our approach and validate the relevance of our findings so far, we decided, at this stage, to consult some industry experts. We conducted three interviews with representatives from The Operator[2] and two with representatives from Ericsson, as well as met several times during the process with Bertil Thorngren, affiliate associate professor at the Centre for Information and Communication at the Stockholm School of Economics. In line with suggestions from Bryman and Bell (2007, p.474), the interviews were conducted in an unstructured format allowing the interviewees to go off on tangents and especially reveal points they found relevant to the matter. The results were rewarding; not only was our study confirmed for its relevance and importance, we were also provided with more applicable insights and an opportunity to enhance our understanding of the capabilities to date of the technology behind mobile broadband.

2.3.3 *Focus groups with customers*

After the positive feedback from our interviews, we proceeded with focus group sessions using our industry-related findings and newly acquired knowledge as a base for the discussions. Focus groups are small groups of people interacting with each other around a few and focused number of issues. The technique is especially powerful when it comes to generation of new ideas as well as determination of both current problems and success factors for a particular product or service (Stewart and Shamdasani 1990, p.15). The advantage of group interaction is that the respondents' arguments are challenged and discussed by other participants, which furthermore probes reactions that would otherwise not be voiced (Bryman and Bell 2007, p.512). Moreover, these vivid discussions allow the researcher to develop an understanding of why individuals feel the way they do towards a topic. According to American sociologist Blumer (1969) (cited in Flick 2009, p.196), "a small number of individuals brought together as a discussion or resource group, is more valuable many times over than any representative sample". Besides, this collective evaluation of a phenomenon is closely alike the construct of meaning in everyday life and thus focus groups can be regarded as more naturalistic than single interviews or surveys (Wilkinson 1998, cited in Bryman and Bell 2007, p.512). However, it is important to keep in mind that the main strength of this method is as well its greatest weakness, namely that respondents are influenced by each other and in settings with particularly dominant individuals, this could result in unexpressed opinions (Flick 2009, p.201).

The number of sessions and participants in each group varies between different researchers, but it is generally suggested to have somewhere between five and ten individuals per group and three to four sessions (Bryman and Bell 2007, p.517). It is also important to look over the composition of the groups, as it will have significant implications for the quality and outcome of the discussion (Stewart and Shamdasani

[2] Due to the strategically sensitive issues discussed during our interviews, the operator will remain anonymous throughout the thesis and thus only referred to as "The Operator".

1990, p.51). Kitzinger (1995) asserts that heterogeneous groups maximize exploration of different perspectives, while homogeneous groups run high risk of falling into flat and unproductive discussions. This is somewhat supported by Flick (2009, p.203), who states that focus groups should be heterogeneous during at least the first round of data collection. Note that heterogeneity in this context should be based on factors relevant to the subject of the study (Munnukka 2005). We conducted four focus groups, each containing seven participants aged between 21 and 26, all living in the Stockholm region. Individuals in this age span were selected upon recommendation from The Operator (Mar 2010) who referred to young customers as early adaptors and significant influencers on the general public opinion. In line with the aforementioned, we arranged groups with high heterogeneity. The factor used to determine the group allocations was, alike Munnukka's (2005) study, level of experience in terms of both Internet and access to mobile broadband,

As previously mentioned, it was primarily our industry-related findings that served as a ground for the dimensions of mobile broadband discussed during the focus group sessions. While it is important to create an unstructured setting to stimulate free flow of thoughts and reflections among participants (Bryman and Bell 2007, p.510), we also realized that the complex nature of our research topic required some explanations and exemplifications. Therefore we put together a short visual presentation that was used in a similar manner during all four sessions. To report our focus group findings, we followed Morgan's (1997, p.63) concept of group-to-group validation to determine the relevance of the various viewpoints. The disposition of the reported focus group findings, in essence, follows the same layout as our visual material used during the sessions.

2.4 QUALITY OF RESEARCH

To determine the research quality, Yin (2009, p.40) recommends an evaluation of the study by examining its reliability and validity. The latter can be broken down into *construct, internal* and *external* validity. Below follows a discussion about each of the concepts.

Reliability is the degree to which a study can be replicated and produce the same results as the original study (Yin 2009, p.45) or phrased differently: "to what extent we get the same results from several measurements" (Söderlund 2010). The aim is naturally to minimize the risk of random errors and biases (Malhotra 2004, p.267). In large, this could be achieved through the standardization of the data collection process. However, considering the qualitative nature of this study and, in particular the use of focus groups, the obtainment of high reliability is jeopardized (Bryman 2006). Nevertheless, below follows an account of the measures taken to ensure highest possible reliability.

First of all, we conducted the second screening of our industry-related literature independently of each other and then compared outcomes. Material that we disagreed upon was reread and discussed to determine its relevance to the scope of this thesis. This was done to reduce personal bias and make sure that only sources of high significance were part of the final selection. Moreover, due to the natural tendency for bias in newspaper articles, we have, to a high degree, crosschecked the contents of these sources with other publications to guarantee rightness of the information. Onwards, the open-ended format of the interviews certainly poses a problem in terms of reliability, especially since we did not follow the same standardized script for all interviews. Nevertheless, it is important to remember the purpose of the interviews being to confirm the relevance of our approach and findings at that stage rather than to collected new data. Lastly, numerous steps have been undertaken to ensure high reliability for our focus group findings. During all four sessions, both of us were present and listened in on the conversations. While one of us acted as moderator, the other took notes of the discussions. These roles were switched after each focus group to minimize moderator bias. In addition, to eliminate random errors from misunderstandings, the moderator asked participants for clarification whenever a comment or viewpoint was unclear. Furthermore, the sessions were recorded and afterwards studied by one of us at the time, before crosschecking with each other and the notes taken during the sessions. Consistently, the same presentation and guiding questions were used for all four sessions.

Construct Validity concerns the use of correct operational measurements for the concepts being studied (Yin 2009, p.41), or in essence, the study's ability to measure what it attempts to measure (Sekaran 2000, p.208). Yin (2009, p.41) states that the use of multiple sources for data collection is one way to increase construct validity. We have drawn on this fact by collecting and crosschecking industry-related material from a broad range of sources, as listed above. In addition, the interviews also serve as a means to raise construct validity by having the interviewees confirm the relevance and practicability of our literature findings. Furthermore, one goal with our focus groups was to reveal the individuals' viewpoints on the current components of mobile broadband. To achieve this, we presented a real-life example from the Swedish market and asked the respondents to comment specifically on the components of these plans.

Internal Validity is defined as the extent the results from the study correspond with reality (Merriam 1994, p.177). In qualitative research, the most valuable findings reside in the individuals' viewpoints and their mental constructs of reality and thus it is not desirable to obtain results that reflect the objective view of reality. Merriam (1994, p.178) claims that it is, with a qualitative method, in fact possible to achieve a high level of internal validity.

The important points to consider are whether the respondents are expressing their true opinions and the extent the findings are interpreted and reported correctly. As Yin (2009, p.42) states, measures intended to eliminate individual's fear of providing true viewpoints are important for securing high internal validity. Prior to our focus group sessions, we sent out some preparatory material to all participants and particularly asked the present users of mobile broadband to review their subscriptions. Moreover, even though many of the participants recognized each other from before, we introduced everybody before discussions were commenced. These steps were undertaken as means to create a relaxed and familiar atmosphere, where the individuals would feel comfortable with expressing their true opinions. In order to make sure no viewpoints were left unvoiced in a situation with particularly dominant persons, it was the moderator's role to make sure that every one got a chance to speak. On another note, The Operator has been anonymized in order to raise the internal validity of their shared insights.

External Validity relates to the extent the study's findings are generalizable across social settings (Yin 2009, p.43). Both Yin (2009, p.43) and Bryman (2006) argue that qualitative studies tend to have somewhat lower external validity than quantitative ones, particularly due to the small samples used. Nevertheless, it is questionable whether it is relevant to be able to make generalizations beyond our case, as we are interested in the values and viewpoints of individuals within the specific context of mobile broadband (Bryman and Bell 2007, p.426). Besides, with an exploratory approach, our aim is to probe discussions, provide managerial implications and suggest areas of further research rather than lay down final and definite solutions for the structure of a new business model.

3. THEORY

A theoretical framework relating exclusively to the identified issues of the mobile broadband business is non-existent. Instead, with regard to our demand-side focus, we have resorted to two theories that adequately link demand and customer perspectives to the issues of capacity, revenues and churn. Below follows an extensive presentation of the theories selected for the purpose of this study.

3.1 YIELD MANAGEMENT

Yield management is the process of allocating the right type of capacity to the right customer at the right time and at the right price (Wirtz *et al* 2003). It is often interchangeably referred to as revenue management. It has its origins in the airline industry, where it became a widespread practice after the market was deregulated in the United States at the beginning of the 1980s. Many new companies with favourable cost structures emerged on the market and gained territory with their competitive prices. Yield management became a way for existing airlines to meet the low-priced competition while still maximizing profits from high-income segments (Jallat and Ancarani 2008).

The overall aim of yield management is to maximize total yield by ensuring efficient capacity utilization and optimizing revenues for each and every transaction (Berman 2005). It is an appropriate business strategy for industries that are characterized by the following criteria: fixed capacity, perishable inventory, customer segmentation, fluctuating demand, low variable-to-fixed costs ratio and when advance selling occurs (Jallat and Ancarani 2008, Upchurch *et al* 2002 and Wirtz *et al* 2003). According to Berman (2005), the meaning of customer segmentation is to identify groups with different price elasticity. They also relax the criteria of advanced sales and assert that it is enough if demand is somewhat predictable.

The core of yield management is to segment the market and to identify different services and prices suitable to different customer groups (Lieberman 2004). By then varying the service offerings and continuously updating price levels, it is possible to transfer demand from peak to slack periods and thereby achieve more efficient capacity utilization. Similarly, Jallat and Ancarani (2008) claim that yield management relies on the attractiveness of prices to manage customer segments and match capacity just in time with the largest possible demand.

In times of overcapacity when the limited revenue streams intensify competition, yield management can be a useful tool for protecting a firm's high-income market shares while selling out excess capacity at lower prices (Jallat and Ancarani 2008). In these situations, it lies in the manager's best interest to stimulate demand through attractive offers (Upchurch *et al* 2002). At other times, yield management allows a company to take advantage of its undercapacity by opting for the most valuable customer segments and adjusting price levels accordingly.

In essence yield management is about adjusting prices to optimize utilization of available capacity. It is worthwhile noting that it is often confused with the much-less sophisticated practice of price discrimination, where a firm only takes advantage of pricing according to different customers' perceived value of a service (Jallat and Ancarani 2008). The key to successful implementation of yield management lies in a firm's ability to understand and project future demand patterns based on historical data and advance reservations (Berman 2005). Also making customers aware of why prices may vary could stimulate voluntary adaption of appropriate buying strategies (Lieberman 2004).

Yield management is often said to lead to significant increases in revenue (Berman 2005). Jallat and Ancarani (2008) claim that it is also a valuable means for improving service quality and retaining profitability. However, there are both drawbacks and several potential pitfalls when developing and implementing yield management strategies. First of all, customer loyalty may be compromised when the model opts for the highest-paying customers rather than the most loyal ones (Wirtz *et al* 2003). Shoemaker (2003) ascertains that yield management may very well be fruitful in the short-run, but over a longer period of time it has negative effects on customer loyalty. Secondly, customers may well perceive the firm negatively if the principle of fairness is violated (Wirtz *et al* 2003). For example, if two customers enjoy the same service but at different costs, the pricing schedule is considered unfair. Lastly, Berman (2005) asserts that yield management is attractive, but wrong to use to resolve long-term problems due to sustained overcapacity.

3.2 PRICING THEORY

Pricing theory encompasses a number of different constructs of which the relevant ones are presented below.

3.2.1 *Value-based pricing*

Traditionally, cost-based pricing has been the custom practice for professional services (Wardell III *et al* 2008). The price is determined by adding some standardized margin to the cost of producing the service. While it is easy to calculate and simple to understand, the method ignores surrounding market conditions and overlooks variations in customers' willingness to pay. Instead, Wardell III *et al* (2008) state that if a price can be more closely correlated to value, a firm can increase its profits without having to drastically increase staff or workload.

Value-based pricing is a technique where prices are set based on the customer's perceived value of the product or service being sold (Phillips 2005, pp.24-25). The term 'value' is ambiguous, but generally implies the total savings and satisfaction that a customer obtains from a purchased product or service (Shoemaker 2003). Munnukka (2005) takes a slightly different approach by defining value-based pricing as the process of aligning prices based on anticipated reactions from customers rather than the firm's own cost structure. If successfully implemented, a firm is likely to become both more competitive and profitable compared to with cost-based pricing. Furthermore, Shoemaker (2003) suggests that, if handled delicately, a customer's value perception can be changed or at least influenced to increase both revenue and loyalty.

3.2.2 *Price discrimination*

The general concept of price discrimination is charging different customers different prices for the same good or service (Phillips 2005, p.74) or as defined by Jallat and Ancarani (2008): "taking profit opportunity of pricing according to different customer perceived value". Hence, it takes a pure demand-side perspective and aims to maximize revenue by recognizing and exploiting customer heterogeneity. The first step when implementing price discrimination is to conduct market segmentation and to identify distinct customer groups that differ in terms of value perceptions and price elasticity. Then a firm can create a pricing schedule that extracts consumer surplus and thereby increase revenue beyond that possible with a single-tiered pricing plan.

Price discrimination naturally implies that some customers will pay more than others for the same service. In order to keep different price groups separate, in particular to avoid that all customers pay the lowest price, it is common practice to implement so-called rate fences. A simple example is the pricing of entrance to a museum, where a customer can only get the student discount price with a valid student card. In more sophisticated ways, rate fences allow, according to Wirtz *et al* (2003), consumers to self-segment on the basis of service characteristics and willingness to pay. A firm can confine lower prices to consumers who are willing to sacrifice some service features or accept certain restrictions. It may, for example, be that a customer is willing to pay a lower price and give up the possibility of flexible dates or abstain from a product guarantee. The more restrictions that a customer is prepared to accept, the deeper the discount available (Wirtz *et al* 2003).

There are forms of price discrimination where the goods or services sold to different customers are not necessarily identical. One such strategy is premium pricing, which involves differentiating the offer and identifying segments that value different service attributes (Taher and El Basha 2006). For example, only some customers may be willing to pay a premium for adding the feature 'upgradable' or 'flexible' to their flight ticket. Another strategy is for a firm to introduce different service classes, again in order to recognize variation in customers' willingness to pay for different service attributes. The most widespread example is perhaps the classes on an airplane. Cocchi *et al* (1993) have found that it is possible, with service-class sensitive pricing, to set prices so that customers in all classes are more satisfied with the overall performance of the service. However, there must be significant distinctions between the different service classes in order for customers to be willing to pay for a higher level. Dupuit recognized this already in 1849 when he explained the reason for why a train company had removed the roof in the third-class carriages: "the company is trying to prevent the passengers who can pay the second-class fare from travelling third-class" (Trebilcock 2002, p.324).

3.2.3 *Smart-market pricing*

Smart-market pricing encompasses strategies for both efficient resource allocation and revenue maximization. It is very similar to yield management in the sense that prices are supposed to reflect a firm's available capacity and projected demand. In many cases, this practice is also referred to as auction-based pricing (Falkner *et al* 2000 and Yaipairoj and Hermantzis 2006). The core of smart-market pricing is to let customers set their own prices based on their value of a particular service and then distribute capacity according to the submitted prices (Yaipairoj and Hermantzis 2006). Naturally higher bids are given priority, which in other words imply that customers are required to compete for the available resources. Priority pricing is very similar, but instead of requiring monetary bids, customers have to indicate their perceived value of the service by selecting a priority level. Again, capacity is then, during times of excess demand, allotted in order of the indicated levels. According to Yaipairoj and Hermantzis (2006), these types of pricing are expected to yield economic efficiency, but Matzler *et al* (2006) draw attention to studies showing that customers generally consider such pricing schemes unfair and harmful to building long-term relationships. Meanwhile, Cocci *et al* (1991) (cited in Falkner *et al* 2000) have found that it is possible to set the prices of different priority levels such that the overall user satisfaction is higher under priority pricing than under flat pricing.

Another distinct type of smart-market pricing is to introduce a congestion charge that, as the name suggests, only applies in times of undercapacity. In services, such as road transportation or telecommunications, a user's own traffic inevitably imposes negative externalities on other users. Therefore a congestion charge that induces users to utilize the service during off-peak periods, can improve the experience for all users (Falkner *et al* 2000). However, as emphasized by Berman (2005), sometimes it is enough with good information to get customers to voluntarily shift their preferred time to use a service. Besides avoiding many issues of perceived lower quality, such strategy is also likely to increase customer loyalty (Taher and El Basha 2006).

3.2.4 *Price satisfaction*

Price satisfaction among customers is important as it contributes to increased profitability and growth through its positive effects on loyalty (Matzler *et al* 2006). Logically, loyal customers cost less to serve, have lower price sensitivity, frequently exhibit cross-buying behaviour and are more likely to generate further business through word-of-mouth (Matzler *et al* 2006 and Shoemaker 2003). Matzler *et al* (2006) have identified five factors that have an impact on customer price satisfaction: price-quality ratio, price fairness, price transparency, relative price and price reliability.

First of all, consumers assign value to products or services based on two factors: perceived price and perceived quality. Depending on the balance between what is given and what is received, a customer will be more or less satisfied with the acquired product or service. This is denoted as the price-quality ratio and according to Matzler *et al* (2006), price satisfaction will only manifest if perceived quality exceeds perceived price. The second factor is price fairness, entailing that customers are not willing to pay a price that is perceived as unfair. It may either be that they perceive an imbalance in the exchange between seller and buyer or they discover that other buyers in similar transactions have paid lower prices for the same product (Matzler *et al* 2006). Hence, a firm must establish a price structure that is perceived as fair to raise price satisfaction. Alternatively, as Wirtz *et al* (2003) claim, when a firm sets a multi-tiered pricing scheme for essentially the same service, it must be able to justify the price differences. It is interesting to note that customers find price differences published as discounts fairer than economically identical price differences expressed as surcharges (Wirtz *et al* 2003).

Price transparency encompasses the communication of clear prices so that customers can obtain a comprehensive and effortless overview of a firm's prices. This has proven to reduce customers' search and evaluation costs and thereby lead to increased price satisfaction (Matzler *et al* 2006). Jallat and Ancarani (2008) also emphasize the importance of visibility and transparency in a service transaction, so customers clearly understand what they are paying for. Rendering price information public may very well absorb short-term profit margins as customers can more easily find ways to reduce costs. However, in the long run, openness and clarity are expected to yield higher revenue, mediated by customer satisfaction and loyalty (Jallat and Ancarani 2008). The next factor, relative price, is also correlated with price satisfaction. Whenever possible in a decision-making situation, a customer will compare the price of a product or service with that of a competitor (Matzler *et al* 2006). Naturally, if the comparison indicates that a favourable deal has been found, a customer will experience price satisfaction.

Lastly, Matzler *et al* (2006) have found that price reliability has an influence on price satisfaction. This aspect concerns the fulfilment of price expectations and the avoidance of negative surprises. This means that when prices do not change unexpectedly and there are no hidden costs, customers will perceive the price as reliable and hence be satisfied. Logically, copious studies have found that customers prefer flat-rate pricing to pay-per-use tariffs (Lambrecht and Skiera 2006). There is evidence that customers are even willing to pay a premium to enjoy the simplicity and predictability of a fixed monthly charge (Wirtz *et al* 2003). Nonetheless, Matzler *et al* (2006) point out that if prices must change, customers should be informed properly and in a timely manner to maintain loyalty and strengthen long-term relationships.

Altogether it is generally agreed that perceptions of price are important to customer satisfaction and thereby also loyalty. A study by Keaveney (1995) (cited in Matzler *et al* 2006) found that more than half of all customers switched service provider because of poor price perception. Furthermore, according to Munnukka (2005), the most positive price perceptions are obtained by customizing pricing schemes to match the usage habits and preferences of each customer. There is nothing better than having justifiable, reasonable and understandable prices that closely reflect the customer perceived values, when building trust and long-term relationships (Shoemaker 2003).

4. LITERATURE REVIEW

"*Mobile broadband has moved from being nice in our world, to being a necessity*" –Hans Vestberg, CEO Ericsson, at the latest Mobile World Congress (Ericsson 2010c). The concept of mobile broadband has changed and so has its challenges. Operators are no longer looking for ways to attract new customers. Instead focus has shifted towards customer satisfaction and strategies for reducing churn in this turbulent market (Interview with The Operator Mar 2010). Meanwhile, the issues of capacity shortages are becoming more and more vivid. Operators must start looking for ways to use capacity more efficiently as well as find ways to finance new infrastructure investments (Ewenfeldt 2010). The following is a condensed report of current research gathered from the literature review and is structured in accordance with our three solution-oriented dimensions, namely *Quality of Service*, *Congestion Control* and *Value Creation & Satisfaction.*

4.1 QUALITY OF SERVICE

Today all subscriptions are quoted with an "up to"-speed, which means that operators are complying with their service offerings regardless of actual speed delivered. Technically operators cannot provide guaranteed quality of service (QoS). Speed is dependent on two factors: the amount of traffic in the network infrastructure and the user's proximity to a cell. The QoS for a particular user is determined on a "best effort" level, all packets are treated on a first-come-first-serve basis and when the network is crowded, packets are randomly dropped or queued (van der Weiden *et al* 2009). As networks become increasingly congested and time-sensitive content proliferate, such as streaming services, users will be more and more exposed to the shortcomings of "best-effort" and experience greater volatility in service quality. Considering that researchers have found that consumers rank network quality and coverage amongst the most important factors of mobile broadband (Schlautmann *et al* 2008), this is a critical issue for operators.

Schlautmann *et al* (2008) consider differentiation based on network service quality a future option for operators who want to survive in the increasingly competitive environment. It is a method for managing the available networks more efficiently. Many users, especially business customers, may not be satisfied with the usual “best-effort” of their mobile broadband and would be willing to pay more for secure levels of QoS (Thorngren 2007). Through clever traffic handling, it is possible to assign priority to packets from a certain user, while leaving others to compete on a first-come-first-serve basis. Consequently, the QoS delivered to a priority user becomes independent of the traffic conditions in the network (Schlautmann *et al* 2008).

Hence it is possible to introduce service classes to mobile broadband and have customers pay different prices for different levels of service. This is already common practice in many other competitive markets, such as the airline and hospitality industries. Customers would select among service packages that offer specified levels of access priority (Schlautmann *et al* 2008). The key is to differentiate between “best effort” and priority services and to set prices so that monetary incentives are offered for reducing required QoS (Ericsson 2008). This becomes a means of both allocating existing capacity more efficiently and introducing new sources of revenues. In Spain, Vodafone has already implemented a QoS-differentiated pricing scheme, but so far it is only offered to business customers (Ray 2009). For €49 per month, business users are prioritized regardless of cell congestion. Finally, the trade literature provides no insights about the potential risks with introducing a QoS-based pricing structure.

4.2 CONGESTION CONTROL

While some have focused on identifying new sources of revenues, other industry experts have concentrated on ways to alleviate congestion in the existing network infrastructure. Even though the most obvious solution to crowded networks would be to invest heavily in new infrastructure, it is also the most capital intense one. Already now operators need to find ways to control traffic and efficiently utilize existing capacity. Irrespective of day, peaks hours for mobile broadband occur approximately between 18 and 23 (Ericsson 2010b). It is during these times that operators are most likely to face congestion problems, which lead to degradation of service performance for users.

Antonios Drossos, vice president of Omnitele’s business consulting unit, talks about controlling busy hour traffic of heavy users (Williams 2009), while AT&T takes a broader perspective and considers options involving all users of mobile broadband (Kim 2009).

The latter discusses how price incentives, such as time-based differential pricing, could make users voluntarily alter their consumption behaviours. For example, higher charges for downloading information during peak hours or variable pricing for usage of different applications could shift usage in a favourable manner. This is similar to voice subscriptions available on the market during the late 1990's allowing users to make particularly cheap calls at night.

Another means of congestion control is already possible to witness in the UK, where BT throttles down-speed for video sites such as YouTube and IPlayer[3], during the day's most busy hours (Goldberg 2009). Customers paying for 8 Mbit/s have to put up with streaming video at only 1 Mbit/s between 17 and 24. So far the throttling has been made stealthily, but now application providers are starting to voice criticism over such practices and are raising issues of network neutrality[4]. Onwards, smart-market pricing has also been mentioned in relation to congestion control for mobile broadband. The idea is to make individual packets contain a bid value set by its originator and then give packets with higher bid values priority whenever a cell is overcrowded. In theory it is an efficient means of both handling congestion and generating revenues (Bandyopadhyay and Cheng 2006).

Alike the possibility of assigning top priority to particular packets, it is also possible to lower priority of packets originating from certain users. Both Blennerud (2009a) and Blennerud (2009b) consider traffic management using this technical ability. Today when users reach their fair-use cap, they are throttled down to very low speeds for the rest of the month. Blennerud (2009a) suggests that instead of throttling, these users are given lower priority, meaning that only when they are competing for capacity in a congested situation will they experience a degradation of the service. Such real-time traffic management entails better capacity utilization than throttling, but without compromising fair-use (Burley 2009). Back to the example in Spain, where Vodafone simultaneously to introducing priority access for business users, also began applying the abovementioned strategy (Ray 2009). Simply stated, Vodafone now only restricts users, who have exceeded their fair-use caps if there are other customers waiting for capacity.

4.3 VALUE CREATION & SATISFACTION

"*Tiered pricing is the only realistic option left to operators to cope with the massive increase in data consumption*" –Eric Schmidt, CEO Google at the latest Mobile World

[3] An internet television service provided by BBC
[4] Net neutrality is a controversial debate between network operators' ability to selectively discriminate content transmitted in their nets and content providers' rights to reach customers (Thorngren 2006).

Congress (Lomas 2010). Also Hans Vestberg, CEO Ericsson, identifies multi-tiered pricing for mobile broadband as one of the most important challenges of 2010 (DI.se 2010). Operators need to move away from unlimited flat-rate subscriptions that make price comparisons easy and profit margins low (Ray 2009). Some countries have tried pay-per-use pricing, but that has proven unpopular among customers (Lambrecht and Skiera (2006) and Viklund 2008). It has become evident that pricing schemes for mobile broadband must become value-driven and customer-centric (Mörner 2010). According to Thorngren (2007), data based communication offers greater potential to provide customized offerings and different quality levels compared to the traditional voice services. However, Bandyopadhyay and Cheng (2006) argue that the lack of segmentation in mobile broadband services today is because operators do not provide guaranteed QoS and thus customers do not value different levels of service. In order for customers to be willing to pay for different service levels, there must be significant and easily detectible differences between the various levels.

In contrast, Ericsson (2008) suggests that through identification of traffic types and monitoring of traffic volumes, operators can offer various forms of packages that better meet the specific needs of different customer segments without necessarily involving QoS. Besides, clear and differentiated segmentation is a first step towards identifying customer value (Feller *et al* 2003). For example, the introduction of time-based differentiation would be much more welcomed than QoS alterations, because customers understand the implications of being restricted during certain hours of the day. They are already familiar with such schemes from pricing methods in other industries.

Pricing must also become more related to extra value creation in order for operators to maintain profitability (Thorngren 2007 and Jallat and Ancarani 2008). For example, given that a customer needs to quickly download a file, he or she could pay a small fee for temporary boosting connection speed. Bandyopadhyay and Cheng (2006) refer to this as liquid bandwidth, whereby customers can pay a per-unit access charge to temporarily upgrade their speed when they want to retrieve heavier types of content from the Internet. Especially in the business segment, customers have shown great willingness to pay a premium for such services (Feller *et al* 2003). Moving beyond multi-tiered pricing structures, former president of Mobility Services at Telia, Kenneth Karlberg, talks about better tailoring subscriptions after the needs of customers (Ewenfeldt 2010). While the idea is attractive, its actual practicability is questionable considering that very few have any clue about the size of a megabyte or the implication of a Mbit/s (Thorngren 2007). How are they then supposed to opt for the speed or the volume that best suits their usage? Auspiciously, Vodafone Italy has successfully implemented a system whereby a mobile user's traffic is first monitored for a period of time and then, in line with the results, the operator offers the user an appropriate subscription plan (Jallat and Ancarani 2008). Considering today's latest technology, this is possible to apply to the mobile broadband business as well (Ericsson 2010c).

5. FOCUS GROUP FINDINGS

The disposition for reporting our focus group findings, in essence, follows the same layout as the visual material used during the sessions. This means that we first convey the participants' responses and reflection on the current components of mobile broadband and then advance to discuss new features inspired from our literature review.

5.1 CURRENT COMPONENTS OF MOBILE BROADBAND

5.1.1 Speed –"*Today you only reach full speed between Norrmalmstorg and Centralen*"

Most respondents related to Internet connections as either being fast or slow. Only a few could specify the implications of a Mbit/s and quantify their needs in terms of this measurement. During the discussions, it became apparent that there are two distinct groups with different speed requirements. There are those who demand highest possible speed either because of their frequent usage of heavy applications or because they simply cannot tolerate waiting times. In contrast, there are those who only require very low speeds as they view mobile broadband foremost as a complement to their fixed broadband at home and their mobile usage requires little more than a basic connection. Nevertheless, common to all is the perceived diminishing marginal utility of increasing speed. Therefore the willingness to pay is not linearly correlated to speed.

Then there is the fact that all subscriptions quote speed as "up to" implying that operators are fulfilling their service promises regardless of actual connection speeds delivered. Many respondents have lost faith in their mobile broadband and do not count on ever obtaining the speed they are paying for. Some individuals get around the problem by subscribing to larger packages in an attempt to reach a satisfactory speed level. Others have lowered their expectations on the mobile broadband technology and are nowadays satisfied as long as the connection is enough to support their usage. In other words, the actual Mbits/s have become less important. Again there is this notion of fast or slow, either it works or it does not. Furthermore, not until operators can provide reliable speed levels are the non-users in the sample ready to pay for a mobile connection.

5.1.2 Volume – *"How can fair-use caps that even 70-year-olds would exceed be imposed?"*

Raising the issue of volume and fair-use caps immediately evoked more involvement among participants than the earlier discussion about speed and it seems generally agreed upon that volume is a more important aspect than speed. Yet in the meantime, most respondents neither understand the concept of a gigabyte nor are aware of the capacity requirements of various applications. Thus it is not surprising to find that very few know their current volume usage. It is interesting to note that those aware of their data traffic volumes tend to be heavy users. They have already opted against mobile broadband as their primary connection simply because the low data allowances do not suit their needs. Meanwhile those who have no feel for the value of a gigabyte are generally average users with little risk of actually exceeding their caps. Even so, they feel restricted by the limits and hesitant to use their mobile broadband to its full potential.

When provided with basic information about the capacity requirements of various applications, such as checking *Aftonbladet* or downloading a movie, the average users could more readily evaluate their consumption in terms of gigabytes. However, streaming services and other real-time applications still make things difficult to understand. Then there was also the debate about what constitutes a sufficient capacity level for the normal user. Even though the current limits could account for the average usage today, some participants anticipated that shortly it would be way too little. Considering the fast development of complex applications and the general trend of increasing Internet usage, fair-use caps must soon be raised significantly.

The notion of data allowances is not only perceived as complicated, it is also controversial. Up until recently all subscriptions have been unlimited "all-you-can-eat" data plans. Now most operators put restrictions on usage without adjusting down prices. Even though most respondents could not recall a time when they have exceeded the limit, this modification is regarded as highly unfair and has resulted in much dissatisfaction. Furthermore, all respondents expressed objections towards having their freedom restricted. One participant exclaimed: "I don't want to have to think about my Internet connection. The whole point of having mobile broadband is to be able to connect anywhere at anytime." Many respondents claimed that they are ready to pay high premiums for the simplicity of unlimited usage. In addition, some complement users described their altered habits as a result of the implementation of fair-use caps. They now wait until they get home to watch a movie or download a file, as they then can be sure of not exceeding any limits.

The capacity restrictions have reinforced the divide between complement and substitute users of mobile broadband. On the one hand, substitute users think the limits are set way too low. On the other hand, complement users have by now adapted their habits so they no longer have much use of high data allowances. There seems to be a general demand among the participants for subscription plans that better meet their individual needs. Again, non-users are hesitant to switch to mobile broadband as long as there are fair-use caps, since their fixed subscriptions are still unlimited.

5.1.3 Throttling – *"When you are throttled, it's game over"*

Common across all groups is the view that being throttled down to a very low speed is the same as having the Internet access cut off completely. In other words, the service virtually becomes non-existent after exceeding the fair-use cap. Nevertheless, when forced to consider the utility of the adjusted speeds, well-informed participants admitted that 200-300 Kbit/s is actually enough to support emailing and basic web browsing. However, the levels are still regarded as pathetically low considering the capabilities of today's network. Besides, the general objections towards the principle of being throttled withstand, not surprising considering the widespread protests against fair-use caps.

Given that restricting volume is the current practice among a majority of operators, the participants were asked to evaluate three possible scenarios once throttled. First, an incremental charging scheme was suggested, whereby users maintain their original speed levels and pay per megabyte transmitted. Second, users were offered to purchase additional capacity in bulk for usage during the remaining month. The last option was status quo; the users accept the throttled speed. Even though the second offer has now been available to the market for quite some time, very few respondents had heard of it. Only one respondent had actually purchased additional capacity and was very negative towards the fact that he had had to contact customer service, wait for 30 minutes and then finally be put through to an incompetent employee. The general opinion was that no alternative is more attractive than another. The respondents could consider paying extra if in real need of a fast connection, but would only allow this to happen once. Thereafter, they would look over their subscription plan and search for other alternatives, regardless of operator. In any case, the respondents require instant notification once a limit is reached and readily available options for proceeding thereafter.

5.1.4 Price – *"Given significant quality improvements, I could even accept a higher price"*

At this stage in the discussion, the participants were presented with three alternative data plans and asked to comment on the reasonableness of the prices. The immediate response among many was to use their fixed broadband as a point of reference. A comparison of features such as speed, volume and quality naturally resulted in a disadvantage for mobile broadband. Mobile broadband services do not live up to the same standard as fixed and thus the respondents were not willing to pay as much for the former. Surprisingly enough, the unique feature of mobile broadband, namely mobility, was barely accounted for in the comparison.

Some respondents then emphasized the differences in value between having mobile broadband as a substitute and a complement and naturally the willingness to pay was lower for complementary usage. Besides, they felt that today's subscription plans neither target nor adequately accommodate the complement user. Another disturbing factor voiced was that some subscriptions come with unlimited usage while others have fair-use caps, yet are equally priced. The individuals see this as highly unfair and most cannot understand the large differences between offers. In addition, similar to before, respondents find it unjust to pay the same price for a subscription plan with volume restrictions as they previously did for unlimited. Lastly, it actually appears as if though the respondents could accept slightly higher prices for their mobile broadband, but only as long as QoS improves.

5.2 NEW FEATURES

5.2.1 Premium –*"How do you communicate this? Loser vs. winner subscription or what?!"*

The focus groups were introduced to a new technical solution whereby it is possible for the network to assign priority to packets from a certain user, while leaving others to compete on a first-come-first-serve basis. Accordingly, priority users would receive best possible quality regardless of the traffic conditions in the network infrastructure. The participants were invited to comment on the concept as an additional service and determine the value of such an offer. Despite the parallels drawn to other industries, it was striking to find that very few actually understood the implications of such a service. On the one hand, most individuals were not aware of the major challenges that operators face today and could thus not acknowledge the point of a priority scheme. On the other hand, there was the fact that users today are already paying for a certain speed, why would they then have to pay more to have operators actually deliver according to these levels?

A major problem with the priority service from the perspective of the participants is that there are still no guarantees. What is it that you actually get by paying a little premium? "It is not like Spotify Premium where you pay a little extra to avoid something, the commercials, and it is pretty obvious if you get value for money." The difference between the proposed priority service and the existing offer could not be quantified in any way. Besides, clauses such as "best possible quality" and "always top priority" do not convey any further information. Therefore, many individuals were unable to say how much they would be willing to pay for it. Some said that premium would only become attractive if the difference between the two levels is significant and would need to experience this difference before subscribing long-term. A proposed suggestion is to offer potential customers a free test month before having to subscribe.

The respondents also voiced concerns about those who do not subscribe to the premium service. They fear that they are immediately going to suffer negative consequences such as downgraded speed and increased volatility in quality. One respondent compareed it to an airplane situation and said: “it is as if though someone willing to fly in first class comes and steals my economy class seat so I am forced to share seat with the person next to me.” Many respondents find it ideologically wrong to upgrade one customer’s situation at the expense of another customer. Even when we proposed a very large price difference between the premium and standard service, these respondents still strongly objected to such a setup. Nevertheless, the focus group findings indicate that many would indeed sign up for premium just because of the little value left in retaining their current subscriptions. However, they did realize that if everyone upgrades, then the value of premium is quickly going to erode as well. The fact that many would pay for premium is perhaps an indication of the perceived low reliability and satisfaction among customers towards the level of performance of mobile broadband today.

5.2.2 Time-based –*“If I get a really good deal on the ‘fixed times’-option, I am in!”*

A new time-based subscription form was, in two stages, presented to the sample. In the first stage, they were shown a data plan with a very low base speed and the possibility to reach up to 10 Mbit/s when there is leftover capacity in the network infrastructure. In other words, a suitable alternative for those who’s Internet habits deviate very much from the norm. Upon request, they were given further information about average traffic patterns over the course of a day. In the second stage, the same data plan was presented, but the clause “when there is leftover capacity” was replaced with two distinct time periods. During peak hours (18-23), the speed is restricted to a very level, while during the remaining 19 hours; it is like a normal subscription allowing for speeds up to 10 Mbit/s.

The overall response to the first suggestion was scepticism. Again there was this notion of unwillingness to pay for something without any guarantees. The participants immediately assumed that they will, on the whole, receive the base speed and would view it as pure luck to reach any higher level. With a very low base speed, this subscription is not worth much in the eyes of the respondents. If the lowest speed level would be somewhat reasonable, then there were in fact a few participants who could consider the scheme. Besides, most respondents argued that there should be no volume limits to using leftover capacity; nobody would suffer from their usage anyway. Once given the additional information, complement users realized that this plan could actually suit them well. They primarily use their mobile broadband during the day and are usually home with their fixed connection during peak hours. In contrast, the additional information did still not manage to persuade those who solely have mobile broadband. They demand a decent and reliable connection regardless of time of day. Again as repeated by one respondent: "the whole point of having mobile broadband is to be able to connect anywhere at anytime."

The second suggestion was perceived with greater enthusiasm than the first. The fact that this option offers some certainty makes participants willing to pay more for this than the former alternative. However, it is still only regarded as suitable to complement users. Common to both cases is a slight hesitation from the respondents to accept something that makes their subscription even more sophisticated. They refuse having to actively think about their mobile broadband; it should just work! Alike earlier, some respondents suggest a free test month before having to subscribe to the service.

5.2.3 Day passes –*"Too many nitty-gritty details to think about"*

The last new feature that was introduced is the idea of a day pass; you can buy either priority service or extra speed for 24 hours. Common across all groups was an immediate objection to the priority day pass, simply for the same reasons as discussed earlier. Nonetheless, the idea of extra speed was received positively by a number of respondents. Some viewed it as a good complement to the previously suggested timed-based subscription because sometimes even during peak hours one is in need of a fast connection. Even for other types of subscriptions, they recognized the sporadic utility of a speed day pass, such as for the occasionally important hockey game or party with Spotify music. The participants agreed that the actual purchasing of a day pass needs to be quick and simple, preferably through SMS or a user-friendly web interface.

In contrast, a recurring issue was the fact that very few actually seem to grasp the implication of the specified numbers. As one respondent suggested, it would be more informative to explain what the specific speed level can enable you to do, rather than just publish a digit, "then even those above 23 could understand the point of a speed day pass". Furthermore, many respondents perceived the whole idea of day passes as complicated. Again, it becomes clear that most individuals do not want to have to think about their mobile broadband, it has become a hygiene factor in today's society. Then there was of course the objection that with "up to"-speeds there are still no guarantees.

5.3 THE SUBSCRIPTION

"The essential three: simplicity, convenience and flexibility!"

Here we aim to reveal some general findings that relate directly to neither components of today's offer nor the new features. First of all, the importance of simplicity cannot be voiced enough. No one is particularly fond of the dongle; it is an obnoxious gadget. Also, flat-rate subscriptions are by far the most preferred pricing schemes because of the absence of negative surprises and hidden costs that would otherwise be revealed on the end-of-month invoice. Furthermore, it is evident that most participants are willing to pay extra to have unlimited "all-you-can-eat" data plans, just to avoid the irritation and anxiety of being restricted. Moreover, they want to reduce the time it takes to search and understand the forms of subscriptions offered by the various operators.

Secondly, there was an extensive discussion regarding the customization of subscriptions to better meet individual needs. The participants talked about the fact that today mobile broadband is only marketed and sold as a substitute to fixed broadband. However, as the focus group findings reveal, there are indeed many individuals who have or would like to have mobile broadband only as a complement. Moreover, they feel that today's speed levels are not adequately matched with volume levels and thus the subscriptions do not suit them well. One idea voiced, would be to let customers choose both their desired speed and volume and then pay accordingly. In addition, few were aware of today's prepaid options, but when the concept was explained, they were received favourably.

Lastly, the focus group participants offered some insight as to why satisfaction towards operators today is low. One aspect is what the respondents referred to as the "star, star"-phenomenon, in other words that the details and restrictions behind offers are nested away either behind multiple mouse clicks or in a miniature font on the edge of the page. Another aspect is the fact that all subscriptions come with long binding periods. Not only do customers run the risk of being stuck with something that quickly becomes obsolete, they do not understand why operators have to lock in customers for 12 months or more. As one respondent declared: "to be locked-in only creates badwill." This increases the likelihood of switching operator once the binding period has ceased. For example, one respondent revealed, "as soon as someone offers me a better deal, I am not brand loyal anymore". A lot of dissatisfaction also stems from the fact that operators have subtly tried to increase the price of mobile broadband subscriptions without really improving the quality of service. A final point was voiced among the participants; the demand for better bundling of services to reduce the administrative work for the individual. Instead of having three separate subscriptions, the respondents would like to see their mobile phone, mobile broadband and fixed broadband all in one package.

5.4 SUMMARY

The focus groups sessions have clearly expanded the understanding of customers' values, behaviours and beliefs towards mobile broadband. We have been able to extract perceptions about both the current state of mobile broadband and potentially new features. As a bonus, the open and unstructured discussion forums also allowed for new ideas and valuable insights to be voiced.

6. ANALYSIS

In this chapter we aim to conduct an analysis using a triangulation of industry-related research, relevant theories and focus group findings. The following is structured according to our three solution-oriented dimensions, *Quality of Service, Congestion Control* and *Value Creation & Satisfaction*, as a means of effectively extracting important findings and connecting back to the initially proposed ways of alleviating the operators' problems relating to capacity, revenues and churn.

6.1 QUALITY OF SERVICE

6.1.1 *Service classes & Yield management*

Industry experts propose a model that differentiates customer segments based on network quality. The QoS for a user is determined by the priority level assigned to the packets originating from that particular user. The idea is to form different service classes, similar to the airline industry, and let customers self-segment based on desired QoS level and price elasticity. This practice is supported by the fundamental concept of yield management, namely to differentiate the service based on available capacity. In line with the theory, the attractiveness of prices should be used to manage the different customer segments. If successfully implemented, yield management is a way to exploit customers' willingness to pay while simultaneously obtaining efficient capacity utilization (Jallat and Ancarani 2008). From an operator's perspective this is surely an attractive implication, but are customers ready to accept service classes as a part of their subscriptions?

6.1.2 *QoS as differentiator*

QoS can be defined as the actual speed level obtained as a percentage of quoted maximum speed. While the industry views QoS on a gradated scale, our respondents perceive it as binary; either the operator delivers according to quoted speed or not. Our findings show that on a daily basis, customers do not complicate matters more than to think of their Internet as fast or slow, and are adequately satisfied with the actual service as long as it can support their needs. However, the attitude towards an operator will remain negative whenever quoted maximum speed is not delivered. Respondents view failure to deliver quoted maximum speed as a break of contract, even though the subscriptions indeed contain an "up to"-clause. In other words, it is the principle of not living up to a promise that aggravates people and causes dissatisfaction. Hence, customers would oppose to operators that accept the current performance levels and furthermore try to make profits from implementing a scheme based on a gradated QoS scale. This is supported by theory on price satisfaction that emphasizes the importance of price fairness. Naturally, customers want to feel that they receive what they have paid for. In the case of mobile broadband, customers view the product as the provision of a certain speed and therefore, if operators deliver any less, there is a perceived imbalance in the exchange between buyer and seller, resulting in dissatisfaction.

6.1.3 *Value of service classes*

The point of introducing service classes would be, according to price discrimination theory, to maximize profits by exploiting customer heterogeneity. There is naturally a variation in customers' willingness to pay for a service. However, the respondents do not seem to understand a service class scheme applied to mobile broadband since it is still not technically possible to make any guarantees about actual connection speeds. Hence the customers can neither perceive nor estimate the value differences between the various service levels. This is in line with industry findings, namely that the lack of segmentation within the mobile broadband business is due to the fact that operators cannot provide guaranteed QoS levels, leaving customers unable to appreciate different levels of service. According to the theory of value-based pricing, pricing based on different customers' perceived value of a service can potentially result in significant profit opportunities. Price discrimination theory adds that there must be large differences between the distinct service classes in order for customers to be willing to pay for a higher level. However, as customers appear unable to express any value at all, operators cannot use QoS differentiation to exploit these profit opportunities.

6.1.4 *Ideological resistance towards service classes*

Another large problem with service classes identified during our focus groups is a form of ideological resistance stemming from the fact that it is wrong to upgrade the QoS of one user at the expense of another. The customers see mainly large risks of suffering negative consequences rather then potential benefits. Again, there is this notion of fairness and it extends not only towards the operator, but also to other users. It is interesting to note that both priority pricing theory and price discrimination theory claim that it is always possible to set the prices of different service levels so that customers in all classes are more satisfied with the overall performance of the service than under flat pricing. Even though, in line with theory, price incentives were used to probe the respondents' attitudes towards service classes, the lack of enthusiasm makes it clear that the problem resides on a conceptual level. Customers do not acknowledge different QoS levels since, from their perspective, operators promise certain speeds and hence it is hard to convince customers to pay a premium for the service they have already bought.

6.1.5 *The paradox*

The paradox of this whole discussion is that many would indeed be willing to pay for a high QoS service level just to avoid being stuck with a poor connection. Perhaps this observation is an indication of today's perceived low reliability of mobile broadband. Nevertheless, it is hardly advisable for operators to introduce such a scheme considering the abovementioned opposition. While it may potentially result in new revenue streams, these are bound to be short-lived. In the long-run operators are likely to witness decreased satisfaction and even higher churn rates than today.

6.2 CONGESTION CONTROL

It has become clear that customers are not ready to accept a pricing system differentiating customers based on QoS. One big reason appears to be the fact that they can acknowledge neither the concept nor the implications of service classes. Nevertheless, as the following section will illustrate, there are other means of dealing with some of the operators' most immediate issues.

6.2.1 *Fair-use caps & Throttling*

Due to the rapid increase in mobile broadband usage, operators are now facing congestion in their network infrastructure. One response to deal with this problem has been for operators to introduce so-called fair-use caps or volume restrictions. While it is an easy way of making sure everyone gets some access to the network, our findings make it clear that this practice has angered many customers. They feel as if though the operators have taken something away from them that was earlier offered for free. Again, customers perceive unfairness in the exchange between themselves and the operators, which in turn, causes a decrease in satisfaction. In addition, customers do not understand how some operators can offer unlimited data plans while others have to enforce restrictions, all along with identical prices. As supported by theory, the customers' willingness to pay has subsequently decreased because the pricing is not transparent and easily understood. Moreover, today's throttling down to ridiculously low speeds does not contribute much to efficient capacity utilization, but certainly evokes dissatisfaction among customers. One improvement would be to copy Vodafone Spain's practice, whereby a user's data packets are assigned lower priority rather than throttled once the fair-use cap is exceeded. Another improvement would be to better communicate both the exact implications of data allowances and speeds as well as provide individuals with personal information about actual usage. In addition, the respondents assert that the current volume limits are well adapted for neither the associated speeds nor their individual needs. This issue will be returned to under the third section, *Value Creation & Satisfaction.*

6.2.2 *Congestion control & Yield management*

While fair-use caps restrict total usage, through both actual data limit and anticipated overdraft, they do not target the immediate problem of inefficient capacity utilization. Congested peak hours reoccur during approximately the same time every day. The current flat-rate subscription plans give users no incentive to shift consumption away from this busy period. Hence, operators stand with overcrowded networks at times, while empty at others. Yield management theory claims that by varying services and continuously updating price levels, it is possible to transfer demand from peak to slack periods. It is suggested that capacity should be matched just in time with the largest possible demand and in times of overcapacity, excess capacity should be sold out at lower prices. This would not only yield more efficient capacity utilization, it would also get customers to shift their desired time to use a service voluntarily and thereby avoid problems such as perceived poor connection quality (Taher and El Basha 2006). Applied to congestion control for mobile broadband, the idea of yield management is surely relevant, but there are several matters that hinder direct implementation. First of all, both our findings and theory confirm that flat-rate is preferred over pay-per-use, implying that a variable pricing scheme would not be appreciated. Second, unlike an ideal yield management case, it is, with mobile broadband, not possible to reserve capacity for a specific time, making it difficult to predict and match pricing ahead of time with available capacity.

6.2.3 *Time as differentiator*

Even though complete yield management for congestion control is not realistic for the mobile broadband business, it gives valuable input to the development of suitable solutions. Industry experts have speculated in the use of price incentives and time-based differential pricing as means of making users voluntarily alter their consumption behaviour. According to our findings it is indeed possible to use time as a differentiator. Naturally, people understand and can relate to the concept of time, a reason why it has always been simpler to charge for voice communication compared to data traffic. By exploiting time as a differentiator, it is possible to segment customers based on their need for a fast or slow connection during different times of the day. For example, our findings stress that a lot of customers merely have mobile broadband as a complement and for them it is not worth much having a good connection during peak hours when they are at home anyway. Alike price discrimination theory, rate fences in terms of time restrictions may be implemented as a means of getting customers to self-segment and opt for different time-based alternatives. Obviously, the more restrictions a customer is willing to accept, the deeper the discounts available must be.

6.2.4 *A time-based subscription*

It is important to note that customers are still unwilling to pay for something without guarantees and sufficient information. A time-based model would have to provide decent information about average traffic patterns and explicit time frames for usage, in order to create value in the eyes of customers. This request for certainty is similar to previous discussions about guarantees, namely that customers are hesitant to invest in something without knowing what to expect of the service. Besides, both the assertion of anywhere and anytime persists and customers are disinclined to account for yet another parameter. Nevertheless, given that operators provide concrete information about hours and speed, in combination with generous price discounts, such a subscription could potentially be attractive for complement users.

6.2.5 *Smart-market pricing & Congestion charges*

Other suggestions from theory for managing congestion include smart-market pricing. While it, in theory, is an efficient means of handling congestion, improving the experience for all users, as well as generating extra revenues; it is a problematic scheme to actually put in practice and has controversial social implications. Again there is the fact that people prefer flat-rate subscriptions without hidden costs and negative surprises. As theory has shown, customers that perceive price reliability tend to be more satisfied than those that do not. Both congestion charges and smart-market pricing would unfavourably leave customers with varying invoices and no certainties. Moreover, as supported by our findings, these schemes would be far too complicated and time-consuming for customers to consider when managing their daily consumption patterns. Furthermore, smart-market pricing is controversial as it, in essence, is a race for speed based on biggest wallet. In addition, since highest bid is the only determinant of who is granted priority access, this scheme would neglect the importance of loyalty.

6.3 VALUE CREATION & SATISFACTION

6.3.1 *Loyalty & Yield management*

Time has come for operators to shift focus from acquiring new customers to retaining existing ones and making them more loyal. Today immense churn is one reason why operators are forced to resort to price pressing strategies in order to survive in the competitive landscape, which results in insufficient revenues to support network expansions. Unfortunately, yield management does not appear to shed any light on the quest of making customers more loyal. The practice of constantly updating prices to better match available capacity with demand violates the principle of fairness and thus evokes price dissatisfaction. This is certainly a problem when it comes to implementing some of the earlier discussed solutions. Nevertheless, using other pricing theories, the following section will expand and evaluate the ideas that industry experts have had on value creation and satisfaction.

6.3.2 *The flat-rate setup*

Flat-rate is definitely the most preferred form of subscription, confirmed by both theory and our findings. It is even so that customers are willing to pay high premiums in order to obtain the simplicity of flat-rate. Mobile broadband has become a necessity placed among the things in life that are taken for granted to work without effort. Hence, attempts to elaborate with a pay-per-use setup for certain applications or time periods are deemed to face customer objections. Instead of trying to elaborate with entangled offers and sophisticated applications, operators should focus on improving the quality of their core service. Opportunely, respondents express willingness to accept slightly higher prices for their subscriptions, but only if the quality and reliability of the service improves. This may appear contradictory considering that the operators' recent stealthy price increases have stirred much dissatisfaction among customers. However, these price increases have not been associated with any significantly noticeable service improvements. As theory certifies, without justifiable prices and a favourable price-quality ratio, the result is logically customer dissatisfaction.

6.3.3 *Complement vs. Substitute users*

It is essential that operators begin to focus on the value creation process, as customers perceive it. According to theory, a price more closely correlated to value can make a firm both more profitable and more competitive than with a cost-based pricing structure. Accordingly, there is nothing better than having justifiable, reasonable and understandable prices that closely reflect the customers' perceived values, for building loyalty and long-term relationships. Our findings recognize two distinct customer segments: complement and substitute users in relation to fixed broadband. During our sessions, it became clear that both value perceptions and price elasticity differ between the two groups. In order to capitalize on this discovery, operators must create and communicate more directed offers to the two distinct groups. According to complement users, today's subscription plans are not well adapted to meet the consumption patterns of these individuals. For example, speed and volume restrictions are not successfully combined, implying that a complement user would either have to pay for more than needed or restrict usage significantly. Moreover, unlike substitute users, a large share of these users is attracted by the time-based subscription whereby full usage is restricted during congested hours. In order to still satisfy the importance of anywhere and anytime, they support the idea of liquid bandwidth, meaning that they see value in being able to temporary boost speed during restricted hours. Lastly, all users perceive an added value of bundling mobile broadband with other telecommunication services, leaving them with only one account to manage. Once more there is the request on operators to provide simplicity.

6.3.4 *Customization*

Both theory and industry experts have identified the inherent value of a multi-tiered pricing structure, where the offer is closely correlated to the customers' preferences, for increasing both revenue and loyalty. Using today's latest technology, it is in fact possible to tailor subscriptions down on a customer level enabling subscriptions to closely correlate to a user's individual preferences. Through a user-friendly interface, customers could choose between various parameters, such as speed, volume and time, and create price plans that suit their consumption patterns. While our focus group participants explicate that this would be a significant improvement compared to today's unaccommodating subscriptions, a natural objection is still that customers neither understand the measurement units nor are willing to spend much time managing their subscriptions. However if, similar to Vodafone Italy, operators could objectively help customers tailor subscriptions based on actual requirements, both goodwill and profitability could undergo a positive boost. Logically, prices would become more transparent and value-based, while still allowing users to pay a monthly flat fee.

6.3.5 *Communication*

A major issue illuminated during our focus groups is the operators' lack of clear communication. Evidently, customers neither understand the underlying concepts of mobile broadband nor are aware of the major challenges that operators are facing. According to theory, it is sometimes enough with good information to get customers to voluntarily shift their consumption habits. In a competitive landscape, it may appear risky to render traffic information public, but theorists insist that openness and clarity are indeed long-term drivers of revenue streams through its positive effects on satisfaction and loyalty. Logically, having customers understand what they are paying for can surely help an operator reduce churn.

6.3.6 *The *Star, star*-phenomenon*

Furthermore, our respondents talk about the "star, star"-phenomenon in relation to the communicated subscription plans. The details and restrictions behind offers are nested away either behind multiple mouse clicks or in a miniature font on the edge of the page. Even though customers do not like restricting clauses and complicated measures, they like misleading communication and negative surprises even less. The “star, star”-phenomenon only results in high search and evaluation costs for customers. Besides the urgency for clear communication, our study has discovered a high value for free test periods enabling inexperienced users to get an understanding of their needs before having to subscribe. Moreover, according to our findings, operators must cease lock-in strategies as means to retain customers. Long binding periods only evokes frustration and badwill towards the operator, making customers even less brand loyal.

7. CONCLUDING DISCUSSION

In this chapter we will conclude the main results of our study and provide both concrete answers to our research questions and managerial implications. We will also put our findings into a broader perspective and discuss the future role of mobile broadband.

7.1 CONCLUSION

The aim of our study was to contribute to the development of a new business model for mobile broadband. Considering the broad and open-ended nature of this challenge, we decided to zoom in and focus on three specific problems, capacity congestion, revenue shortages and immense churn. We wanted to explore ways operators can alleviate these three problems and provide managerial implications and suggestions for further research. Due to the widespread lack of knowledge about customers' values, behaviours and beliefs, we wanted to emanate from a demand-side perspective throughout the evaluation of new ideas. In order to achieve the aim of our study, we formulated two research questions:

- *What might be alternative ways for operators to solve the immediate issues of capacity congestion, revenue shortages and immense churn?*
- *Which of these alternative ways could, from a demand-side perspective, successfully be implemented in the mobile broadband business?*

7.1.1 *What might be alternative ways for operators to solve the immediate issues of capacity congestion, revenue shortages and immense churn?*

The initial literature review of industry-related publications to date provides an answer to this first research question. Since each alternative could not be isolated to one problem area, it was more suitable to group the findings into three solution-oriented dimensions.

Quality of Service. Many experts have suggested that operators assign priority levels to data packets and thereby introduce service classes with QoS as differentiator. It is argued that it is possible to set prices for the different classes so that customers in all classes are more satisfied with the overall performance of the service. Accordingly, this would theoretically contribute to both relieving revenue shortages and tackle high churn rates.

Congestion Control. Industry experts have identified several ways to control or even alleviate congestion. First of all, time-based differential pricing is considered a good means of making users voluntarily alter their consumption behaviours. One way would be to offer discounts to customers willing to restrict their usage away from the day's most busy period. Another way would be to impose higher charges for downloading information during peak hours, which would both reduce congestion problems and allow for new revenue streams. However, following BT's practice of stealthily throttling its customers during peak hours is not a good alternative considering the debate that flourished subsequent to the revelation of the practice. The next alternative is a sophisticated extension of congestion charges, namely smart-market pricing, whereby users would be prioritized during congested hours according to the bid values they assign to their data packets. This is a tactic of trying to capture as much consumer surplus as possible by forcing users to constantly update their valuation of the service. Lastly, industry experts propose lower priority rather than throttling once a user has exceeded their fair-use cap. This is primarily a step towards better customer care, since there is no logical reason why a customer should be restricted from full usage when there is excess capacity in the network infrastructure.

Value Creation & Satisfaction. Even though this dimension has been emphasized as extremely important for the mobile broadband business, industry experts offer few concrete alternatives. Nevertheless, there is no doubt that multi-tiered pricing in combination with a value-based and customer-oriented focus should by now be on all operators' agendas. This is an essential step towards new revenue streams, particularly through its potential impact on churn. Onwards, two experts do offer a minor financial contribution with their suggestion of liquid bandwidth, whereby customers can, on demand, pay a per-unit access charge to temporarily upgrade their speed. Lastly, there are talks about customization either by having customers tailor their own subscriptions or by having the operator monitor a user's consumption patterns and then adapting the data plan accordingly. Even though it is anticipated that this would absorb short-term margins, in the long run, profitability should stem from increased customer satisfaction.

7.1.2 *Which of these alternative ways could, from a demand-side perspective, successfully be implemented on the market for mobile broadband?*

After having collected qualitative primary data from customers and triangulated this with relevant theory and the findings from the industry-related literature review, we are able to present the answer to our second research question. Again, the response is structured according to our three solution-oriented dimensions.

Quality of Service. While industry experts and yield management argue that the introduction of service classes would both boost revenues and generate efficient capacity utilization, customers do not share their enthusiasm. Accordingly, customers cannot appreciate the value of an incomplete service that still lacks guarantees. There is also strong ideological resistance stemming from the principle of fairness, namely that it is wrong to upgrade the QoS of one user at the expense of another. Even though it paradoxically appears as if many would still pay for a high QoS service level, it is not advisable for operators to implement such a system. Customers would only feel forced to comply to avoid being stuck with a poor connection, resulting in nothing more than short-term profits and long-run dissatisfaction.

Congestion Control. A dynamic pricing scheme including congestion charges, whereby prices would vary depending on the time of the day and the level of network utilization is not practically possible to implement. Customers demand, above and beyond everything else, consistency, mainly in the form of a flat monthly rate. Nevertheless, our study has determined that it is feasible to use time as a differentiator, as customers can easily understand and relate to time. Given that operators provide concrete information about hours and speed, in combination with generous price discounts, many complement users are ready for a subscription where they would on a daily basis be restricted from full usage during congestion hours. Onwards, smart-market pricing may in theory be an efficient means of handling congestion, improving the experience for all users, as well as generating extra revenues. However, in practice, it seems unfeasible to implement such a scheme. Again, people prefer an effortless flat-rate subscription without hidden costs and negative surprises to a race for speed based on biggest wallet. Lastly, lower priority rather than throttling is a sound improvement from a demand-side perspective for handling users who exceed their fair-use caps. However, the resistance towards restricting volume in the first place is still strong and continues to evoke dissatisfaction.

Value Creation & Satisfaction. In terms of multi-tiered pricing, our study has confirmed two distinct customer segments based on whether a customer is a complement or substitute user of mobile broadband. It is advisable for operators to direct differentiated offers to these two groups, as they evidently do not share the same value perceptions and price elasticity. Besides, we have found two aspects that would boost satisfaction and value among complement users even further. First of all, they would appreciate offers where mobile broadband is bundled together with an operator's other services. Secondly, in combination with a time-based subscription, they do appreciate the flexibility and utility provided by liquid bandwidth. Even though this minor service would never become a cash cow for operators, it is in an important part of making a business customer-oriented. Onwards, we have found strong demand-side support for customization of mobile broadband subscriptions either by having customers tailor on their own or by primarily having the operator monitor a user's consumption patterns and then adapting the data plan accordingly. This has been identified as an important development that would certainly generate customer satisfaction and long-run profitability. Regarding value creation, the number one area of improvement is communication. Our study has revealed that customers who understand neither the concepts nor the pricing plans are hesitant to invest time and money in the service. Operators must eliminate the "star, star"-phenomenon and render information public. Also reducing binding periods and offering free test months are important measures for generating added value and customer satisfaction. Lastly, it is worthwhile noting that respondents express willingness to accept slightly higher prices than today for their subscriptions, given that operators improve the quality and reliability of the service.

7.2 MANAGERIAL IMPLICATIONS

The unique problems of capacity congestion, revenue shortages and immense churn are interlinked and it is not possible to target just one of them without offsetting a row of changes to other aspects of the business model. Besides, small changes receive little attention amongst the myriad of constantly new information on the market. Hence, as an implication, operators should ensure that all necessary changes are implemented together as a way to bring about a major restructure of the business landscape.

One major finding has been the recognition of a segment consisting of complement users, whose value perceptions and price elasticity differ from those of solely mobile broadband users. Today, this group feels neglected in terms of data plans available on the market. In response, we suggest that operators launch a time-based subscription where full usage is restricted during congestion hours and offered at a discount. In order to acknowledge the value of anywhere and anytime, operators should, as a part of this plan, simultaneously offer the possibility to temporary boost speed in exchange for a small premium. While this may appear to go against the demand for flat-rate pricing, our findings show support for this suggestion in the particular context of a time-based subscription. Furthermore, as an extension, it is advisable to bundle this new offer with an operator's other existing services, as a means to cater better for the requirements of simplicity and convenience as well as effectively tie customers to the company.

The latter concept is certainly a constructive step towards alleviating the three problems, however, our study has found that it is possible to take the restructuring one step further. It is both technically possible and welcomed from a demand-side perspective to introduce customization of subscriptions all way down on an individual level. However, it is important to remember that, on average, customers possess neither detailed knowledge about nor willingness to engage in their mobile broadband subscription; it has become a commodity service. Therefore, operators must take an active role in tailoring subscriptions after the customers' individual needs. Following the example from Vodafone Italy, operators could monitor individuals' consumption patterns to uncover ways that subscriptions can be adjusted to better meet the individual needs. This process should not stop at the most typical parameters such as speed or volume; it should extend to factors such as throttling options and the aforementioned time-based alternatives. Moreover, there should be no limits as to how these parameters are combined, implying the requirement of a very flexible and transparent pricing scheme. Nonetheless, once a customer has settled for a tailored subscription, the monthly charge will have to remain constant.

It may appear contradictory to suggest an improvement whereby all parameters, including a few new ones, are maintained while reporting on the customers' urges to keep the service simple. However, customization by first having the operator review actual needs may very well result in favourable price reductions for customers and signal customer care, both reinforcing the value of the offered service. We believe that fair-use caps will become less problematic if customers are shown and ascertained that they will not exceed their limits. Moreover, offering a free initial test month could both educate customers and give the operator time to suggest a suitable plan based on actual usage. Furthermore, operators should progressively switch from using long-term binding periods to other means of voluntarily tying customers to the company, such as cross-service bundling and loyalty programmes. The overall important managerial implication is to imbue the business with a value-driven and customer-oriented focus to instil customer satisfaction and long-term profitability.

7.3 DISCUSSION

Our study has come down to one comprehensive solution to the illuminated problems. We have suggested that operators introduce individual-based customization and, into this, incorporate both time-based and bundling alternatives. While the latter particularly alleviates congestion problems, the concept as a whole, is targeted at improving customer satisfaction as a means to reduce churn, which in the long run should generate increased revenues. In response to our objective to conduct an exploratory study of feasible ways for operators to alleviate the specific problems relating to capacity, revenues and churn, this is certainly a productive conclusion. However can we find support for it, once put into a broader perspective?

During our focus group sessions, a fundamental question was returned to again and again; *is mobile broadband only a fad?* Customization in all its glory, but if the answer to this question is 'yes', then the solution to the operators' problems lies elsewhere. On the one hand, after a quick overview, it is possible to summarize that fixed broadband is still the most important access source to the Internet (PTS 2009), the distribution of WiFi-hotspots is becoming more and more dense (Interview with Thorngren 2010) and sales of Smartphones have absolutely exploded during the past year (Carlbom 2010). Considering these observations, it is hard to see a natural place for mobile broadband in the product portfolio. On the other hand, mobile broadband is still exhibiting strong growth after several years on the market, particularly considering Hans Vestberg's assertion about an added 3 billion subscribers within the next five years (Ericsson 2010d). Thorngren (2007) compares the development of access sources to the situation of multiple carriers within physical transportation, indicating an increased and combined utility for different modes of connecting to the Internet. These predictions in conjunction with both 4G and SIM-card compatible computers on the rise, mobile broadband may in fact be here to stay.

In any case, if the prospect of 50 billion connectable devices by 2020 is even somewhat close to correct, then with today's circumstances that would imply an overwhelming amount of subscriptions to apportion out on the world's population. Since we are beginning to take access for granted we are becoming less inclined to deal with all the underlying subscription plans. Logically, cross-service bundling appears to be an important improvement, in order to allow us to time-efficiently and cost-effective handle all our future connected gadgets. Even on this level, the idea and implications of customization should surely be remembered, as it could clearly enable users to maximize value and optimize utility of each and every access device. Therefore, we can assure applicability for our findings even in a broader perspective.

7.4 LIMITATIONS & SUGGESTION FOR FURTHER RESEARCH

Our study has been conducted from a demand-side perspective and comes down to a solution that adequately solves the three illuminated problems. In accordance with our delimitations, the supply-side of the business has all along been neglected. Naturally though, it is not advisable to launch a brand-new concept without first overlooking the balance between supply and demand. Perhaps the system will cost more than it gives, as there may not be enough inherent value in mobile broadband to make it worthwhile investing so heavily in its customers. Hence, we propose further research into the supply-side of mobile broadband, particularly focusing on the cost aspects of customization. Besides, even from a demand-side perspective, customization is not yet ready for introduction to the market. The whole idea builds on a flexible pricing strategy and numerous variable parameters that will require extensive testing in cooperation with broader groups of customers, including enterprises, before a sound concept can be launched. Moreover, we also shortly propose the introduction of loyalty programmes as a means to tackle the immense churn, but offer little insight as to how this could be done. Hence, a future research project should aim to explore worldwide loyalty programmes and create a suitable programme for the Swedish telecommunication market.

In terms of the theories applied to enrich and to provide a deeper understanding of our findings, there is certainly room for further developments. The fundamental idea of yield management, to maximize total yield by matching available capacity just in time with demand, fits well into the overall mobile broadband business. However, two of its prerequisites, constantly updated prices and advance capacity reservations, are today not practically possible to observe. We have identified the need for a modified yield management model that disregards these two prerequisites but still maximizes total yield by matching available capacity with fluctuations in demand. Beyond, like Jallat and Ancarani (2008) point out, today's yield management theory neglects the importance of customer relations. As our study has shown, customer management is a key to future success in the telecommunication business, which is why we request yet a further modification of yield management theory to incorporate elements of customer relationship management. Furthermore, extensive testing of customer perceptions and reactions in response to a flexible pricing structure and numerous parameters will hopefully help develop pricing theories to include aspects of customization. Additional research should also aim to integrate bundling concepts in today's pricing theories, particularly in relation to the telecommunication industry.

One last fundamental question is whether we have adopted a sufficiently long perspective. Considering the fast-moving industry, where products and packages literally become obsolete over night, it may soon not be relevant to talk about types of mobile broadband subscriptions in isolation. Besides, the approaching launch of the 4G-infrastructure will most certainly change the business landscape. On top of everything, there is the ongoing discussion about who is to pay for it all. Should content providers pay a share of the expensive infrastructure? What about the financial role of advertisement? These questions are not to be answered here, but should offer some inspiration for further research. Overall, it appears necessary to take a broader look at the mobile broadband business and explore some fundamental questions about its existence.

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INTERVIEWS

Representatives from The Operator
2010-03-03, 2010-03-22 and 2010-04-29

Representatives from Ericsson
2010-03-03 and 2010-03-10

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