How to become the Leader in the Mobile Telecom Industry

Technology Management

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Abstract

Title: How to become the Leader of the Mobile Telecom Industry

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Purpose: The purpose of this study is two-fold:

To provide an understanding of the current situation in the mobile telecom industry. How are the different segments of the industry interconnected, what influences the industry, to what extent and what are the consequences in a general perspective?

What can be considered as value in the mobile phone in the future? How will the new ways of creating value affect the industry structure, the value conversion and the extraction of value?

Method: An inductive approach with a qualitative method has been applied in this study. The empirical information has mainly been conducted through interviews and thorough examination of news and articles. The theoretical framework is based on both articles and literature by reputable authors from each area of study.

Conclusions: Five main observations have been made. First, the integration is likely to continue within the mobile telecom industry. Second, the value creation process will change significantly during the next few years. Third, the operators must reinvent their position in the value chain to maintain high profitability. Fourth, ecosystem

keystones will capture most of the value. Fifth, flexibility will become even more important in the future.

Both horizontal and vertical integration makes the companies larger and less flexible, which in turn makes it more difficult for them to adapt to the market and the rapidly changing consumer needs. However, it is through size, integration and cooperations that a company can take a keystone advantage position. To become a so called keystone, and be able to capture most of the value created within the industry, it is important to have the customer in focus and apply co-creation and the customers-as-innovators approach. By taking in the consumer early in a product development process, the risk of losing flexibility to changing consumer needs can be reduced. Currently, it is the operators and the mobile phone brands that are competing for the position as keystone within the mobile telecom industry.

Keywords: Mobile telecommunication, mobile phones, industry configuration, value creation, value conversion, value capture, mobile content, applications, future.

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Writing this thesis has been a journey that has given us many new experiences. It has been very interesting and challenging at the same time, due to its up-to-date theme, including microeconomic issues, and its global perspective. First of all, we would like to thank our sponsor Celerant Consulting for giving us the opportunity to conduct this study on their behalf. However, the result from this study will not only benefit Celerant Consulting but hopefully also other companies or researchers with interests in the Telecom Industry.

Special thanks go to our project hosts at Celerant Consulting: Richard Nyström and Joakim Nideborn. Bo Ekelund and Nicklas Gerhardsson also deserve special thanks for giving us the opportunity to work with such an interesting subject.

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Sandra Petersson Johan Pålsson

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Abbreviations and frequently used terms

2G	The second generation cellular telecom networks that were commercially launched on the GSM – Global System for Mobile communications. Main services for GSM are voice and SMS. (Mobile Manufacturers Forum, 2009)
3G	The third generation of telecommunication hardware standards and general technology for mobile networking. Additional features also include HSPA (High Speed Packet Access) data transmission capabilities. This technological step enables for instance higher bandwidth than 2G and video calls. (Mobile Manufacturers Forum, 2009)
4G	The fourth generation, the next evolution in wireless communications. A 4G system will be a complete replacement for current fixed line networks and be able to provide a comprehensive and secure IP solution where voice, data, and streamed multimedia can be given to users on an "Anytime, Anywhere" basis, and at much higher data rates than previous generations. The technology is also called LTE – Long Term Revolution. (Young Kyun & Prasad, 2006)
ARPU	Average revenue per user.
Open Source	In general, open source refers to any program whose source code is made available for use or modification as users or other developers see fit.
Smartphone	Smartphone is a mobile phone offering advanced capabilities beyond a typical mobile phone, often with PC-like functionality (Best, 2006).
The Mobile Telecom Industry	Telecommunication is the technology of which information and messages are transmitted over

distances. The equipment needed to do this is the infrastructure consisting of a network of base tower stations where the signals travel between, the operator handling all the data and the devices translating the data to understandable information for the consumers. From this definition there are three major sections of the industry, the infrastructure, the mobile phones and the operators. The value chains of these three sections intersect and create a complex network of relationships between the many different actors.

1 INTRODUCTION

This initial chapter presents a basic background which provides a summarized understanding of the telecom industry. This is followed by a problem discussion that leads to the purpose of this thesis. An outline of the chapter disposition is also presented.

"*Change is the law of life. And those who look only to the past or present are certain to miss the future*."
– John F. Kennedy, 1963

1.1 Background

New technologies are constantly reshaping the world. Innovations such as the radio, the television, and the telephone have all changed our way of living. Being able to communicate with whoever we want whenever we want is nowadays something most people take for granted. The recent years have been characterized by several innovations from the mobile telecommunications industry, further on referred to as the mobile telecom industry, such as messaging through SMS and MMS, the ability to connect to the Internet and the use of more advanced applications, such as camera and GPS, all in one device small enough to fit in your pocket. As a consequence, boundaries between industries such as telephone, television and Internet are being razed and the technological development and the increasing bandwidth invite new competitors and services to the industry. (PricewaterhouseCoopers, 2009)

The ongoing convergence of other industries with the mobile telecom industry has given rise to several new opportunities of product and service solutions. Among these are the future pacemakers, which communicate with the health care via the mobile phone (Malm, 2009). Everything in the future will probably have an IP address that allows communication between devices (Lindoff, 2009). In addition, more payment services will be enabled in the mobile phones (Ekelund, 2009) (Malm, 2009), and more and more phones will be equipped with Wi-Fi (Öijer, 2009).

Consolidations and bankruptcies as well as new entrants have all been the reality in the mobile telecom industry recently, which all have had significant impact on the industry. (Ekelund, 2009) (Gerhardsson, 2009) Among these is the merger of Alcatel

and Lucent, the near bankruptcy of Nortel[1], and Apple's launch of the iPhone. Among the mobile phone brands are the well-known joint venture of Sony and Ericsson, and the BenQ's acquiring of Siemens a few years ago that were grand happenings. In addition, the mobile phone market is suffering from its first downfall since 2001 (Young, 2009). The last quarter of 2008 the mobile phone sales dropped by almost 13 percent compared to the same period 2007 (Global Insight, 2009). And the downfall is likely to continue over 2009 with a decrease in volume of approximately ten percent (Nokia, 2009). Among the successful new entrants is Apple's iPhone and RIM's Blackberry. Apple had no experience of the mobile telecom industry, despite this, they possessed strategic capabilities well-fitted for the mobile telecom industry and they managed to develop a product with such a great impact, that many companies are still trying to imitate.

The mobile telecom industry can be characterized as a complex industry due to the necessity to manufacture large volume in order to create profitability. Furthermore, mobile phones need to undergo several tests and verifications in different networks around the world. In addition, the phones have to be both type approved and accepted by operators. This makes it very difficult for new actors to enter the industry as a global mobile phone manufacturer. (Öijer, 2009)

The complexity is making the industry's competitive landscape even tougher. There are those who struggle with declining sales and decreasing market share, among these are the two large mobile phone brands Sony Ericsson and Motorola (Sony Ericsson, 2009). It is interesting that Apple and Google are the leading innovators in the industry even though they are relatively new in the industry compared to actors such as Nokia and Sony Ericsson. (Mace, 2007) (Iyer & Thomas, 2008) (Malm, 2009) Another segment in the industry is the semiconductor companies. These companies generally have low margins and will be affected by the declining consumer demand. (Semiconductor Manufacturing International Corporation, 2004-2009) (Chartered Semiconductor Manufacturing Ltd., 2004-2009)

Besides this, the market is still growing and there are several parts of the world were the mobile phone penetration rate is still low and where there is no service coverage. This situation allows expansion of the industry. However, the trend among the majority of the largest companies within mobile telecom are now focusing on their existing markets and are therefore not making any new large investments at the moment. It is cheaper to establish mobile infrastructure compared to fixed line communication to every single household, especially in the developing countries. The

[1] Nortel has filed for chapter 11, which permits reorganization under the bankruptcy laws of the United States.

demand for different communication technologies varies from country to country, or at least between continents. Many countries are still only requiring GSM mobile phones. The western part of the world is now in a technology shift between 3G and 4G, while emerging regions such as Africa and South America are still within 2G. (EE Times India, 2009) As mobile infrastructure becomes more and more IP based, there is a possibility that Ericsson will for instance have Cisco as a new competitor. (Dyer, 2009) This is another argument for describing the industry as complex. (Lindoff, 2009)

The mobile devices are getting more and more advanced and the boundaries to the computer industry are being razed in the same pace the bandwidth is increasing. About 10-15 years ago the boundaries between different industries were much clearer than they are today. Today it is almost as if several industries, such as the industries of computer and home entertainment, have merged. Before, the mobile phone was only a device for calling and texting, now devices such as camera, calendar/PDA and mp3-player are embedded in the mobile phone. Furthermore, GPS are becoming a greater part of the mobile phone and will in the future be followed by higher quality video recording. In other words, there are now several devices in one and there are even more features that will be embedded in the mobile phone. (Lindoff, 2009)

Competing in the middle segment will be the critical factor for survival in different segments. In the operators US-market, Verizon and AT&T fight for the top position among operators by both organic growth and acquisitions. The smaller companies claim smaller, specific segments. The actors in between are left vulnerable – stuck in the middle, the same conclusion as in Porter's generic strategies. In general, the operators are in a powerful position compared to the other segments in the mobile telecom industry. In addition, the operators are those who earn the most money. (Ademar, 2009) (Barge, 2009) (Ekelund, 2009) (Gerhardsson, 2009) In the infrastructure vendor segment Nokia-Siemens and Ericsson dominates the market with 60 percent market share. In the emerging markets, Huawei and ZTE lead the market development and set the price floor. The middle segment with Alcatel-Lucent, Motorola and Nortel has already shown declining sales and profit margins. (Telecomasia.net, 2009)

Traditional mobile communications, 2G, are becoming mobile broadband through HSPA, 3G, which is becoming even faster with the upcoming 4G technology LTE. The conversion with media is ongoing and enables new services and products, creating possibilities for new ways of creating revenues, for example through user-generated content and social networking communities becoming mobile, such as Facebook. (Malm, 2009) One good example of technologies combined is micro

blogging service Twitter, which shows an annual growth of amazing 1382 percent from February 2008-2009. New Twitter applications are constantly being launched for the mobile phone. (Ostrow, 2009)

The development of faster communication technologies enables more content and services in the mobile phone. Mobile content is any type of media which is viewed or used on mobile phones, such as ringtones, graphics, applications, discount offers, games, and movies. The significance of the mobile phones in everyday life has increased since the mid 1990s as the mobile phone use has grown.

The risk of being early on a market is zero, while the risk of being late is that one will be hopelessly after and there is little value left to capture. Nobody has caught up with Intel and nobody can compete with Ericsson in terms of switching systems. (Mäkitalo, 2009)

As indicated in the statement by JFK, change is the way to success in the future. The question is how these changes will occur?

1.2 Problem Discussion

Due to the complexity in the industry, one of the challenges in this thesis is to describe the current industry situation. It is therefore of high interest to investigate the market structure, the value chain, and the different segments within the mobile telecom industry. How is the industry structured?

Investigating the future industry situation is also a part of the study. How will the industry structure develop within the next few years? Which segments will lose their bargaining power and which will become more powerful? How will the cooperations develop in the future both vertical and horizontal?

The theories of today regarding the industry analysis are often focused on either technological or strategic issues. Discussions of, for example, how the industry structure affects the value creation, and how this transfers the value capture are rare. A suitable theoretical approach should help forecast and design the understanding for the future of an industry.

The power configuration between the actors and segments is of great importance to both the current industry situation and the future situation as well. Today the operators are in a position where they are making a lot of money as well as having the power to influence other segments in the industry. (Wingren, 2009) (Barge, 2009) (Ekelund, 2009) Will this power balance be a fact even in the future? If not, who will take the best position?

News flow and trends has brought content into the spotlight. (Burrows, 2009) (Gartner, 2009) This enables new ways of making profit through new business models and new innovation strategies. Will content become a new segment in the industry? How will the content be distributed and how will the payment-model be designed? Bo Ekelund (2009), consultant and former head of corporate transformation program at Sony Ericsson, claims that the operators will never get sole right of company produced content such as music and movies. There is no secret that one of the largest and fastest growing segments on the Internet is the User Generated Content, UGC, such as Facebook, Twitter and YouTube. (Maru, 2009) How will this affect the mobile telecom industry and the mobile phones? How will the end-users be involved in the process of content creation and usage?

When the total mobile phone sales are dropping the sales of Smartphones is on the contrary increasing. When the mobile phone sales decreases with almost thirteen percent (Global Insight, 2009) the last quarter of 2008 compared to a 2007, the Smartphone segment showed an increase of 3.7 percent (Gartner, 2009). Part of this increase is due to new actors in the industry, Apple and RIM, and their launch of the successful iPhone and Blackberry. These phones revolutionized the industry with a new user interface and the ability for customers to customize the phone in an easy way using their computer. This phenomenon is the foundation for many questions. How will the importance of user interface change the industry structure and which players will benefit from this? Where will the value be in the industry and who will capture it?

Influencing the industry is also the discussions about the next generation communication standard, 4G. How will the increased bandwidth affect the content and offerings to the end users? How will it affect the industry?

To summarize; as mentioned above, it is of great interest to describe current the industry structure in order to foresee the future. It is also important to forecast the industry movement and the impact of forces affecting the industry, such as new ways of creating value. The design of a theoretical framework for these issues is also central.

1.3 Purpose

Regarding the discussion above, the purpose of this study is two-fold, first a general purpose and then a specific:

- To provide an understanding of the current situation in the mobile telecom industry. How are the different segments of the industry interconnected, what

influences the industry, to what extent and what are the consequences in a general perspective?

- What can be considered as value in the mobile phone in the future? How will the new ways of creating value affect the industry structure, the value conversion and the extraction of value?

1.4 Delimitations

Prior to the first part of the purpose, all segments of the industry are interesting to study, but as this investigation continues, certain segments will be more prominent than others because they are more central to the investigation of the second part of the purpose. The segments that will be less investigated are components and ODM/EMS.

Even though emerging markets are very interesting due to their high growth, they will not be investigated any further in this thesis. The future of the mobile telecom industry is driven by high technology which not yet is the reality for the emerging markets.

1.5 Disposition

The thesis is divided into the following chapters:

Chapter 1: Introduction

This initial chapter presents a basic background which provides a summarized understanding of the telecom industry. This is followed by a problem discussion that leads to the purpose of this thesis. An outline of the chapter disposition is also presented.

Chapter 2: Method

The methodology chapter presents how the study has been conducted. The techniques when gathering information will be presented, along with why they have been chosen. This chapter will end with a discussion regarding the criticism of sources.

Chapter 3: Theoretical framework

This chapter will first present the theoretical framework and how it has been developed. Thereafter, each theoretical area of the framework is presented further in detail to provide the reader with a greater understanding of the theoretical framework. Finally, the chapter is summarized.

Chapter 4: Current Industry Situation and its dynamics

The current industry situation and its dynamics will be discussed in this chapter. Each segment of the value chain will be explored and some key facts of each segment will be presented. Trend observations from expertise involved in the industry will be varied with outtakes from business news.

Chapter 5: Analysis

This chapter uses the 4C-process to analyze the industry. Each step of the process will be used with a summary at the end of each step. The analysis will start with a rather general perspective for the industry structure and become narrower and focusing on the impact of value on the industry.

Chapter 6: Conclusions and Discussion

This chapter contains our conclusions and a discussion of the analysis. The application of the 4C-process will also be evaluated. Questions that arose in the problem discussion will also be answered.

2 METHODOLOGY

The methodology chapter presents how the study has been conducted. The techniques when gathering information will be presented, along with why they have been chosen. This chapter will end with a discussion regarding the criticism of sources.

The methodology used in this thesis is illustrated in Figure 1.

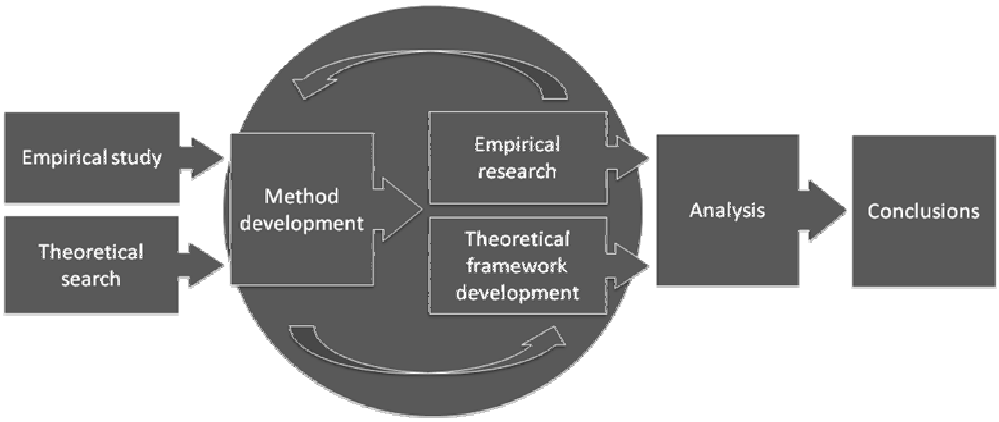


Figure 1: Illustration of the working process of the study.

The study is derived from the many changes, described in chapter 1, taking place in the mobile telecom industry and therefore it was necessary to first get a solid understanding of the industry. A genuine empirical study was necessary in order to provide an understanding of the current industry situation and then to be able to foresee what changes will occur in the future.

Initially, the emphasis in the study was to gain knowledge of the current industry situation. Discussions with the project hosts and reading of articles and reports relevant to the subject helped the authors reach the sufficient level of understanding. Interviews were carried out with respondents with the right set of knowledge to get an objective view of the situation. The process was iterative and the new inputs from the initial interviews were used in the continued information gathering.

The theoretical search was conducted parallel to the empirical study. Articles regarding strategic issues and high technology industries were initially studied in order to receive a foundation for the development of the theoretical framework.

2.1 Empirical Study

Initially we needed to create a general understanding of how the industry is configured and which actors that was included. Therefore we chose to do a few introductory interviews in order to achieve an idea of what is happening in the mobile telecom industry today and what is the main focus for the actors. This provided us with a basis of which areas to concentrate on and which individuals that would be interesting to conduct deeper interviews with. We also got familiar with the news feed through reading news sites and blogs.

2.2 Theoretical Search

Parallel with the empirical study we also started to search for theories that could be applied on the mobile telecom industry and the chosen alignment. During the empirical study we found four interesting areas: the industry configuration, value creation, value conversion and value capture. Accordingly, we identified these as central areas for our theoretical framework.

2.3 Method Development

The main method for this study is of qualitative character. The developed questionnaire contained more general issues which mean that the interviews were more like discussions. The respondents chosen for the purpose all had the ability to discuss the material in a rather free context. This made the interviews interesting and very useful as well as relatively objective. The facts gained from the information gatherings were analyzed with the theoretical framework as a foundation, in an inductive approach. (Bjerke, 1981)

In a qualitative study the validity depends in a great extent on the competence of the authors (Quinn Patton, 1990, p. 14). Hence, the initial research is of great importance for the validity to reach a satisfying level. A close discussion with both the project hosts and the tutors is therefore an important aspect. Another part of the validity issue is the quality of the data collected, both written and oral. The subject studied is not an exact science. The opinions stated in articles and interviews regarding the industry situation and future development are only guesses. To be able to sort out this matter all the data must be viewed critically. Facts and statements coming from the information gatherings have been validated by triangulation, which means that we have substantiated them by finding several sources to the same information. The position and background of the information sources can also influence the view stated. Facts from well-known sources have not been reviewed as thorough as the ones from less-known sources.

2.4 Empirical Research

The empirical research included numerous news sites and blogs as well as several profound interviews and different articles.

Interviews

Initially, interviews were conducted with the sponsor company Celerant Consulting, and with other respondents with substantial industry experience. The interviews were of a qualitative character and the purpose was to receive fundamental insights and find out what problems are associated with this fast changing business. Thereafter, more specific interviews were performed with experts on the global mobile telecom industry in general and with experts within different fields in specific. These initial interviews also provided a clear picture of the actual issues that needed to be investigated.

Information was gathered through formal meetings and interviews, both face-to-face and by telephone. All interviews were open and semi structured in order to avoid influencing the respondents and to obtain a broader perspective (Bryman & Bell, 2003, pp. 360-364). Furthermore, informal discussions were held with project hosts at Celerant Consulting as questions emerged. The most important part of the empirical data gathering was the individual interviews, since they opened up for personal thoughts and opinions from experts from different areas of expertise. Predetermined subject for the interviews were derived from the theoretical framework and secondary information gathering.

In order to make the most of the interviews the questions were sent in advance to give the respondents time to prepare and reflect on the questions. Follow-up questions were also prepared for each interview which the respondent was not aware of in advance, with the intention of receiving a deeper interview and a more valuable discussion around each question. Merging the information from the interviews after documenting them separately strengthened the objectivity of the study. The information gathered from the interviews was rewritten shortly after the interviews in order to increase the reliability and validity of the study. The risk for misunderstandings and loss of information were also reduced through this process. (Bryman & Bell, 2003, pp. 48-50)

The interviews have been conducted with respondents representing different parts of the industry and also respondent not directly involved in telecom, such as the dean of School of Economics and Management in Lund, Allan T Malm, who has a great interest of the telecom industry. In that way, the thesis is influenced by different contrasts and provides the opportunity to compare the primary gathered information

from the different sources in order to increase the validity of the thesis. Employees from Celerant Consulting, the sponsor company of this thesis, were also among the interviewees. Since the company is not an actor within the telecom industry the risk of receiving subjective information is considered minimal. There has been a strive for trying to find more than one source to information viewed as very important or having substantial effect on the essay in order to increase the reliability.

Interpretations had to be made when analyzing the collected information. There arose a need to adapt the data to a more objective image since the interviews and the information obtained from experts from different companies and from employees from different parts of the value chain was sometimes more or less subjective.

Information Gathering

When gathering information from secondary sources, for example books and articles, the aim was to find as updated versions as possible in order to further increase the reliability of the study. Though, in some cases it can be interesting to study older events and in other cases events from 2008 can already be obsolete. To avoid misinterpretation the ambition has been, to the highest possible extent, to always use the original source and sources written at a "higher level" than this study. The information was gathered from articles, industry related web pages, business reports, scientific publications, textbooks and newspapers, which were found in libraries at Lund University, in Lund University's web-based article search tool, and at Celerant Consulting.

A broad and deep pre-understanding was received through the literature studies and it complemented the empirical information. The theoretical framework was based on the literature studies.

Since mobile telecom is a fast changing industry we believe the reliability in the longer perspective will not be as strong as for other more slow moving industries such as the forest industry. Nevertheless, since the perspective is rather general it is reasonable to assume that the study will be somewhat relevant five years from now. Taking the experience level of the respondents into consideration makes this argument even stronger.

Criticism of Sources

We argue that we have received a very good empirical foundation, mainly by the interviews with our respondents which all have a lot of experience from the industry. However, it would have been desirable, within a longer time frame, to make contact with other international personalities from other well-known companies within

mobile telecom, since the thesis has a global approach. Nevertheless, most of our respondents have a lot of international experience within the industry.

All of the interviews were recorded and then listened to almost immediately after the interview. The interviews were not transcribed, but thorough notes were taken when listening to the recorded interviews. Since the interviews were recorded, we were also able to go back and listen to them again in order to avoid misinterpretations.

Besides the interviews, the remaining part of the empirical foundation has been gathered from annual reports and the websites of the companies mentioned as well as well-recognized websites within mobile telecom. Information was also retrieved from well-known individuals and their blogs. However, we have been extra critical of the information from these blogs because they tend contain personal opinions, and some speculations, which makes the information very subjective. Therefore, the information considered interesting has only been used if it has been able to be confirmed by other sources of information, for example, our respondents, or sources that are more objective and based on facts.

The working process has been iterative in order to enhance the validity and reliability of the theoretical study. The theoretical study have constantly been matched with the empirical information to secure the consistency and thereby the validity and reliability of the thesis.

2.5 Theoretical Framework Development

We have evaluated several theories within the chosen areas. Further on, we have chosen theories and concepts based on the empirical study and research. In order to evaluate all concepts and terms, they been compared in a table for better overview. The framework has then been developed parallel with the empirical research to customize it even more for our specific purpose.

Theoretical Contribution

The theoretical contribution in this thesis is based on a combination of four theoretical areas: industry configuration, value creation, value conversion and value capture. Combining these four concepts has never been made before when analyzing an industry and the theoretical framework is applicable for other industries as well. Specific theories used in the different steps can be replaced depending on the purpose and characteristics of the study. However, we argue that the theoretical framework will be applicable even in the future since it can, to some extent, be adjusted to always be up to date with the changing climate.

2.6 Analysis

The analyzing methodology was based on an inductive method. (Bjerke, 1981) The facts and information gathered have been tested with our theoretical framework in order to reach the purpose of this study.

The process that was developed in the theoretical framework was applied to the analysis. The empirical foundation has then been applied in each step of the process, where the first step in the analysis is, to a large extent, based on market shares and the largest actors in each segment. The second step involves a deeper examination of what is value for their customers and how value is created in the industry. The third step is based on economic data from each segment. Finally, the fourth step discusses how the created value is captured. Each step results in an output that is used in the next step of the analysis process. The process as a whole has an iterative character.

3 THEORETICAL FRAMEWORK

This chapter will first present the theoretical framework and how it has been developed. Thereafter, each theoretical area of the framework is presented further in detail to provide the reader with a greater understanding of the theoretical framework. Finally, the chapter is summarized.

3.1 The Analysis Process

The theoretical framework used in this study is based on a combination of four areas of theories: industry configuration, value creation, value conversion and value capture. The selection of these theories is based on the purpose of examining the future situation in the mobile telecom industry. The first part of the purpose, determining the current situation and the structure of the industry is enabled by the theoretical area, industry configuration, and in some extent value conversion. To meet the second part of the purpose, determining what value is in the industry and how to extract it, the theories regarding value creation and value capture is suitable. The characteristics of the discussion during the interviews conducted, was often heading towards the issues regarding value, what is value for the customers and how it is created, which clarifies this selection. The chosen theories address the purpose well, and cover both the structural as well as the issues regarding the value creation. It is the combination of these theories that provides an overall support for describing the current and the future situation of the industry. The theories alone are not sufficient to achieve this. The empirical research also strengthens this choice.

In order to provide a general understanding of the mobile telecom industry mechanisms, this study will first describe the industry structure – how the power balance is configured, then provide an understanding of what value is and how it is created. Furthermore, the study investigates how value is converting within the industry, between segments and organization, and finally how and who captures the value and gains a stronger bargaining position and thereby affect the industry configuration.

No other research has been found that analyses an industry combining all these four areas of concepts. Therefore this study will contribute with a new way of analyzing an industry such as the mobile telecom industry.

An analysis tool has been developed based on the above four mentioned areas. It is an iterative process that aims to foresee the future configuration in the mobile telecom

industry; it is thereby called the 4C-process (Configuration, Creation, Conversion, and Capture), see Figure 2.

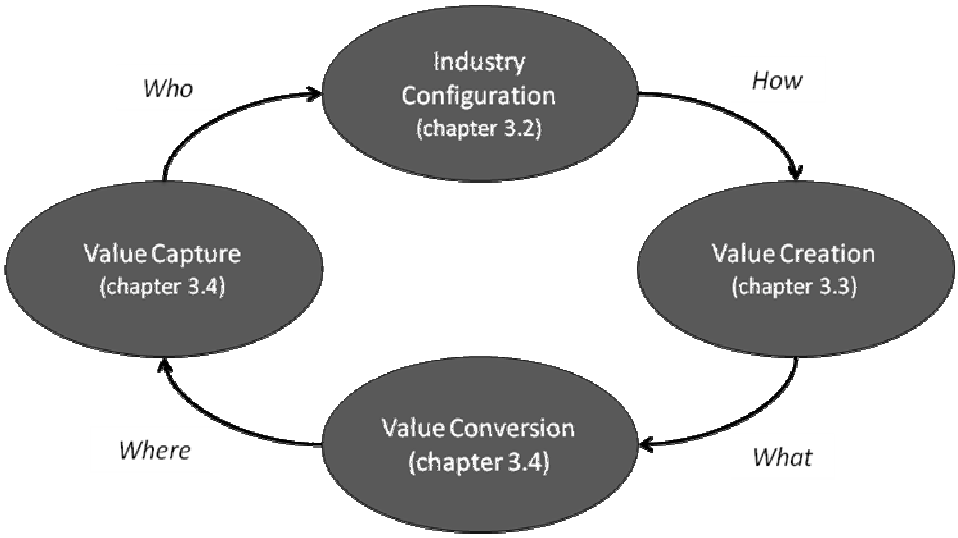


Figure 2: The 4C-process

Explanation of the steps:

1) *Industry Configuration*: Investigate how the industry structure is configured
   - Output: How the industry is configured in terms of power balance between the segments
2) *Value Creation:* Determine what value is in the specific industry and how it is created
   - Output: What defines the value creation process
3) *Value Conversion:* Determine to where the value converts
   - Output: Where the value converts to
4) *Value Capture:* Determine who will capture the created value
   - Output: Which actors that are capturing the value

3.1.1 Introduction to the 4C-process

This is a brief presentation of the 4C-process. Based on the four areas above, several theories, terms and models have been taken into consideration, see Table 1 below. Several authors often address the same subject but are using dissimilar terminology, which in the end have similar meaning. The purpose of evaluating several authors' view in one subject is to generate the desired concepts for this theoretical framework which will be used in the analysis. To further investigate which theories, terms and

models that are suitable for our study we have mapped them in a matrix, see Table 1. The mapping is also based on our interpretation of each theory, term or model.

Authors	Industry Configuration	Value Conversion	Value Creation	Value Capture
C.K. Prahalad & V. Ramaswamy			Co-creation with customers	
CM. Christensen, M. Raynor & M. Verlinden		Where will the money be?		
Adrian J. Slywotzky		Value migration		
Richard Normann	From value chain to value constellation			
S. Thomke & E. von Hippel			Customers as innovators	
Michael E. Porter	Value chain, value system			
Andrew Cox	Supply chains and power regimes	Power Regimes		
M. Iansiti & R. Levien			Ecosystem, keystones, niche-players, physical- & value dominator	
C. Bowman & V. Ambrosini			Value creation and value capture	
Dovev Lavie			Value creation versus value capture in alliance portfolios	

Table 1: Creating the theoretical framework.

Industry Configuration

Several authors have provided a foundation that can be applied to analyze how an industry is configured, and how to map the relations and dynamics of the specific industry. Among these are Michael E. Porter, Richard Normann, and Andrew Cox. When Porter initially introduced the concept of the value chain he addresses the internal process in the company being analyzed, from inbound logistics, through production and finally outbound logistics. However, the model does not address the relations between several actors in the industry and how they are linked together. Nonetheless, this theory has recently been extended and now the term value chain often refers to the industry supply chain. To receive a general understanding of the mobile telecom industry as a whole, Porters model is considered not sufficient.

The opinion that Porter's value chain model is not sufficient is shared by Richard Normann. Normann criticizes Porter's extended value chain – the whole supply chain

and distribution networks. He argues that the business of today is to a much higher extent more about who in the most creative way can design transboundary system solutions than about who can position itself in a "value chain". Normann writes about reconfiguration – either you reconfigure or you will be reconfigured. The company who reconfigure is the so called prime mover. (Normann, 2001)

"Companies are abstractions, value creating networks, rather than factories and offices."
– Richard Normann

Already in 1975, the concept regarding the power balance between the buyer and the supplier were discussed by Bengt O. Färnström and Christer Kedström (1975). Cox, Sanderson and Watson investigates this further and presents a way of analyzing the dyadic relations between the buyer and supplier. When the supply chain, from the foundry to the end customer, is determined the power balance between the buyer and supplier in each interface are being discussed (Cox, Sanderson, & Watson, 2001). This theory is based on a company perspective, while this study has applied it on entire industry segments.

This study refers to the mobile telecom industry structure as an extended value chain and applies the approach of Cox. However, this is a simplification which is necessary in order to provide a general understanding of such a complex industry such as the mobile telecom industry.

Value Creation

Among the authors writing about value creation are C.K. Prahalad and V. Ramaswamy, Stefan Thomke and Eric Von Hippel, Marco Iansiti and Roy Levien, Cliff Bowman and Véronique Ambrosini as well as Dovev Lavie.

An important aspect regarding the value creation process is whether or not the customer should be involved in the creation process. The similarities between these authors are that they state that the best way to create value is to involve the customer. Prahalad and Ramaswamy address this phenomenon with their connection of experience network and co-creation of value. (Prahalad & Ramaswamy, 2003) Thomke and von Hippel argue that customers as innovators is a new way to create value and this could be enabled by providing the customers with a specific tool kit. They present five steps for turning customers into innovators as well as three major signs for an industry that may soon migrate to a customers-as-innovators approach. (Thomke & von Hippel, 2002)

Iansiti and Levien argue that it is highly important for a company to consider its ecosystem when developing its corporate strategy. They mean that many organizations fall outside of the traditional value chain of suppliers and distributors that directly contribute to the creation and delivery of a product or service. Instead, they apply the expression "a healthy business ecosystem". (Iansiti & Levien, 2004)

Bowman and Ambrosini have defined what value is. They make a distinction between use value and exchange value while discussing consumer surplus. Lavie have presented different value creating strategies in an alliance portfolio. (Bowman & Ambrosini, 2000) (Lavie, 2009)

This study applies a combination of these theories of value creation. Prahalad and Ramaswamy, and Thomke and von Hippel, address the importance of customer involvement. Bowman and Ambrosini provide requirements in succeeding in value creation. And finally Iansiti and Lavie discuss how to control the creation process.

Value Conversion

Authors who have written about value conversion are for example Clayton M. Christensen, Michael Raynor and Matt Verlinden, Adrian J. Slywotzky, and Andrew Cox. Christensen, Raynor and Verlinden have addressed how the ability to capture desirable profits will shift in the value chain to those activities where the immediate customer is not yet satisfied with the existing products' functionality? Complex, interdependent integration take place in these stages, activities that create sharper economies of scale and greater differentiation opportunities. The power will shift away from activities where the immediate customer is more than satisfied because that is where standard, modular integration occurs. Overshooting has triggered a change in competition, which in turn has generated an architecture change, which has forced the dominant, integrated companies to disintegrate. Executives, whose companies are now making a lot of money, must not to wonder whether the power to earn desirable profits will shift, but when they do. There is a chance they can prosper in all cycles, rather than only in one, if they watch for the right signals. (Christensen, Raynor, & Verlinden, 2001)

Slywotzky on the other hand have written about *value migration*. Products as well as whole business designs go through cycles; from growth to obsolescence. Value migration occurs when the company's business design that matches the structure of the customer priorities, breaks down. (Slywotzky, 1996) A value flow arises from outmoded business designs to new better ones that can satisfy customers' most important priorities more effectively. (Slywotzky, Baumgartner, Alberts, &

Moukanas, 2006) A migration can affect a specific division within a company, a whole company, or even an entire industry. (Slywotzky, 1996)

According to Andrew Cox there are four different power regimes, and the location of where the value is transferred depends on how these power regimes are designed. For example, in the context of buyer dominance, the supplier has few alternatives for its products and therefore the value flows towards the customer. (Cox, 2001)

This thesis applies a combination of these three approaches to value conversion because they complement each other: Christensen, Raynor and Verlinden discuss when value is transferred, while Slywotzky and Cox discuss how and where the value converts.

Value Capture

Bowman and Ambrosini investigate who will capture the created value. Additionally, Lavie adds the perspective of an alliance portfolio and presents different strategies for capturing value. After value has been created the question is who will capture it. Bowman and Ambrosini discuss value creation versus value capture – what value is, how it is created and who will capture it. They integrate several existing bodies of theory into a coherent explanation of value creation and value capture. (Bowman & Ambrosini, 2000)

Lavie studies how companies capture value from their alliance portfolios, since many companies depend on alliances for their operations and long-term success. Lavie discusses different strategies for value creation as well as value capture strategies in alliance portfolios. In short, he argues that value creation strategies generate benefits which are shared by the alliance partners while the value capture strategies determine how these collective benefits are split between the partners. (Lavie, 2009)

This study utilizes Bowman and Ambrosini discussion of who captures the value and Lavie's value capture strategies.

3.2 Industry Configuration

Explaining an industry includes investigating the dyadic relationships between buyers and suppliers, which often are more abstract than meets the eye. The chosen theory by Cox regarding the dyadic relationships takes some of the aspects in the well-known five-forces by Porter (Porter, 1980) and applies them to a supply chain industry configuration.

3.2.1 The Power Balance in the Industry Structure

If one of the keys to success in business is the ability to acquire the lowest cost and the highest quality relative to competitors, it is easy to argue that this approach is ideal if the goal is achieved. However, logical reasoning demonstrates that this environment is unlikely to occur in circumstances where the benefits of lower price and higher quality arise as a result of economies of scale on the supply side. Further, it does not follow that all buyers will, as a result, get the same deal from the supplier. The point is that all supply chain relationships between buyers and suppliers operate in an environment of relative buyer and supplier power. (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

To acquire the key to business success in an understanding of how suppliers achieve and sustain situations of power and leverage over buyers are needed. Two major strategic routes are available, the closure of the market, and the ability to operate in an opaque supply market. Suppliers unable to achieve these two states are forced to operate in supply chains with very low returns. In that situation, the only strategy is to seek short-term opportunity to win a large market share by constant innovation, or seek market closure by merger and acquisition actions. These markets are ironically considered commoditized and mature industries, were investors do not wish to invest. (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

The power balance between the buyers and suppliers can be explained in Figure 3. A buyer can be located in any of the four basic power positions. (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

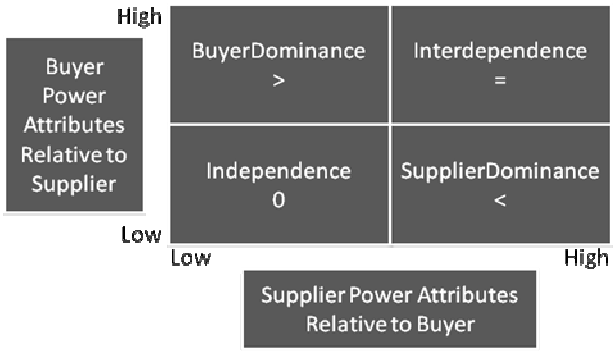


Figure 3: The Power Matrix.[2]

Buyer dominance means that each power attribute is relative to the supplier and acts as a basis for the buyer to leverage on the suppliers performance and to ensure that the supplier receives only normal returns. Interdependence means that both the buyer and supplier possess resources that require the two parties to work closely together. Neither party can force the other to do what it wishes not to do. The supplier may also receive above normal returns but must also pass some value to the buyer as well as some form of innovation. In an independent situation none of the parties have significant leverage opportunities over the other and both parties must accept the current quality and price levels. Fortunately for the buyer, the price and quality level is not in favor of the supplier because the supplier has few leverage opportunities and may be forced to operate at only normal returns. When supplier dominance exists, the suppliers have all the levers of power. The suppliers may possess some of the isolating mechanisms that close markets to competitors and allows above normal returns. (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

[2] (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

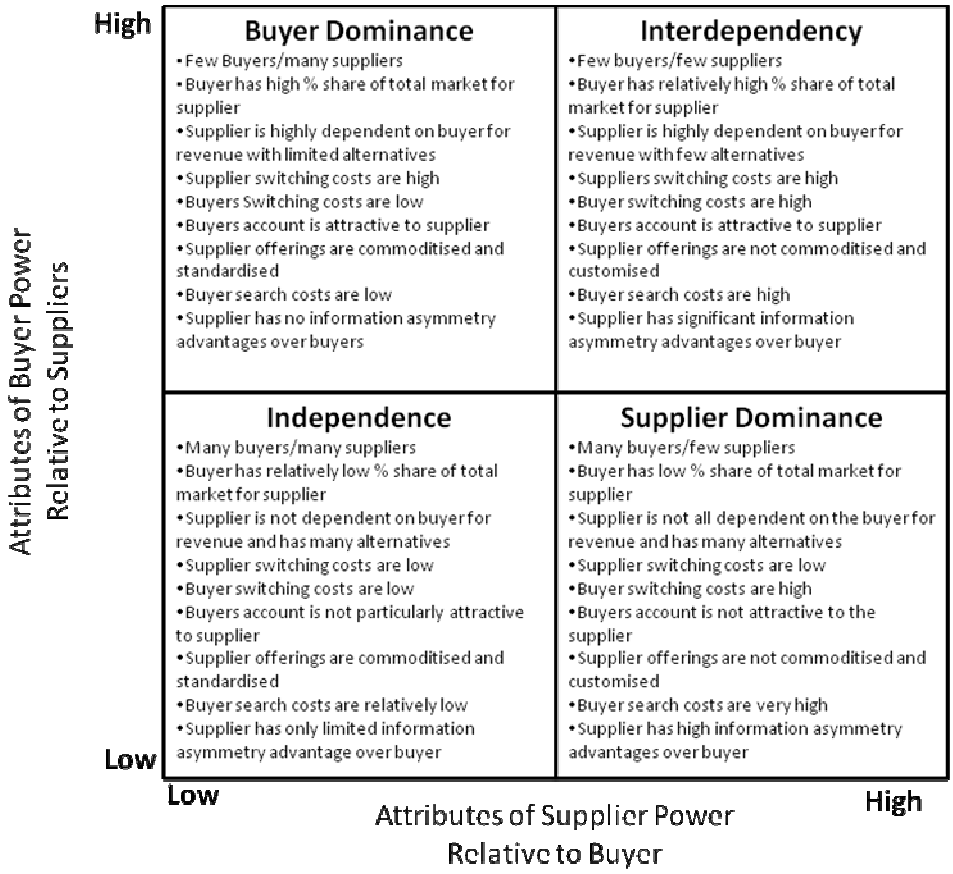


Figure 4: The attributes of Buyer and Supplier Power[3]

Fel! Hittar inte referenskälla. provides an understanding of the power matrix and the different attributes one may find in each of the boxes. It is obvious for the buyer to force all of their suppliers into the buyer dominance box. Keeping the suppliers in markets that are highly contestant forces the return for the suppliers to retain at a normal level. On the contrary the suppliers are working on repositioning themselves to the supplier dominance box. In this way, suppliers seek to create above normal returns by making their buyers more dependent. (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

Supply Chains and Power Regimes

A supply chain is simply the extended network of dyadic exchange relationships that must exist for creation of any product or service that is supplied to a final customer.

[3] (Cox, Understanding Buyer and Supplier Power: A Framework for Procurement and Supply Competence, 2001)

For a product or a service to be delivered it must start out as raw material and then pass through some stages of value adding processes between buyers and suppliers. This is obviously an oversimplification of the process and not all chains are physically alike. The key point is that there is a recognizable network of dyadic exchange in the supply chain in which successive value adding transformation occurs. A typical supply chain is shown in Figure 5. (Cox, Sanderson, & Watson, 2001)

Figure 5: A typical supply chain[4]

Several authors discuss the phenomenon supply chains in a descriptive way. This approach however has a serious weakness; they fail to address what is arguably the most important issue for managing the business. This is the concept of power. The real need lies in the need to explain why products and services have been created in the form they have. Only by explaining why any product or service has been created, who benefits from it, and in what ways, it is possible for practitioners to be able to know whether, and how they can transform what currently is to something different. (Cox, Sanderson, & Watson, 2001)

To properly understand the supply chain it is necessary to move from a description of the chain to a more analytical perspective, understanding the relationships between physical properties and the value that flows through the chain. (Cox, Sanderson, & Watson, 2001)

The existence of buyer dominance is indicated by the symbol (A > B), when A is the buyer and B is the supplier. Supplier dominance is indicated by the symbol (A < B), buyer supplier interdependence by (A = B) and finally, buyer-supplier independency by (A 0 B). (Cox, Sanderson, & Watson, 2001)

Where a situation of buyer dominance or of buyer-supplier independence exists the value flows from the supplier to the buyer. In the context of independency, this occurs because competition in the suppliers' market place normally forces them to offer their customers a good deal, if they do not, the customer goes elsewhere. In the context of buyer dominance, the value flows towards the customer because the supplier has few alternatives for its products. Where supplier power exists the value flows from the buyer to the supplier. If there is no real choice or the supply market is cooperating to fix prices, customers do not get the best deal. Where interdependencies occur, the

[4] (Cox, Sanderson, & Watson, 2001)

pains and gains tend to be shared between the buyer and supplier. (Cox, Sanderson, & Watson, 2001)

Changing the Power Balance

How to achieve a better deal and reposition the company in relation to its buyers and suppliers is an important aspect in supply chain management. Mindless replication of what others have done, without any real understanding of the surrounding environment makes the expected success hard to reach. To reach this success, managers must both understand the term proactive supplier selection and proactive supply development. Supply development means working with suppliers to ensure a transformation of the offering that is made to the buyer from the supply chain regime. Such approach must involve an extended view on the supply network. This can only be achieved when the buyer has the opportunity to work closely with the suppliers in the extended supply network to achieve innovation in the product or services created in that network. (Cox, Managing with Power: Strategies for Improving Value Appropriation from Supply Relationships, 2001)

As outlined earlier in the discussion of the power matrix, there are basically four basic power circumstances were buyers may find themselves in. Changing the current power circumstance enables an improvement in value for the focal company. Moving the supply relationships to one that improves value appropriation is desirable for the buyer. (Cox, Managing with Power: Strategies for Improving Value Appropriation from Supply Relationships, 2001)

The buyer must also be aware that the supplier also will be pursuing the way to a strategically better position regarding the power balance. Obviously, buyers and suppliers both seek to operate in the box where their own power is maximized. Since both have contradictionary goals there must be a tension in most business relations. With proactive supplier development the buyer is directly attempting to encourage innovation among suppliers by working with them, instead of relying on that the suppliers reach breakthroughs in cost or quality aspect. (Cox, Managing with Power: Strategies for Improving Value Appropriation from Supply Relationships, 2001)

3.3 Value Creation

Co-creation with customers is important when creating value. Which requirements are necessary in succeeding in value creation, and how to control the process? These are both central issues regarding value creation.

"Dialogue is more than listening to customers."
– Prahalad & Ramaswamy

3.3.1 What is value?

According to Prahalad and Ramaswamy co-creation of value through personalized experiences is the emerging opportunity space. Advances in technologies and businesses are increasing opportunities in a wide variety of industries. (Prahalad & Ramaswamy, 2003) Deregulations, ubiquitous connectivity and globalization are further accelerating the development. As the competitive environment continues to rapidly transform the innovation potential is greater than ever. This also increases the pressure of creating value. Traditional methods such as cost reduction, re-engineering and outsourcing cannot longer alone solve this problem. Innovation capability is more important than ever. (Prahalad & Ramaswamy, 2004)

Converging technologies are blurring, and sometimes razing, the familiar industry boundaries. The authors gives the example that traditional industries such as communication, education, leisure and entertainment all were served by distinctly different industries and business: the consumer electronics, the computer industry, the communication device industry, the software industry, the music industry and the movie industry. 25 years ago each of these industries had their own established competitors and unique competitive dynamics. The digitization has brought these industries to the same emerging digital consumer space. A telephone today is also an e-mail client, Internet device, electronic organizer, and camera and music player. (Prahalad & Ramaswamy, 2004)

Increasing the product variety is the popular way to meet increasingly boundaryless and changing competitive space. This leads to a product-centric view of innovation. As the consumers get more informed and connected this view is challenged. The value has to be co-created with consumers, and therefore innovation must be emphasized on their co-creation experiences. (Prahalad & Ramaswamy, 2003)

Definition of Value

Bowman and Ambrosini state that a distinction needs to be made between *use value* and *exchange value*. Use value is subjectively evaluated by customers since it refers to the specific qualities of the product perceived by customers in relation to their needs. In other words, use value is perceived by the customer. Exchange value refers to price and is only realized at the point of sale when goods are exchanged. (Bowman & Ambrosini, 2000) The price the customer is prepared to pay is associated to the price the customer actually pay when there is a monopoly supplier who can price discriminate, and who is aware of the customers' valuation. This price is called *total monetary value*. The difference between the price paid and the customer's valuation of the product is *consumer surplus*. (Bowman & Ambrosini, 2000) Consumer surplus is what consumers normally refer to as 'value of money' (Whitehead, 1996). The

chosen product must be differentiated in ways which are valued by the customer since customers choose the product that will give them the largest consumer surplus, see Figure 6. The consumer surplus can be amplified by enhancing the perceived use value of the product (and in that way increasing the total monetary value), at the same time as the price is being kept at the same level (product B in Figure 6), or by keeping the total monetary value constant but reducing the price (product C), or by doing both concurrently (product D). In this case, product D would be selected since it gives the most consumer surplus. (Bowman & Ambrosini, 2000)

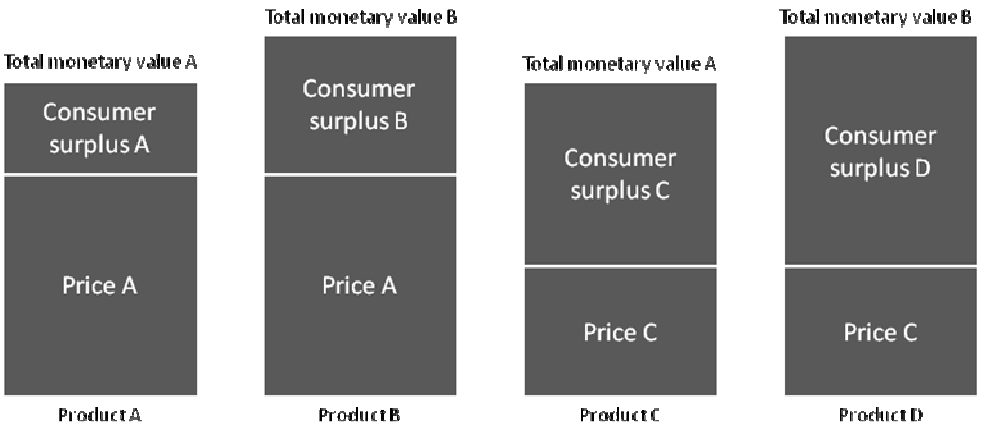


Figure 6: Total monetary value, price, and consumer surplus.[5]

The quantity of consumer surplus that a customer can enjoy can only be appraised at the point of sale – when the customer knows the selling price and can evaluate the product in relation to other offerings. Customers are unable to value most inputs to the production process due to the fact that they can only value what they perceive. Use value is perceived by the customer at the point of decision to purchase. At the time of sale, the product has both a perceived use value and an exchange value. For example, the exchange value of a machine is realized at the point of sale. However, only the use value is transferred in to the organization's production or distribution process. Many purchased resources do not add value in the same way that a customer can perceive, but the purchased input was considered as a use value by the manager who bought it. But once the machine was bought, all the exchange value was realized by the seller. This indicates that any company that is able to sell something is, in the eyes of its customers at a point in time, supplying a unique and superior package of value for money. (Bowman & Ambrosini, 2000)

[5] (Bowman & Ambrosini, 2000)

Co-Creation, a Foundation for Value Creation

Offering the individual consumer an active role in value creation is different from granting them access to the technology or using their help in product development. In the latter case the foundation of the development process remains in the technology or the product, it is better to shift the focus to the individuals' co-creation experience. To keep this unique focus, innovation should not be in the company or product, neither at the customer in the way that the company is responsive to how customers consume the products and the services associated with it. (Prahalad & Ramaswamy, 2003)

Thomke and von Hippel have written about how companies can find new ways of creating value by using their customers as innovators. They call it the customers-as-innovators approach, which means that a supplier provides customers with tools so that they can design and develop the application-specific part of a product on their own. The result is significantly increased speed and effectiveness due to the shift of location of the supplier-customer interface. In other words, the trial-and-error iterations necessary for product development are now carried out by the customer. They claim that the trend toward customers-as-innovators has the power to completely transform industries, it can generate great value but it is capturing that value that will be complicated part. The location where value is both created and captured has changed as a consequence of the customers-as-innovators approach, and companies must therefore reconfigure their business models accordingly. (Thomke & von Hippel, 2002)

Developing the right tool kit for customers is not a simple matter; they must provide four important capabilities in order to be useful for the customers and the company in question. First and most important is that the tool kit enables people to complete a series of design cycles followed by learning by doing. Second, it must be user-friendly. Third, the tool kit must contain several useful modules and components which have been pretested and debugged and fourth, it must contain information about the capabilities and limitations of the production process that will be used to manufacture the product. (Thomke & von Hippel, 2002)

3.3.2 Prerequisites for Co-Creation

Thomke and von Hippel have identified three major signs implicating that an industry may soon migrate to a co-creation approach. One sign is that the market segments are shrinking, and the customers more and more are asking for customized products. When a company tries to respond to those demands, its costs increase, and it is difficult to make the customers take on those costs. Another sign is when a company and its customers need several iterations before a solution is found and the customers' loyalty could starts to erode. The last sign is that if the company and its competitors

develop new products by using high-quality computer-based simulation and rapid-prototyping tools internally. If there are also computer-adjustable production processes that can manufacture custom products, these technologies could form the basis for a tool kit. (Thomke & von Hippel, 2002)

Well-designed tool kits have several advantages over traditional product development. They are much better at satisfying subtle aspects of customer needs because customers know what they need better than manufactures do. Because the customers can create the designs at their own site, the designs will generally be completed more rapidly, they could even be manufactured the first time around if the customers follow the rules embedded in the tool kit. Other additional advantages are that the tool kit enables a company to do business with small customers that before have been too expensive to work with, and consequently expanding the available market, and the number of product innovations. However, tool kits will not satisfy every type of customer; for instance, those designs with difficult technical demands will still be designed by the manufacturers. (Thomke & von Hippel, 2002)

A company must continually reposition itself in order to be able to capture the value that the tool kit generates since it tends to migrate. A long-term consequence of customer tool kits is that manufacturers lose some of the value they have traditionally delivered. On the other hand, suppliers do not have a choice if the conditions are ready for technology to emerge in a given industry and customer will benefit from it. (Thomke & von Hippel, 2002)

"*Exactly where that value will be generated and how it will best be captured are the multimillion dollar questions facing companies in industries that are being transformed by customers as innovators*"
– Stefan Thomke and Eric von Hippel

The Experience Space

The authors present a model of the experience space shown in Figure 7. The individual consumer is in focus and an event triggers a co-creation experience. The events have contexts in time and space and the individual influence that experience. The personal meaning derived from the process is what decides the value of the co-creating process. (Prahalad & Ramaswamy, 2003)

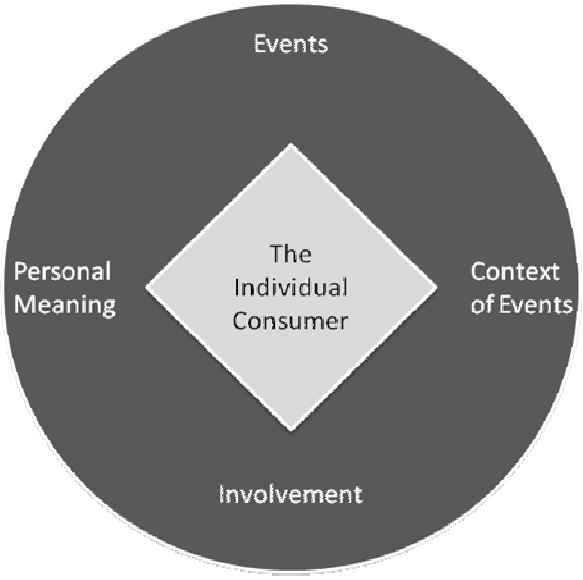


Figure 7: The Experience Space. [6]

There are a couple of key points about experience innovation. The nodal company of the development pulls together a number of suppliers, partners and consumer communities. It is meaningless for any of the involved parties to try managing the individuals' experiences. However, the concept of creating products and services will not disappear. As well as the importance of channels they will be subsumed into the larger concept of creating experience environments supported by an experience network. A network such as this contains a combination of company capabilities and consumer interaction channels, flexible enough to include a wide range of individual specific needs and preferences. Due to the reality that customer needs cannot be determined by facts, experience environments must actively involve consumers to enable a range of potential customer-company interactions which simplifies the co-creation and the willingness of the customer to pay, which is the created value. (Prahalad & Ramaswamy, 2003)

Successful improvement of the experience environment requires both continuity – the products must be recognized, and transformability – functions and features can change continuously. When this is fulfilled, the consumer communities can evolve and expand the innovation and competence as well as add even more value to the co-creation process. (Prahalad & Ramaswamy, 2004)

To summarize, the three co-creators of value are:

[6] (Prahalad & Ramaswamy, 2003)

- The company and its network
- The consumer
- The consumer network

While most companies and managers still work from a product-centric point of view, many have tried to aim for a more customer-centric point of view. But few have totally changed their home position. (Prahalad & Ramaswamy, 2003)

Position in the Business Ecosystem

According to Iansiti and Levien value is created in a healthy business ecosystem. A company can promote its ecosystems overall health by creating services, tools, and technologies that the other members of the ecosystem can use to enhance their own performance. Today, many companies possess ecosystems that extend beyond the boundaries of their own industries. The moves a company makes will, to varying degrees, affect the health of its business network, which in turn will affect the company's own performance. It is almost impossible to draw precise boundaries of an ecosystem, one should rather try to identify the organizations which in the future the company will be most closely intertwined with and determine the dependencies that are most critical to the business. (Iansiti & Levien, 2004)

There are three critical measures for a healthy business ecosystem: *productivity*, *robustness,* and *niche creation*. *Productivity* in this case means the networks' ability to constantly transform technology and other forms of raw materials of innovation into new products and lower costs. A way to measure this is through return on invested capital. *Robustness* refers to a business ecosystem's capability of surviving disruptions such as unforeseen technological change. A measure of robustness is the survival rates of ecosystem members. *Niche creation* represents the ecosystems' capacity to increase meaningful diversity through the creation of valuable new functions, or niches. Niche creation is best measured through the ecosystem's capacity to increase meaningful diversity through the creation of valuable new functions, or niches. (Iansiti & Levien, 2004)

The Keystone Advantage

How to promote the health and stability of a company's ecosystem and thus helping to ensure the company's well-being depends on the current or future role within the network. There are different roles a company can take in the business ecosystem. It can be a physical or value dominator, a keystone, or a niche player. Keystone organizations aim to improve the overall health of the system by providing a stable and predictable set of assets and therefore they play a crucial role in the ecosystem. eBay is a good example of a keystone organization. They can increase the ecosystem

productivity by making the creation of new products by third parties more efficient or by simplifying the complex task of connecting network members to one another. Keystone organization can enhance ecosystem robustness by consistently incorporating technological innovations and by providing a reliable point of reference that helps members respond to new and uncertain conditions. They can also encourage niche creation within the ecosystem by offering innovative technologies to a variety of third-party organizations. The keystone organizations are very important to the ecosystem health that its removal would in most cases lead to a collapse of the ecosystem. Keystones ensure their own survival and prosperity by continually trying to improve the ecosystem as a whole. (Iansiti & Levien, 2004)

An effective keystone strategy is twofold. The first part is to *create value* within the ecosystem, if this is not made efficiently it will fail to attract or retain members. The second part is to *share the value* with its members. If failed to do this, the keystone will find itself possibly temporarily enriched but eventually abandoned. The keystone organizations can create value in their ecosystems in several ways, but the first necessity generally involves the creation of a platform, an asset in the form of services, tools, or technologies that offers solutions to the other members of the ecosystem. The keystones actually leave the vast majority of the value creation to the other members, but what they do create is crucial to the survival of the ecosystem. The second necessity for the keystone organizations' success is that they throughout the ecosystem share the value they have created. However, they must make sure that the value of their platforms, divided by the cost of creating, maintaining, and sharing them, increases with the number of ecosystem members that uses them. In that way, the keystones can share their excess with their network. (Iansiti & Levien, 2004)

"*A firm that takes an action without understanding the impact on the ecosystem as a whole is ignoring the reality of the networked environment in which it operates.*"
- Marco Iansiti and Roy Levien

3.3.3 Strategies for Value Creation

Dovev Lavie has, based on his multi-year research in 2009, identified strategies for value creation and value capture that can guide decisions for partner selection, and develop alliance portfolio management practices to help managers extract more value from their alliance portfolios. The strategies to capture value will be further investigated in chapter 3.5 Value Capture. Value creation strategies generate benefits which can be shared by the alliance partners. While dominant partners can contribute to value creation in alliances by furnishing substantial resources, they may also capture a larger share of that value at the company's expense. Therefore, managers must distinguish between value creation strategies and strategies for capture value.

Value creation strategies facilitate a company and its partners to generate value from their relationships by cooperatively pursuing shared objectives and extending the range of their value chain activities. The strategies do not create new value, but determine how much value a company can extract from its alliances compared to its partners. (Lavie, 2009)

Not all network resources have the potential to create value; it is only the complementary resources that can. Thus, companies should choose partners that bring complementary resources instead of partners who are rich with various resources. Lavie states that in order to create value, managers should control the complementary resources alliance partners by pursing three different strategies: enrichment, combination, and absorption. A company's value creations opportunities are directly enriched by the complementary network resources supporting the commercialization of its products or enhancing its service offerings. Value is created through an enrichment strategy by providing specialized resources that are otherwise difficult to develop internally or unavailable and by extending the company's range of market opportunities. When using a combination strategy value can be created by combining network resources of different partners with the company's internal resources which creates synergies. Applying an absorption strategy is to observe and learn the skills of and the external knowledge that the alliance partners bring, and over time, the focal company can incorporate and accumulate these resources internally. Based on the knowledge base and experience of the company's partners, it can also learn how to develop new skills and capabilities. (Lavie, 2009)

Migrating to the Co-Creation Arena

For product-centric managers the most important aspect in order to create competitive advantage is to be better in terms of cost, efficiency, quality, and product variety than the competition. Not long ago, companies considered technological capabilities as core competencies. Spending lot of time in developing technology roadmaps, features and functions at the right cost and in which sequence they should be implemented is a common work for managers. Matching these decisions with the different customer segments is often the next step. These investments are then being leveraged in logistics systems as well as in R&D so even more time is spent on creating platforms that enables additions of new possibilities for new segments. All this is executed to perceive a competitive advantage. Nevertheless the competition is doing exactly the same thing. While most companies take their standpoint in the product space, shown in Figure 8 below, many companies have moved toward the experience creation and ended up in between, in the solutions space. (Prahalad & Ramaswamy, 2003)

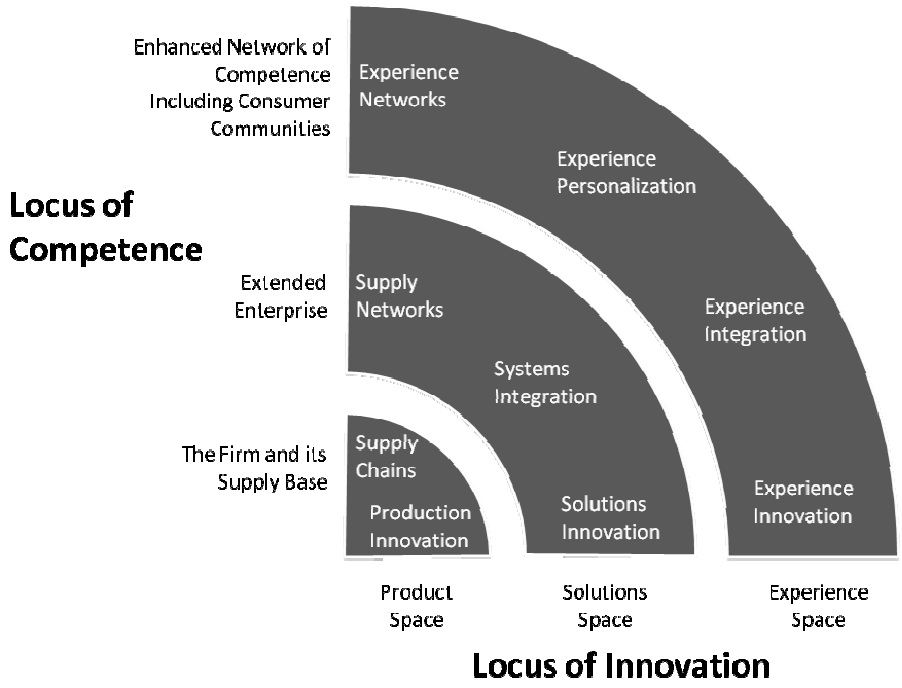


Figure 8: The New Competitive Space for Innovation[7]

Solutions-based innovation focuses not just on the product, but on the total company expertise, "soft knowledge" as well. The capacity to compete by offering solutions is based on both product specific qualities but also on skills in areas such as domain knowledge, supplier management and pricing. (Prahalad & Ramaswamy, 2004)

Although products, services and solutions are embedded in an experience-based approach, emphasis must shift dramatically towards the experience space. An important aspect in shifting their focus, managers must avoid thinking from the company's point of view. Dialogue, access, risk assessment and transparency are key issues in the value creating process from the customer's point of view. The ability to forecast and combine technological capabilities to facilitate experiences will be a key success factor in experience innovation regardless of industry. (Prahalad & Ramaswamy, 2003)

New technologies are important only when it increases the freedom of the user or makes life more convenient, facilitates a desired experience. This aligns with the intent of experience innovation, not to innovate a product or service in itself, but to enable co-creation of an environment populated by companies, consumers and the consumer networks. Only then personalized, evolvable experiences can be reached,

[7] (Prahalad & Ramaswamy, 2003)

and the products and services evolve as means to an end. (Prahalad & Ramaswamy, 2003)

Controlling a Niche

Most companies in business ecosystems follow niche strategies. A niche player aims to develop specialized capabilities that differentiate it from other companies in the network. A niche player can focus all its energies on enhancing its narrow domain of expertise by controlling complementary resources from an ecosystem keystone or from other niche players. When niche players prosper, they represent the mass of the ecosystem and are responsible for most of the value creation and innovation. Normally they operate in the shadow of a keystone, which offers its resources to a niche player, or a dominator, which work to take advantage of or displace the niche players. Even though niche players have little control in comparison to keystones, there are normally hundreds if not thousands of niche players that will move away from a keystone if its behavior starts to stray into domination. (Iansiti & Levien, 2004)

Roles within an ecosystem are not static. A company can be a keystone in one domain and it can be a dominator or a niche player in other domains. Niche players may finally become the keystones in their own new ecosystems. (Iansiti & Levien, 2004)

Risks of dominating one's Ecosystem

Keystones have somewhat an indirect power of their position within an ecosystem. However, dominators exercise their power in a more traditional way, developing a more critical position to either take over the network, or drain the value from it. Physical dominator aims to integrate vertically or horizontally to own and manage a large proportion of a network directly. There is a small opportunity for a meaningful ecosystem when the physical dominator becomes solely responsible for most of the value creation and capture. Value dominators have little direct control of its ecosystem and are sometimes only occupying a single hub. They only create a little, if any, value for the ecosystem. By extracting most of the value created from others within the system, they leave too little to sustain an ecosystem, which eventually collapses and brings the value dominators down with it. (Iansiti & Levien, 2004)

3.4 Value Conversion

After investigating what value is and the creation of it, it is important to understand where it will be transferred.

3.4.1 Value Migration

There are three phases of value migration; the value inflow, the value stability, and value outflow stage, see Figure 9 below. The model can be used to describe value migration between industries, between companies, and within a company. It shows the life cycle of a company's business design. A company can only shift from phase 2 to phase 1 or from phase 3 to phase 2 if the company implements a new business design. A business design can only exist in one of these phases, considering value migration. The phases describe the relative value-creation power is based on the ability to satisfy customer priorities better than the competitors and therefore receive higher returns. In the *inflow* phase, an industry can provide several opportunities for encapsulating value, benefiting from limited competition, high growth and profitability. When the company's business design proves to be superior in satisfying the customers' priorities it starts to absorb value from other parts of its industry. A value migration shift can be triggered when a competitor employs a new business design that responds to customer priorities which established competitors had neglected or failed to see. (Slywotzky, 1996)

In the second phase, *stability*, value growth opportunities are being offered to companies who improve operational efficiencies while continuing to serve customer priorities. Companies in these industries have steady market shares and margins. The companies' business design matches the customer priorities well and by overall competitive equilibrium. Even if the value remains in the business design there are expectations of relatively moderate future growth that prevents new value from flowing in to the company. Depending on the rate at which new, more effective business designs emerge and customer priorities change the value stability can vary in length. (Slywotzky, 1996)

When a company is in the *outflow* phase it experiences stronger competition, low profits, and decreasing opportunities for encapsulating value. Because value starts to move away from the company's traditional activities towards business designs which meet evolving customer priorities more effectively. Additionally, customers, resources and in-bound talent leave quickly. As the business design becomes more and more obsolete the value outflow accelerates. (Slywotzky, 1996)

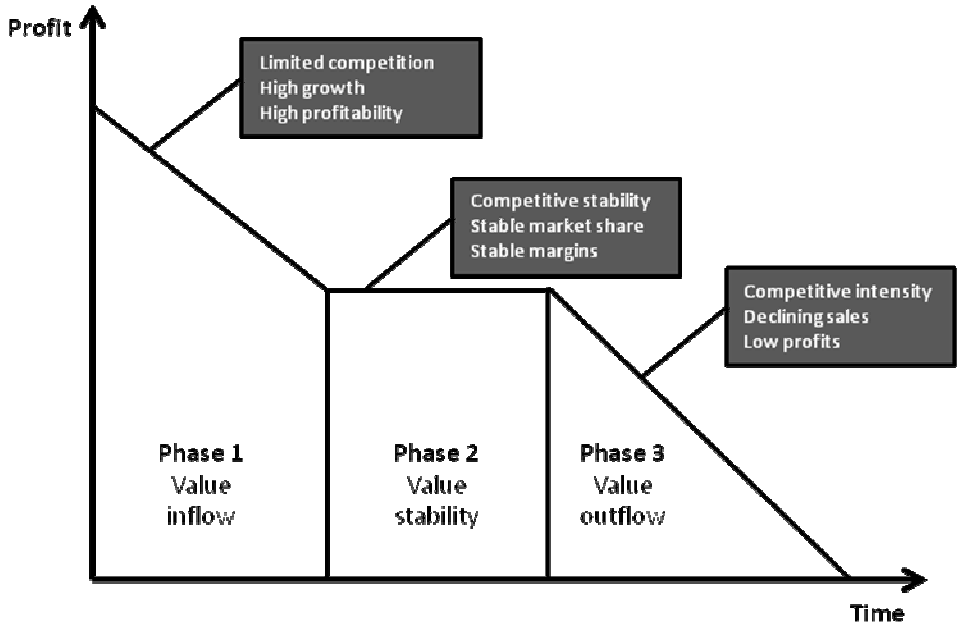


Figure 9: The three phases of Value Migration[8]

To map value migration companies need to find out in which phase they are, what to expect from the industry, and understand the context. This can be more or less complex depending on the nature of the company. For companies involved in multiple types of businesses it can be more difficult to define the market value and revenues than for companies involved in only one industry.

Transitions are notoriously complicated and in changing markets, like the telecom industry, they constitute a weak link for the companies. (Eisenhardt & Brown, 1998) Phase transitions can easily be missed since they are usually subtle; there are no sharp transition points. It is in times of these transitions when a company is most vulnerable. Unexpected collapse can occur when not knowing in which phase ones business design is in view of the fact that management objectives have to change along with the business life cycle. A multidirectional value migration is even more difficult to be prepared for. Value migrates from an integrated foundation towards numerous new types of business designs simultaneously testing the flexibility of the business design. (Slywotzky, 1996)

On the other hand, transitions present the greatest opportunities for new value growth. Industry shakeout can show a relatively similar pattern as value migration. A seismic-

[8] Based on a figure by Slywotzky (Slywotzky, 1996)

shift can take place when a major change in technology or technological discontinuity makes previous processes and know-how obsolete. This is common among mature industries which have experienced years of protected success resulting from isolating mechanisms. Firms are forced to develop a sense of detecting early signals and rely on numerous possible outcomes or scenarios because of the uncertainties inherent in a recently turbulent industry. For well-positioned companies, looming shakeouts are opportunities to stabilize the industry and gain market power. (Day, 1997)

The decisions made in the moment of a transition from value inflow to value stability occur, affects how profitable and long lasting that period will be. Institutional memory limits an organization's ability to detect and respond to the need for change when a business design moves from stability to value outflow. It is also usually too late to try to reverse the flow once the outflow phase is reached. (Slywotzky, 1996)

Value migration towards new stages of industry not only requires the ability to manage the migration of capabilities but also the coherence to evaluate ones position within that framework. The capabilities and disabilities of organizations are defined by the position of the most powerful factors which also migrates over time. They migrate from resources towards conscious, visible processes and values, and eventually corporate culture. Change can become particularly difficult when the problems and factors facing an organization change but the capabilities have come to reside in processes or become embedded in culture. (Christensen, 1997) Thus, flexible organizations with a sharp ability to capture early signals and adaptively alter the firm's conditions have better prerequisites of surviving and keeping a leading position. (Slywotzky, 1996)

Transitions occur inevitably by changing customer priorities and the accessibility of new business designs. However, this normal progression can be interrupted by unexpected external events which make a business design transition from one phase to another. Regulations, trade restrictions, innovations, hyperinflation, aggressive pricing, and even war can cause value to migrate from one business design to another. While the competitors are still considering their options, early understanding of the implications of external shocks often allows a company to diminish their damage or capitalize on the opportunities that may arise. (Slywotzky, 1996)

3.4.2 Positioning based on Profitability

Christensen, Raynor and Verlinden have studied the evolution of industry value chains over the past six years and have discovered a pattern that goes a long way in explaining why companies often make strategic mistakes in choosing where to focus their resources and efforts. (Christensen, Raynor, & Verlinden, 2001)

Once companies are where the money is, there is often very little of it left to go around. Christensen, Raynor and Verlinden, have focused on the interfaces between stages in the value chain, and have outlined a pattern of why companies often make strategic errors in their choice of where to focus their resources and efforts. The pattern they found arises out of a key view of the concept "disruptive technologies", meaning that the pace of technological development generated by established actors inevitably exceeds customers' ability to absorb it, creating opportunity for new entrants to relocate incumbents. According to the authors, the money will not be made where most companies are headed, while they outsource the things they should be holding on to and hold on to the things they should unload. (Christensen, Raynor, & Verlinden, 2001)

The product performance usually improves beyond the mainstream consumers' needs since companies strive to meet the needs of the most demanding and also most profitable customers. Companies often want to win the business of the overserved customers in less-demanding levels of the market when technological development exceeds what the mainstream customers can make use of. Thus, they are forced to change the way they compete in and they must therefore offer more flexible products to promote faster and customize their products to meet the needs of customers in smaller market niches. (Christensen, Raynor, & Verlinden, 2001)

Where the money goes

It is clear that companies competing in an integrated market face very different challenges compared to companies competing in a fragmented market – the rules of the game changes fundamentally once components become modular and customers' prefer speed or convenience rather than functionality. The companies controlling the independent links in a value chain will capture the most value. (Christensen, Raynor, & Verlinden, 2001)

When large integrated actors exceed what their mainstream customers can absorb, disruptive competitors start to move up market. The power to make money shifts away from companies that design and assemble the end-use product toward the back end of the value chain to companies that makes the supply subsystems with internal architectures that are still technologically interdependent. (Christensen, Raynor, & Verlinden, 2001)

Overshooting at a system level generally forces the suppliers of subsystems to a stage where their product does not meet the needs of the system assembler. Competitive forces then compel the subsystem suppliers to create architectures that are ever more interdependent and proprietary as they try to raise the bar of their maximum

performance. This is necessary in order for them to win the business of their direct customers, the designers and manufacturers of modular products. Thus, as a normal and inevitable result of the shift in industry structure, the place where companies normally make a lot of money, at the end-user phase, becomes unlikely the place where money will be made in the future. Conversely, the places where attractive profits were not often made in the past, components and subsystems, often become very profitable. This can be exemplified in the PC-industry. In the 1990's the money flowed from the customers to the companies that designed and manufactured the computers. As the decade progressed less of the profit stayed there. A larger part of the money flowed past these companies and ended up at the suppliers further back in the value chain, such as the operating system and the microprocessor companies. (Christensen, Raynor, & Verlinden, 2001)

3.5 Value Capture

When knowing where the value converts to, it is of high interest to investigate who will capture it.

3.5.1 Who Captures the Value?

Bowman and Ambrosini claim that value capture, the realization of exchange value, is determined by the bargaining relationships between buyers and sellers, even though value is created by the members of an organization. The presence of close viable substitutes, combined with low switching costs increases the customer's bargaining power (Porter, 1980), which in turn decreases the company's ability to capture exchange value in the form of high prices. The accessibility of close substitutes reduces prices, and thus increases the consumer surplus. (Bowman & Ambrosini, 2000)

How much of the exchange value captured from the customer that is retained by the company in terms of profit depends on the perceived bargaining relationship between the resource supplier and the company. (Bowman & Ambrosini, 2000) Cox comes to the same conclusion that value transfers in the direction of power. (Cox, Managing with Power: Strategies for Improving Value Appropriation from Supply Relationships, 2001) Companies are able to capture a larger share of value if suppliers are aware of the buyer's dependence on their supplied resource and they can maintain resource supply at the desired level (Williamsson, 1975). However, there is no relationship between the role of use value in the production process, the nature of the use value supplied by the resource supplier, and how much exchange value that the resource supplier captures. (Bowman & Ambrosini, 2000)

3.5.2 Strategies for Value Capture

According to Lavie, managers must control their bargaining power in the competition that emerges both with and among partners in the alliance portfolio in order to be able to capture value. The ongoing tension between cooperative and competitive pressures in alliance portfolios is called *coopetition*, in which companies work with their partners but maintain a healthy wariness of their intensions and maneuvers. Value capture strategies can determine how benefits generated from value creation strategies can be split between the alliance partners. There three different value capture strategies companies can use to secure their interests in alliance portfolios: enhancing bargaining power, avoiding bilateral competition, and controlling multilateral competition. (Lavie, 2009)

If a company has strong bargaining power it can influence the outcomes of negotiations, reach favorable terms in alliance agreements, and obtain admission from partners and thus a relatively greater ability to capture value from its alliance portfolio than those companies with limited bargaining power. However, it is not easy to develop such bargaining strategy because the balance of power between the company and its partners may change during course of alliance due to trends in consumer behavior or technological change. (Lavie, 2009)

When a company competes with its alliance partners in the same industry, it is especially important to consider the partners' superior bargaining power. Bilateral competition between a company and its partners motivates partners to maximize their payoffs in alliances at the focal company's expense. Instead of focusing on collaboration, the partners might behave opportunistically and try to capture or imitate the company's resource endowments. However, bilateral competition is not necessarily hazardous since the company may still have the upper hand in value capture contests. It is only when partners both compete in the same industry as the company and has superior bargaining power, thus having both the motivation and ability to decrease the company's share of joint benefits, is the company expected to suffer a decline in its performance. Therefore, a company in bilateral competition must develop a strategy that enables it to avoid powerful partners that operate in the same industry. (Lavie, 2009)

Even if competitive tension in alliances can damage interested parties, a company can use this tension in its favor by nurturing competition among different partners in the alliance portfolio. Multilateral competition strategies involve collaborating with multiple partners that offer similar products and services. However, it presupposes that the focal company has relatively strong bargaining power. It can improve a company's ability to control competing interests among partners and decrease their

risk of opportunism, even if the overlap might lead to redundancy and inefficiency in the alliance portfolio. If partners are less dependent on their joint alliance with the company, or if they have greater number of alternative alliances than the company, the company might lose more than it gains from trying to control the competitive tension among its partners. (Lavie, 2009)

3.6 Summary

Figure 10 summarizes the 4C-process and the vital parts in each step.

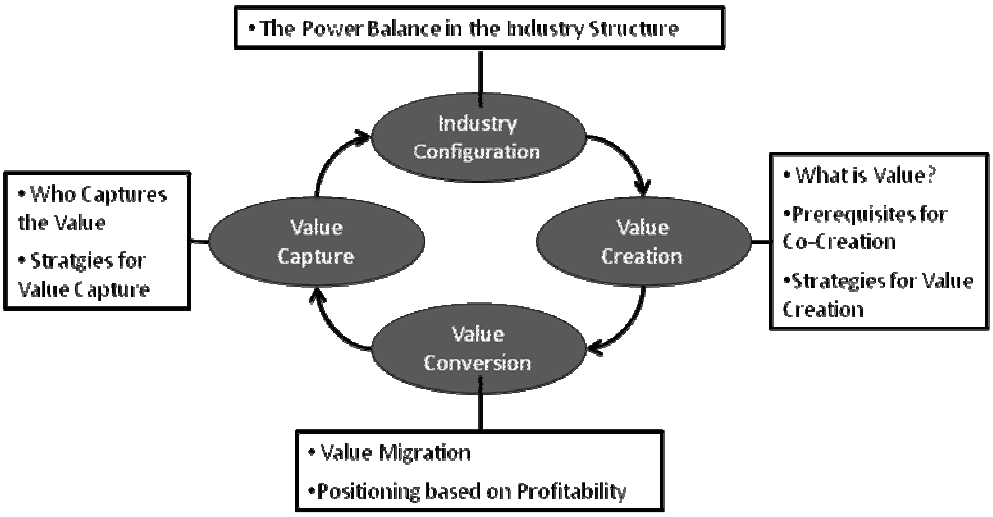


Figure 10: Summary of the 4C-process

4 CURRENT INDUSTRY SITUATION AND ITS DYNAMICS

The current industry situation and its dynamics will be discussed in this chapter. Each segment of the value chain will be explored and some key facts of each segment will be presented. Trend observations from expertise involved in the industry will be varied with outtakes from business news.

4.1 The Mobile Telecom Market

The global economic downturn had a negative effect on the sales of mobile handsets to end-users during the end of 2008 and the beginning of 2009. The economic downturn is still ongoing. The decline was 18 percent from the first quarter of 2008. The decrease was derived from both emerging and mature markets (TT, 2009). All the top five mobile phone brands experienced declines for the last quarter of 2008. However, the total sales for 2008 showed an increase of six percent to a total of 1.22 billion units. (Gartner, 2009)

It is difficult to define maturity phase of the mobile telecom industry due to the ongoing convergence with other industries, such as the PC industry. It is also determined by how one defines the mobile telecom industry. However, this alone is a sign that the market is not yet mature. (Öijer, 2009) In many segments there are only a few large actors accountable for significant market shares. For instance, in the mobile phone brands segment the five largest actors holds a combined total market share of approximately 80 percent. (Sandström, 2009) (Rydbeck, 2009) (Wingren, 2009)

Attractive products, such as mobile phones, that traditionally is a preferred present for Christmas sold less units this year because of the concern of the commitment associated with the subscriber contract connected to the new, most attractive mobile phones on the market. Besides, the operators in the western world are facing greater challenges today than ever before. Subscriber growth looks to slow down and voice revenues are declining because of competitive pressure. (Suo-Saunders, Jones, & Karapandžić, 2008)

Along with the end users the retailers' and operators' channels also showed more caution during the last quarter of 2008. A significant negative difference between shipments into the channel contra out of the channel shows that the inventory levels are being reduced. This is also due to the lowering consumer confidence. Longer replacement cycles in Western Europe as well as a stagnant market in Japan affected sales from the start of the 2008. Emerging markets were able to sustain the growth

during the first half of 2008. However, from the third quarter the downturn from the mature markets was spreading to emerging markets. (Gartner, 2009)

The infrastructure segment of the industry is very dependent on the investments from the operators. Due to the ongoing financial crisis the operators will be more cautious with their investments in new infrastructure. This will affect the infrastructure companies negatively. Some operators have announced that they will start building the next generation of communication technology, LTE, within the next few years. Profitability for individual companies is linked to technical innovation and the ability to secure high-volume contracts from operators. During the last years Asian actors have grown a lot and gained market shares from the western companies. The two Chinese actors, ZTE and Huawei, are the only infrastructure companies, together with Swedish Ericsson, that still shows growth in sales. (Strandberg H. , 2009)

As mentioned before, several other devices such as mp3-players and camera have been integrated into the mobile phone and as a result increased its number of features. Due to this the customer value of the mobile phone has been kept at a high level. (Lindoff, 2009) See Figure 11.

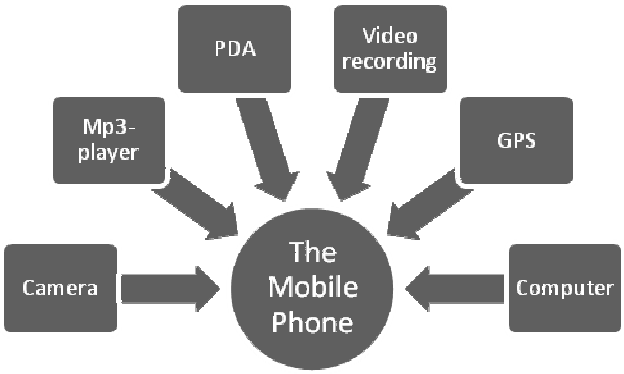


Figure 11: Schematic figure of which features that has been integrated into the mobile phone.[9]

4.2 Industry Structure

After having studied the industry and interviewed several personalities well-versed in the subject, three main areas have emerged and therefore the industry will be both described and analyzed on the basis of these three areas. Three main areas are: infrastructure, mobile phones and operators. The mobile phones and the infrastructure have the same initial steps in the value chain, called components. This is isolated as an own value chain in Figure 12 below, each section of the industry has its own value chain. The consumers generally turn to the operators in case of purchase and service

[9] (Lindoff, 2009)

for example, while the operators interact with both the infrastructure's and mobile phone brands' value chains. (Wingren, 2009) (Rydbeck, 2009) (Sandström, 2009)

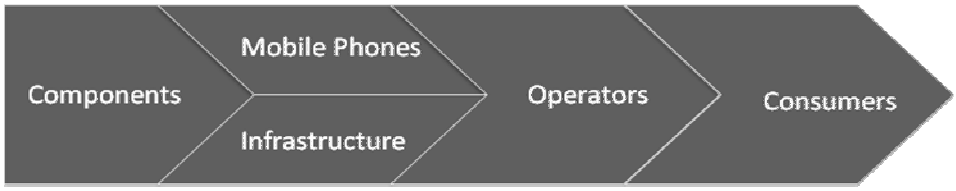


Figure 12: Interconnection between infrastructure, mobile phone brands, operators and consumers

Each part of the industry structure will be discussed separately and referred to as value chains. First, each value chain will be described, starting with the one for components, then the mobile phones', and infrastructure's value chain and continuing with a discussion of the operators. In each segment some key facts will be presented and used later on in the analysis chapter.

4.3 Components

The initial two segments in the industry are communal for both the mobile phones and the infrastructure. These two steps are the semiconductor foundries and the chipset providers, shown in Figure 13. Other components such as displays, cameras and memories will not be discussed in this chapter.

Figure 13: The value chain for components

4.3.1 Semiconductor Foundries

Semiconductor foundries manufacture components such as integrated circuits that are present in everyday electrical and electronic devices, such as mobile phones. The components are produced according to specific demands from buyers – the chipset providers.

Key Facts – Semiconductor Foundries

- One dominating actor, TSMC – Taiwan Semiconductor Manufacturing Company
- Companies rely on a stable demand that keeps the production capacity utilization at a high level
- Buyers account is attractive to the semiconductor companies
- Switching costs for buyers are low, the products are commoditized

This initial segment of the value chain is dominated by one large actor, TSMC, shown in Figure 14.

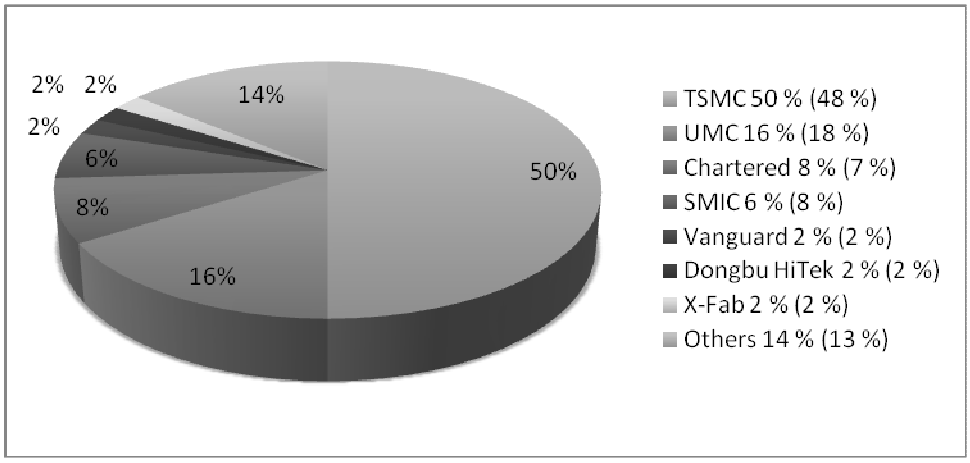


Figure 14: Market share among semiconductor foundries for 2008 (2007)[10]

According to Morris Chang, Chairman of TSMC, the semiconductor items are commodities and the customers are a powerful market force. The switching costs for the customer, chipset providers, are therefore low. The decline in sales of mobile phones has affected the semiconductor industry and the industry is likely to experience negative growth during 2009. The downturn will decelerate the sectors growth until 2012, when total revenues will be at the 2008 level (Sung & Shen, 2009). Worldwide semiconductor revenues are expected to decline 20 percent in 2009. This is a result from the recent shock on the global economy leading to more conservative spending. The downturn is expected to be deep enough to get the semiconductor capacity to ultimate fall, as a result from mergers, acquisitions, bailouts, restructuring, and other industry realignments. (Chen, 2009)

The economic downturn will also affect the gross profit margin due to the underutilization of the factories. An analyst at Gartner claims that this opens up for a

[10] (IC Insights, 2009)

great opportunity for the larger companies with strong balance sheets to make strategic acquisitions. (Gartner, 2008)

4.3.2 Chipset Providers

Chipset providers design and develop chipset platforms for the telecom industry. (Nideborn, 2009) (Nyström, 2008)

Key Facts – Chipset Providers

- Three major players all focusing on LTE instead of WiMAX
- Few large players in the mobile device chipsets business
- Large orders from the mobile phone brands is important and attractive for the chipset providers
- Economies of scale is important

Chipsets are sold to a variety of industries, including the computer industry, the home electronic industry and the wireless communication industry. There is a large amount of actors with one digit market shares, shown in Figure 15, the ten largest actors do not account for more than 45 percent of the total market. (Gartner, 2008)

The 17-year consecutive largest actor is Intel, mainly a provider to the computer industry. Intel increased their market share and Intel's revenues grew by 6.5 percent. The vague boundary between the computer and the mobile telecom industry makes it interesting to study the chipset providers as a whole. A recent press release stated that Intel's Atom processor found in Netbooks will be eventually implementable in smaller devices such as Mobile Internet Devices and Smartphones. (Intel, 2009)

Qualcomm had the largest growth among the top ten vendors. The growth was strongly driven by the first three quarters of 2008. However, the last quarter showed a small downturn because of a decrease in demand for CDMA based devices and chipsets by the operators and mobile phone brands. (Gartner, 2008)

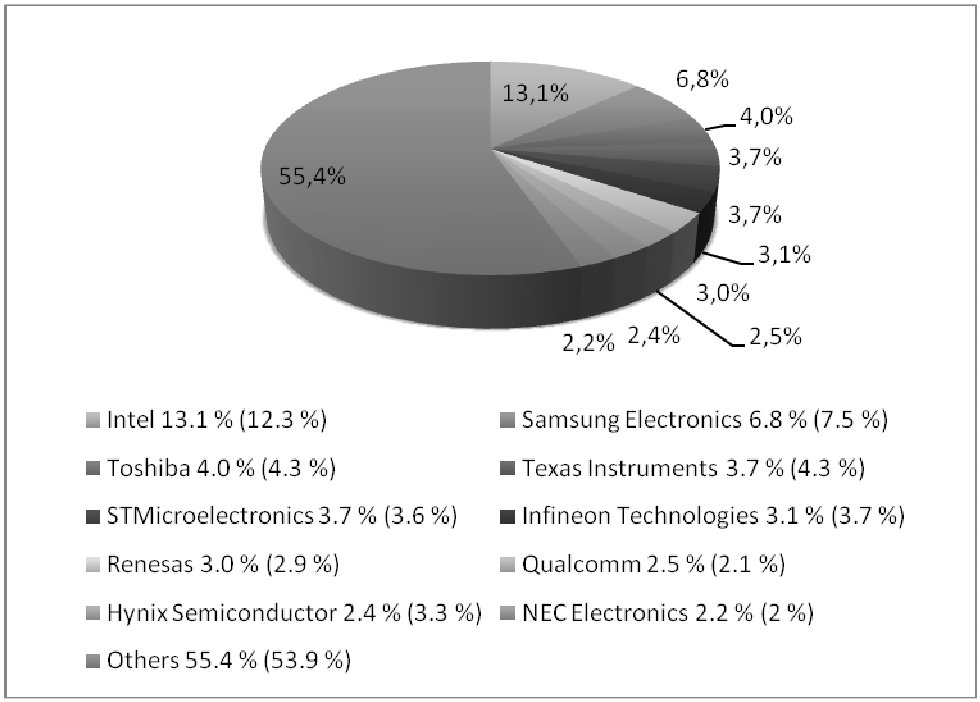


Figure 15: Market shares among chipset providers regardless market segment 2008 (2007)[11]

Chipsets for Mobile Phones

There are three large actors regarding the mobile wireless communication part of the chipset providers. Qualcomm is the largest actor in this segment followed by Texas Instruments (TI) and the recent joint venture between STMicroelectronics and Ericsson called ST-Ericsson, Market shares shown in Figure 16 below. The technology is both required fitting the standard of the wireless communication interface and the software interface. The largest actor among the chipset providers, Qualcomm, is not creating chipsets for the largest mobile phone brand, Nokia. This is due to the compatibility issues between the chipsets and the software. Texas Instruments on the other hand is likely to leave the mobile chipset business, leaving market shares for ST-Ericsson and Qualcomm. (Lindoff, 2009) The consolidation is ongoing and it will likely only be 2-3 large actors in the future. (Nelson J. , 2009)

[11] (Gartner, 2008)

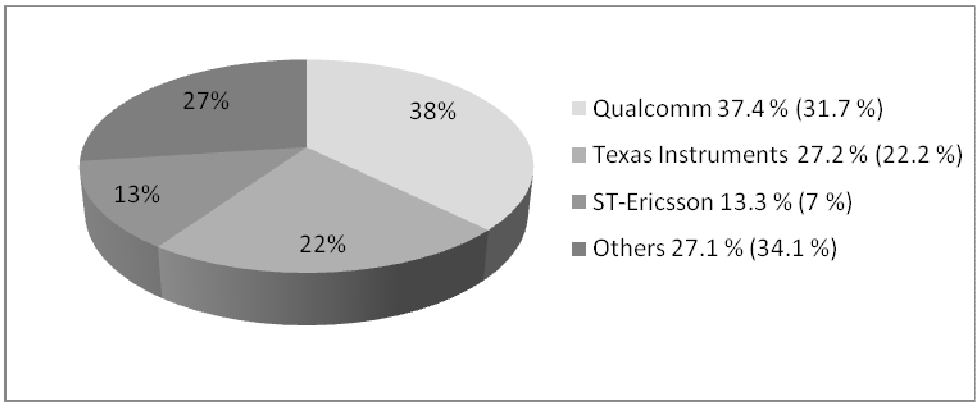


Figure 16: Market Share among Mobile Wireless Chipset Providers 2008 (2007). [12]

The figures for ST-Ericsson, 7 percent market share in 2007, only accounts for STMicroelectronics' market share since the joint venture did not take place until 2008. ST-Ericsson will, according to the CEO Carl-Henric Svanberg, be a strong contestant in the competition for the position of world leader. (Ericsson, 2008)

Trends

Recently, ST-Ericsson announced a cooperation with Nokia regarding development of a new reference platform designed to run the operating system from Symbian Foundation (further discussed in section 4.4.1 Operating Systems).The hardware will have the performance able to meet the requirements for higher bandwidth and increased media implementation. (ST-Ericsson, 2009)

All these three organizations have the similar standpoint in the 4G issue. Qualcomm focuses their business on LTE, after a while of trying to develop their own 4G-technology. (ST-Ericsson, 2009) (Qualcomm Incorporated, 2004-2009) (Texas Instruments Incorporated, 2004-2008)

4.4 Mobile Phones

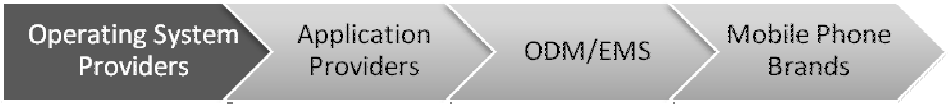
There are several actors contributing to the completion of a mobile phone. The relation between these actors can be illustrated in a value chain as shown in Figure 17 below.

[12] (iSuppli, 2009)

Figure 17: The mobile phone value chain

The segment in the value chain after the mobile phone brands is the operators. Most of the offerings to the end consumers are made through the operators and only a small amount of the mobile phones are sold without any subsidization at retailers. Therefore this study will not focus on the retailer segment.

4.4.1 Operating Systems



The operating system companies design and produce operating systems, further referred to as OS, which is the interface between hardware and user. It is responsible for the management and coordination of activities and the sharing of the resources in a device such as the mobile phone. The operating system acts as a host for applications, meaning that one of its purposes is to handle the details of the operation of the hardware. Therefore, application programs do not have to manage these details and it makes it easier to write applications. A mobile OS controls a mobile device. Though, they are rather simpler than computer OS. They manage the mobile multimedia formats, wireless broadband and local connectivity, and different input methods.

Key Facts – Operating Systems

- Few alternatives among OS
- Long product development process
- Many standards depending on the performance of the device
- User interface is important

Recently there has been a lot of discussion about the customer experience. Different OS, ease of use and the requirements from the increasing media and entertainment in the mobile phone was one of the trends during the Mobile World Congress 2009 in Barcelona. (Thulin, 2009) Since the OS is a vital part particularly in the Smartphone, the Smartphone segment will be discussed further on. Low-end mobile phones often use simpler proprietary OS than Smartphones and will therefore not be investigated any further. (Lindoff, 2009) The market share among the OS in the Smartphone

segment is shown in Figure 18. The total sales of Smartphones reached approximately 140 millions during 2008. (Gartner, 2009)

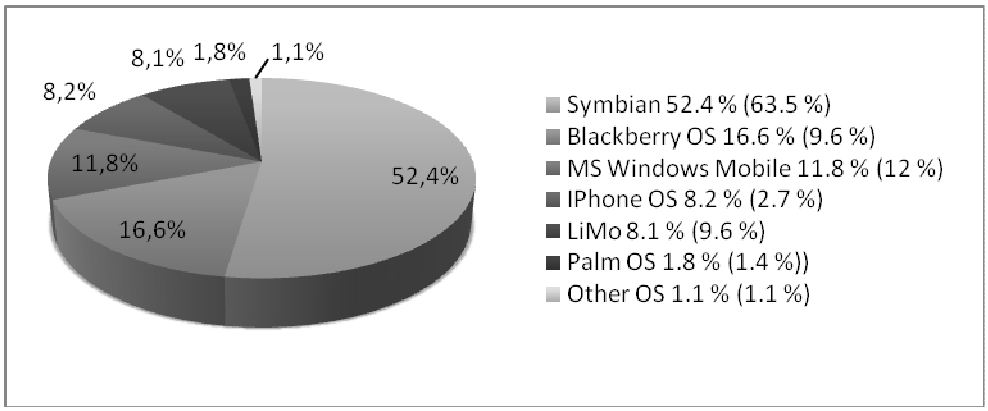


Figure 18: Market share among Smartphone Operating Systems 2008 (2007)[13]

One general criterion for this segment is that all OS has to be adapted to the mobile phone, depending on key set, resolution, performance, touch screen and so on. (Ademar, 2009) The OS can be divided into three categories: proprietary, open source and licensed. The proprietary one's are Blackberry OS and iPhone OS. Open source OS are Symbian, LiMo, Palm OS and Android. Windows mobile is licensed.

Proprietary

A proprietary OS is a system developed and owned by the mobile phone brands. It is not possible to license the OS to other platforms. BlackBerry OS is the proprietary software platform made by RIM for their BlackBerry mobile phones. (RIM, 2008) The iPhone OS or OS X iPhone is the OS developed by Apple for their iPhone and iPod Touch. It is derived from their computer OS Mac OS X. (Apple, 2008)

Open Source

OS based on open source enables the customers, mainly the mobile phone brands, to develop and configure the system to their needs and demands. Mobile phone brands such as Nokia, LG, Motorola, Samsung, and Sony Ericsson use Symbian OS (Symbian, 2008). The source code is not completely open yet, but it will be in 2010. Symbian Foundation, is a cooperation where several large mobile phone brands but also operators, such as Vodafone, and other companies are represented, is working on developing and improving Symbian. (Strandberg, 2009)

[13] (Gartner, 2009)

LiMo is the Linux-based OS for mobile phones. (LiMo Foundation, 2009) Palm OS, by PalmSource, is developed for use with a touchscreen-based graphical user interface. It contains applications for personal information management (Rogers, 2009) (Hartsock, 2009).

Android is based on Linux and was initially developed by Google and later by the "Open Handset Alliance" – a consortium which consists of operators, software companies and mobile phone brands among others. Companies such as Ericsson, Huawei, Vodafone, Google, Samsung, Intel, HTC, and eBay are represented in the alliance. (Google) (Strandberg, 2009)

Licensed

There is basically only one OS that can be categorized as licensed, Windows Mobile. A licensed OS means that a company develops and sells the OS as a product to the mobile phone brands.

Devices that run Windows Mobile include Smartphones, pocket PCs, portable media centers, and on-board computers for certain automobiles. Furthermore, third-party software development is available for Windows Mobile. (Microsoft, 2009) About 80 percent of the existing mobile phones that run Windows are manufactured by HTC. (McLean, 2009)

Windows Mobile is popular due to the low barrier of entry for third-party developers to write new applications for the OS. On the other hand, it has received criticism for having a user interface that is more usable with a stylus[14] and is not optimized for touch input by fingers. Even if the different interfaces are trying to make the mobile phone easy to use, the user is often in need of a stylus. Although, it is a good platform for business mobile phones due to the ability to easily synchronize with email clients on the PC and there are many companies developing programs to the platform. (Strandberg, 2009)

Trends

Some doubts about Google's commitment to Android have arisen. Even if Android is getting a lot of positive feedback, there are those who are questioning Google's objectives regarding Android and their commitment to develop a robust Android application environment. (Settles, 2008) Could Android SDK[15] be merely a temporary solution measure for the search giant until major application functionality can be

[14] A kind of pen used instead of the fingers when touching the display.
[15] Software Development Kit is typically a set of development tools that allows a software engineer to create applications for a certain software package, software framework, hardware platform, operating system, or similar platform.

migrated into the browser? It is the company's latest demo of the HTML5 version of Gmail, which was shown at Mobile World Congress in Barcelona 2009 that is causing the doubts. According to Google's product VP, Bradley Horowitz, both the web applications and the local Android SDK might align on parallel paths in a pursuit of richer, more functional and higher performing solutions. (Wells, 2009)

There has been a demand for a good open source OS within the industry for a long time, mainly by the operators. Android is one option that satisfies this demand (Nelson J. , 2009). Open source alternatives need an initiator such as Google to obtain the momentum needed. It is also important to keep the platform concrete and avoid fragmentation, which can be considered a risk in these types of initiatives. (Ademar, 2009) However, the operator's involvement in the development has in several occasions turned out as desired. OS that has been customized by operators have by the users been perceived as not as user-friendly or performing as the original versions from the OS providers.(Barge, 2009)

4.4.2 Application Providers

The applications providers develop software for the mobile phones. Different applications for the mobile phone can be software for web-browsing and e-mail.

Key Facts – Application Providers

- Many competitors with different products
- Relatively few operating systems to customize the applications to
- Different standards are dependent of the OS and the performance of the mobile phone
- Low fixed costs for application development
- Long development process for a functioning application
- Short life-cycle for the applications

The applications in the mobile phones both hold a value in itself and enable potential profit for other actors. There is a significant difference between content and applications in the mobile phone. The different between content and application is that applications often are used to get access to content such as a web browser enabling access to web pages with specific content. Applications are often pre-installed in the phone while the content is added by the user.

Content providers

Content is a value added service to the standard service offerings within the mobile telecom industry. It also motivates the subscribers to use their mobile phones more and allows the operators to increase their ARPU. The value-added services are provided either by a third-party service provider, also known as a content provider, or in-house by the mobile network operators themselves. There is also a third option, that the mobile phone brands offers services to the post-sales market and thereby gain additional revenue. This last opportunity is one of the large trends 2009. Apple has had a great success with their App Store and the competitors are now taking the opportunity to boost their own revenue streams by starting their own application stores. The mobile phone brands are trying this to get shares of the profit back and are not eager on sharing it with the operators. From another point of view, the content provider does not want to give exclusive rights to a specific operator. Instead, they prefer to have as many distribution channels as possible for distributing their content. (Ekelund, 2009) Example of content is media, such as music and movies, different applications and software, web browsing and online social networks as well as TV-broadcasts.

Middleware

Additional software is required in order to be able to use all of the services and products available from the suppliers. The link between the software and the OS is then referred to as middleware. The use of middleware is necessary if a software application needs to run on several OS without being modified. The mobile telecom industry is not moving towards having one single dominant OS, as that is the case within the PC industry with Microsoft Windows. On the contrary, mobile OS are multiplying. (Ewing, 2009)

2009, Sun Microsystems unveiled a new version of Java for mobile devices called JavaFX. Sun says the programming software allows developers to write applications that work on any mobile operating system. However, the middleware solution is not suitable for all types of applications. Games for instance that require a lot of processing power is not a perfect match with this middleware. On the other hand, operators want to be able to offer the same kind of programs for every customer with different mobile phones. For this segment the middleware is important when the operator want to offer customized content to the consumers. (Ewing, 2009) Another actor that sees the opportunity in middleware is the company behind Flash, Adobe. Symbian, Windows Mobile and Android are all getting customized mobile versions of Flash. (Larsson, 2009)

Trends

User Generated Content, UGC, is a relatively new type of content in the mobile telecom industry. Being able to interact on social networks such as Facebook, twitter and manage a blog is a valuable capability for the consumers. The exploding use of these activities on the Internet requires the users to interact more often, even when they do not have access to a computer. Using the mobile phone is a fine way to stay connected through these types of services. Better communication abilities leads to greater socialization, the idea of social networking. (Maru, 2009)

There are three sub types of Social and User Generated Content, mobile dating and chat rooms, personal content distribution, and social networking. There are sites that are offering two or all of these services, for instance Facebook, while others are focusing on one type, such as match.com or YouTube. (Juniper, 2008)

Social interaction through the Internet and the mobile phone is facilitating access to other forms of mobile content. Social network users are likely to consume two-three times more content than the average user. Among these products and services they consume are: music, movies and games. However they are not consuming this amount yet, since the advertising and offerings are not sophisticated enough at this moment. (ABI Research, 2008)

While many of these services are up and running there are still issues with this trend. There are still difficulties in the user interface regarding the navigation, creating, uploading, and discovering of new content. The user interface is somehow technologically limited in the mobile phone. The bandwidth, the size of the display and the battery life are all limiting factors. Another weakness is the pricing issue. It is often unclear for the consumer which data in the mobile phone costs money and which are for free.. There are also more "soft" issues such as personal integrity and the possibility of misuse. (Juniper, 2008)

Among the service and content providers there has been a change in the attitude towards business models during the last two years. Present business models have been modified to offer a free entry and extracting revenues by charging for premium add-ons. Moving away from subscription-based revenues is making advertising more important in order to retain a stable revenue stream. Obviously this varies with the type of service. For a social network with millions of users the advertising revenues are higher than for a dating service. This is because for the dating sites there is a significant value to be extracted from the users who wish to interact with other users, thus it makes solid commercial sense to charge a premium for this service. (Juniper, 2008)

Other types of content require different cooperations and business models, since the services are not as easy to charge for. The leader in this new segment could be large, experienced Internet companies, such as Google, Yahoo, or Amazon, or consumer electronics companies, such as Sony, Apple, or Panasonic, or media firms, such as Fox interactive or Universal. (Pradayrol & Cyrot, 2008)

The mobile phone has some advantages in relation to the computer. For instance, the mobile phone has the ability to determine each user's location and if the user is moving, which can become useful if the services become aware of its context and content. This means that if the network becomes more intelligent the operators can decide what offerings the user is interested in, based on location and activity. (Mäkitalo, 2009)

Another significant trend is the application stores. Since the launch of Apples App Store there has been more than one billion downloads in only nine months. (Apple, 2009) This has made the competitors to once again try to imitate the rookie in the industry, Apple. During the Mobile World Congress in Barcelona 2009, Samsung, Nokia and Sony Ericsson announced similar projects such as the App Store. This is a distinct trend in the industry and an effort from the mobile phone brands to earn profit from their users even after the mobile phone has been sold. An opportunity solely the operators had before. The main issue with this type of service is how the revenues should be divided between the developer and the mobile phone brand. Apple lets the developer keep 70 percent of the revenue and takes the remaining 30 percent as a transaction fee. (Zirn, 2009)

Issues with this trend are the many form factors the developer must take into consideration. Variations in display resolution, touch screens and number of keyboard pads are only some of the aspects that must be customized for each mobile phone (Nelson J. , 2009). The competition in the OS segments makes this even more difficult to take all the required variables into consideration. (Ewing, 2009)

The first actor to copy the concept from Apple was another new actor within the industry, Google. Their application store, Android Market, opened in October 2008. Until February 2009 there were only free applications available, which mean that there were basically only simple applications distributed. From February 2009, application developers from UK and USA got the opportunity to charge for their products. Transaction fees are the same as Apple, 70/30 (Google, 2008). The main difference from App Store is that an application does not have to get approved by Google before it is launched. (Chu, 2009)

An initiative from Mobile Entertainment Forum, MEF, is the *Smart Pipe Enabler Initiative* which purpose is to accelerate the growth of the next generation mobile entertainment services. The initiative was founded by three MEF members, the BBC, mBlox and Vodafone Group, and was officially initiated at the Mobile World Congress in Barcelona 2009. The services will enable the delivery of a faster, simpler, and more enjoyable user experience for the consumers and are to be provided by operators to third-party providers of content and services. (MEF, 2009)

Andrew Bud, Global Chairman, Mobile Entertainment Forum, highlights the importance of the initiative: "The mobile industry is at the dawn of a new era with many new services becoming available. As mobile content becomes richer and more sophisticated it is important for the industry to create common standards to enable the next phase of growth". (MEF, 2009)

Due to the current financial crisis the large private equity firms decrease their investments in small high-risk projects. This results in stagnation in innovation. Many smaller VC-supported actors struggle to get additional funding. Innovation may shift to the major Internet companies, such as Google, Apple and Microsoft, which all have experience in acquiring and supporting innovative, leading-edge firms. (Pradayrol & Cyrot, 2008)

When the iPhone was launched the term user interface became highly prioritized. The user of the iPhone generated more data traffic for the operators than the regular phone user and this was mostly due to the improved user interface. Suddenly it was easier for the consumers to use the application and services that was embedded in the mobile phone. (Ademar, 2009)

Almost two years after the launch of the first-generation iPhone, competitors are still trying to imitate the hardware-software integration and the user interface successfully implemented in the iPhone. The only actors that will have a chance at challenging Apples concept will either be a leading mobile phone brand, such as Nokia, Samsung, LG or HTC, together with a global operator, or a mobile phone brands with strong service integration, such as Nokia with Ovi or RIM with BlackBerry. (inCode, 2009)

According to several sources the operators have been in the best position over several years (Ekelund, 2009) (Rydbeck, 2009) (Öijer, 2009). Now the mobile phone brands are kicking back with different application and content stores to take a share of the revenue streams from the post-sales market which the operators are currently receiving/acquiring.. (Lindoff, 2009)

The average spending on communication has steadily increased over the last decades since broadband, digital-TV and mobile phone subscriptions have become standard for the average consumer. This makes the total ARPU for a consumer rather high and attractive for several actors to get a piece from. The strategies for how the actors try to increase their ARPU are different between the segments. A significant trend among the operators is the bundled service offerings such as triple- or quad-play[16]. (Lindoff, 2009)

4.4.3 ODM/EMS

The ODM/EMS companies act as a manufacturer for hardware which is eventually branded by another firm. These companies allow the brand firm, in this case the Mobile Phone Brands, to produce without having to engage in the organization managing of a factory. ODM/EMS companies often acts as manufacturers to several nearby industries such as home electronics and computers.

Key Facts – ODM/EMS

- Few potential buyers
- Few competitors, often large companies
- Low operating profit margins
- High fixed costs
- Very dependent on a stable consumer demand
- The economic downturn decrease the demand for key products - mobile phones (and computers)
- Operators are trying to circumvent the mobile phone brands and manufacture branded mobile phones, for example Vodafone, 3, Orange use ODM/EMS companies for production
- Often large individual orders from the buyers

There are a few actors dominating the ODM/EMS segment. The two major actors are Foxconn and Flextronics, both focusing on a low product mix, large volumes, and economies of scale. Foxconn has shown high growth the recent years outdistance the second largest actor, Flextronics. Figure 19 shows the market share for the whole consumer device segment. Foxconn International Holdings is the mobile phone

[16] This refers to the offering of bundled services. Often fixed-line telephony and broadband are combined with the wireless equivalent from the same operator.

subsidiary of Foxconn. As stated below the mobile phone business segment is accountable for a large part of the company's revenues.

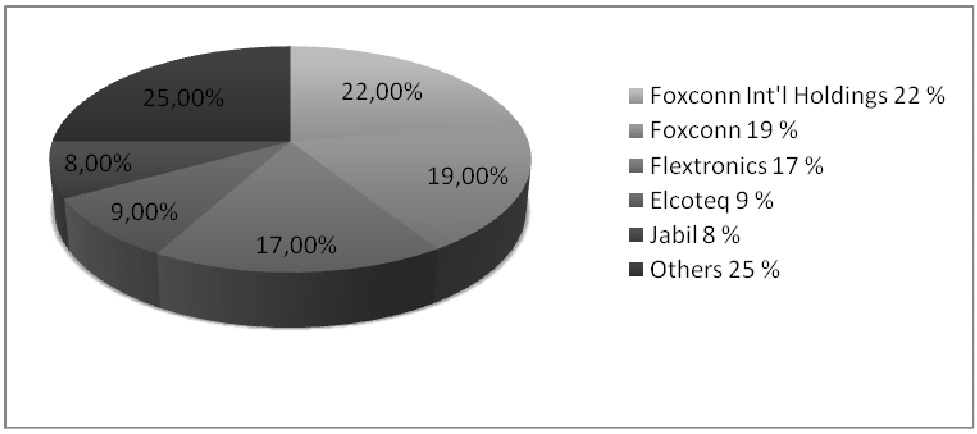


Figure 19: Market share among the ODM/EMS companies for the segment consumer devices 2007[17]

ODM/EMS companies are traditionally located in Asia due to the lower manufacturing costs compared to western parts of the world. These companies tend to leverage rapidly changing technology. The ODM/EMS' prefers to sell the same or a very similar product to as many customers as possible to maximize its return on investment and minimize short-term changes in demand. ODM/EMS' tend to be engineering-centric companies developing commodity products from standard building blocks or platform designs. Their offers range from subassemblies to complete systems. (Coker, 2004)

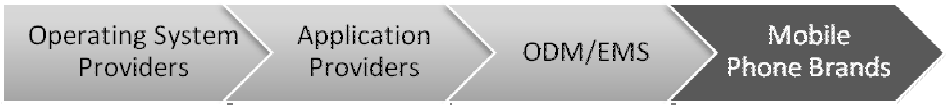
While the global market for mobile phones and personal communication devices shows positive profit margins the ODM/EMS companies continue to struggle with negative figures due to the competitive market forces. These market forces include rapidly changing market dynamics such as increasing market demand, intense cost competition, development cost avoidance, rapidly shrinking product life cycles, inventory ownership postponement and, most importantly, product commoditization. (Coker, 2004)

Single large customer orders are important for the companies. Foxconn have long benefited from relationship with Apple, and Flextronics' buyer Sony Ericsson is accountable for more than ten percent of the company's total revenues (Flextronics, 2008, p. 34).

[17] (Venture Outsource, 2009)

This segment is highly dependent on the demand from the computer and the telecom industry, such as mobile phones. This demand can vary a lot from year to year. Companies can be specialized in producing standardized parts at low cost or by producing highly specialized components at a higher price. The smaller companies can compete successfully by producing specialized parts or by developing applications. Nevertheless, mobile phones are a mass product and the scale advantages are important. (Hoover's Inc., 2009)

4.4.4 Mobile Phone Brands



Mobile phone brands act as an original equipment manufacturer. This means they develop and sell mobile phones mainly to operators and retailers. The actual manufacturing of the mobile phone is often performed by ODM/EMS companies such as Foxconn.

Key Facts – Mobile Phone Brands

- Relatively few competitors
- Many buyers (Operators)
- Competitors are either specialized (RIM) or full range (Nokia)
- There has been several acquisitions of application providers recently – vertical integration
- New service offerings have arisen from this segment (Ovi, PlayNow)
- Two major actors are coping with declining sales – Sony Ericsson and Motorola
- The Smartphone segment has shown strong growth
- Traditional companies are facing competition from new actors such as Apple and RIM
- Buyer (Operators) account is attractive

Nokia is strong dominating actor in this segment, and holds almost 39 percent of the market. Korean actors LG and Samsung launched new touch screen devices successfully and gained a larger market share during 2008. Figures for the market share of the largest mobile phone brands are shown in Figure 20 below. In 2008, there were totally 1.2 billions mobile phones sold. (Global Insight, 2009)

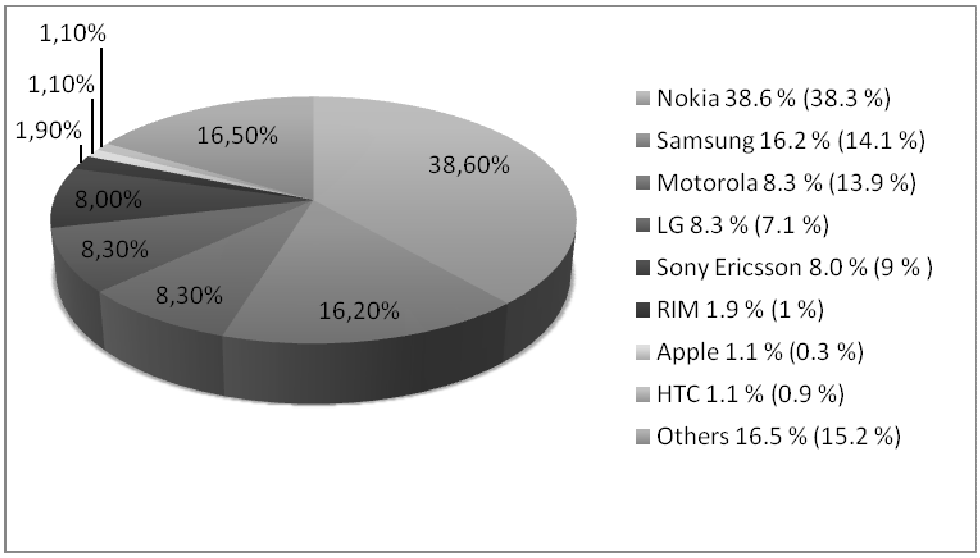


Figure 20: Mobile phone brands worldwide market share for 2008 (2007) in sold units[18]

Significant for 2008 is that the sales volume showed a smaller increase than usual for the last quarter. All major brands continued to increase their volumes, except for Motorola and Sony Ericsson. RIM and Apple shows the highest growth rate (Global Insight, 2009). The sales volumes for 2008 are shown in Figure 21 below.

Both vertical and horizontal integrations are seen in and between the different segments. For example, Nokia acquired NavTeq for 8.1 billion dollars and thereby integrated vertically (Nokia Corporation, 2007). Another example of vertical integration is the one HTC has implemented. This company was acting as an ODM/EMS manufacturing mobile phones for Microsoft running Windows Mobile. They used their knowledge of the hardware-software integration to manufacture HTC-branded mobile phone a few years ago. Now they are a significant actor, especially in the Smartphone segment. (Nelson J. , 2009)

[18] (Global Insight, 2009)

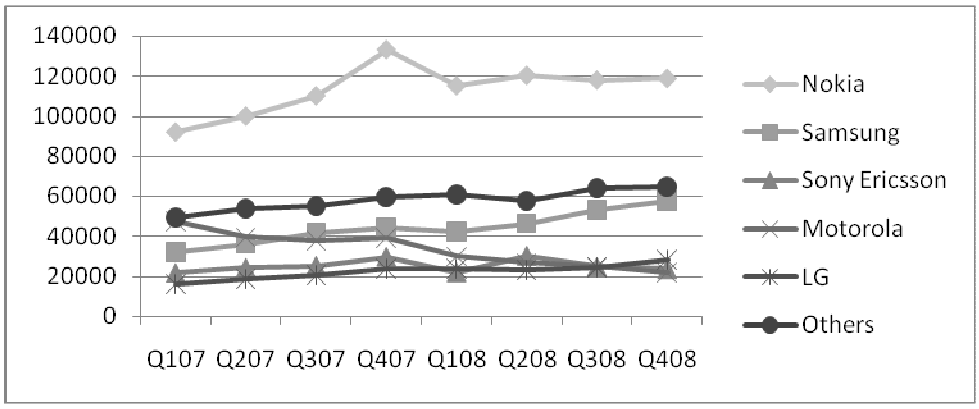


Figure 21: Sales volume for the major brands 2007-2008[19]

Sony Ericsson has the opportunity to use Sony's well-known brands such as Walkman, Cybershot, PlayStation and Bravia. But so far have only Walkman (music) and Cybershot (camera) been implemented /used in the mobile phones. (Gripenberg, 2009)

Significant for the end of 2008 is that the market leaders slowly move away from the hard price competition and are more focusing on mobile phones generating a higher profit margin. The small Smartphone-focused players keep taking market shares from their larger competitors, for example Apple. The mobile phone brands growth in sold mobile phones are shown in Table 2 below. (Global Insight, 2009)

Brand	Sold units 2007	Sold units 2008	Growth
Nokia	437,10	468,40	7,16%
Samsung	161,10	196,80	22,16%
Motorola	159,00	99,90	-37,17%
LG	80,50	100,80	25,22%
Sony Ericsson	103,40	96,60	-6,58%
Apple	3,70	13,68	269,73%
RIM	11,44	22,60	97,55%
HTC	9,92	12,98	30,87%
Others	173,84	194,70	12,00%
Total	1140,00	1180,00	3,39%

Table 2: Sales in million units for the Mobile Phone Brands[20]

The growth shown by RIM and Apple is a result of the success with their Smartphones. This is a segment that has grown a lot during the recent years and will be discussed further below, in the Trends section.

[19] (Gartner, 2009)
[20] (Global Insight, 2009)

Furthermore, the change in the operating profit margin for the eight largest actors during 2008 is shown in Figure 22 below. Notable is that all companies show a decrease of the operating profit margin except Apple and HTC. Apple's profit margin includes the sales for the entire company and not only the sales of mobile phones. For the other actors no more than the business unit mobile phones or devices have been used.

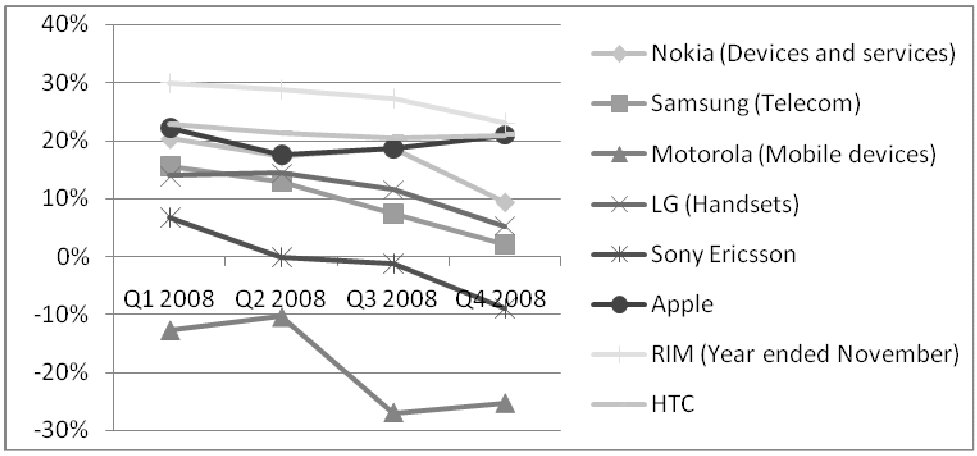


Figure 22: Change in profit margin during 2008[21]

Trends

Significant in Figure 22 above is that the three companies with the highest profit margin are all focusing their business on one single segment – Smartphones. These devices are more advanced than regular mobile phones and the price and profit margin is therefore higher. Positive for the operators is that these devices also enable more data traffic. This, since the users have the opportunity to browse the Internet, send and receive e-mails and use applications that requires data traffic to a greater extent than simpler mobile phones.

Mats Lindoff, former CTO at Sony Ericsson, divide all mobile phones into two categories: low-end and high-end mobile phones. The Smartphones is categorized as a high-end mobile phone, which is accountable for approximately 30 percent of the total revenues generated from mobile phones; low-end mobile phones are accountable for 70 percent. There is no actor today offering a mobile phone in the gap between these two areas, shown in Figure 23. (Lindoff, 2009)

[21] Based on financial data gathered from each company's annual reports

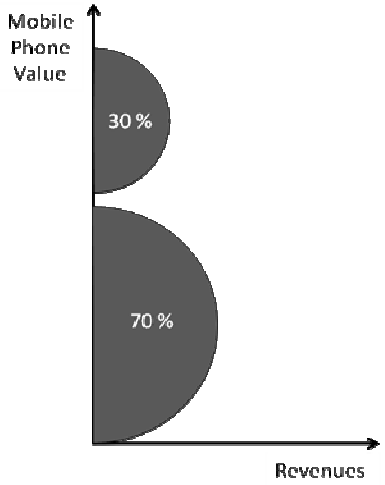


Figure 23: Revenues from segments within the mobile phones[22]

The first version of the *Dataphone* was discussed already 20 years ago, in the late 1980s. This vision was impossible to realize since both technologies in the device and in the networks was not sufficient. About ten years later started the next wave of speculations regarding a more intelligent phone, the Smartphone. The technology in the device was much more advanced and was maybe enough to utilize simple Smartphone-functions. However the bandwidth in the networks was still insufficient. Today, both the technology and the infrastructure have reached a sufficient level for the Smartphone-requirements. (Rydbeck, 2009)

The Smartphone segment showed an increase in sales from 2007 to 2008 of 13.9 percent (Gartner, 2009). The growth was strong during the first three quarters, but then it slowed down during the last quarter. Nokia's trend in the Smartphone segment is negative, the same for the smaller players. The specialized actors, RIM, Apple and HTC, drive the total volume increase for the segment. Samsung's mobile phone with touch screens are huge sellers.. Samsung reached the top five mobile phone brands in volume for the first time during the last quarter among Smartphones, selling 1.6 million devices. The market share development is shown in Figure 24 below. Apples large sales volumes dropped during the last quarter of 2008, but they still managed to maintain their third position due to the initial high sales of 2008. Recently, actors from closely linked markets such as the PC industry announced that they will investigate the opportunity to enter the lucrative Smartphone segment. Dell announced that they will start developing Smartphones both running Windows Mobile and Android (Zachariasson, 2009). Garmin and Asus have also announced

[22] (Lindoff, 2009)

that they will start manufacturing mobile phones under the brand name Garmin-Asus. The devices will also run both Windows Mobile and Android and is supposed to compete in the Smartphone segment (Jenselius, 2009).

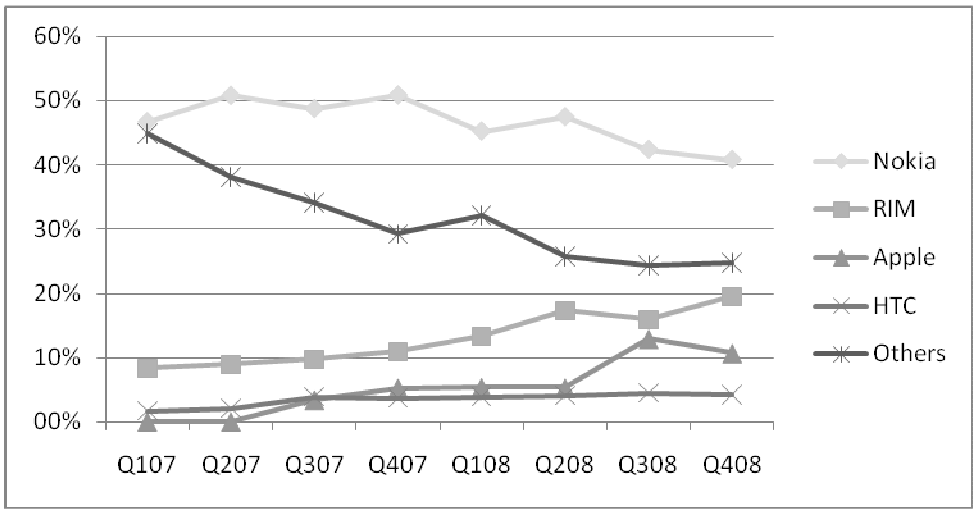


Figure 24: Development of the Smartphone market share during 2007-2008[23]

This segment is of high importance not only to the mobile phone brands but also to the operators since they enable easier access to applications requiring more data traffic. The operating system is also becoming a more important part of the mobile phone since the Applications must be user-friendly which also applies to the user interface. (Ademar, 2009). In general, consumers use only 20 percent of the full capacity of the mobile phone (Rydbeck, 2009).

Best mobile handset 2009

INQ1 became the mobile of the year 2009 due to its ability to enable socializing and its low price. This device enables data services to the mass markets and a user interface built for integration of services such as Facebook and Skype. The fact that these applications are integrated in the phone, rather than merely running in a browser, has taken the mobile phone one step further, to an integrated inbox for messages from Facebook, Skype, e-mails and SMS. The contact book is also integrated and includes status from the chosen socialization applications with the status from visible instants. (Wray, 2008)

[23] (Gartner, 2009)

4.5 Infrastructure

The wireless infrastructure from the mobile telecom industry is a network whose interconnections between nodes are implemented without the use of wires. In recent decades with the development of Smartphones, the wireless infrastructure has been used to carry computer data in addition to voice conversations. (Goldsmith, 2005, pp. 8-10)

The value chain for the infrastructure can be described as in Figure 25 below. These segments will be investigated further, later on in the report.

Figure 25: The value chain for the infrastructure

4.5.1 Technology shifts

It is an ongoing technology shift, from 2G to 3G in the emerging countries of the world and from 3G to 4G in other developed regions. Two competing technologies regarding the 4G have emerged. The verdict between these opponents will mainly be an effect of the decision from the operators. Two distinct groups have emerged during the Mobile World Congress 2009. Verizon, DoCoMo and TeliaSonera will start roll out the LTE network for a commercial launch in 2010. (Tanner J. C., 2009) The rest lead by large, European operators is pushing the LTE trials forward. These actors plan to focus their time and money on enhancing their 3G networks. French Operator Orange expects the first LTE services to be available no sooner than 2011 and the subscriber migration taking place in 2012. (Grant, 2009)

Most of the actors within the mobile telecom industry have discarded WiMAX in favor of LTE. Ericsson was first when they two years ago decided to give up the technology in benefit for LTE. Alcatel-Lucent and Nortel has followed Ericsson. Even Huawei has stated that the technology has not gained enough momentum in the recent years. Further, in October 2008, Intel announced cooperation regarding their modules for mobile broadband will be based on WCDMA, a standard that supports LTE. (Thulin, 2009)

Others have stated that WiMAX died the same minute large operators such as Verizon and Telia Sonera decided to invest in LTE. Mature communication standards such as 3G, has been different in different parts of the world. LTE is the first

communication standard that is global and is the same in North America, Europe and Asia. (Lindoff, 2009)

4.5.2 Wireless Infrastructure Software Providers

These companies provides software and services to mobile and fixed line operators, and infrastructure vendors. The market share for the actors in this segment is not presented due to fact that this is a much diversified area, considering the number of companies and the different types of available software.

Key Facts – Wireless Infrastructure Software Providers

- Diversified products depending on user type – enterprise/consumer
- Niche actors
- This business segment is often embedded in the infrastructure vendors

One of the products or services the wireless infrastructure software providers, WISPs, offer is software designed for converging different networks which enables consumers to use the networks seamlessly. Another service is monitoring or measuring of the network. This service provides the infrastructure vendors and operators with feedback regarding the usage of the networks and also provides troubleshooting. (NetHawk Oyj, 2009) Companies often specializes in one category of products, for example in optimizing the capacity of a network. (Bednarz, 2008)

There are several different types of enablers that constitute a classic mobile infrastructure. This categorization gives a good sense of the mobile application infrastructure market today and where it is heading. (Ebs, 2009)

Mobile application infrastructure enablers can be segmented into four categories: Application gateway/platform providers, mobile application service providers, mobile internet service providers, and mobile application enablers. Application gateway/platform providers delivers user management services, such as secure access, directories, and administration; portal services such as knowledge management, content aggregation, and personalization; communication services such as e-mail, messaging, and scheduling; and e-commerce services such as catalogs, transactions, and billing. (Ebs, 2009)

Mobile Application Service Providers supply data center and infrastructure hosting services. They rent space, equipment, and bandwidth to companies that do not want to

create the plumbing needed to host their own mobile sites. Hosting companies, called managed services providers (MSPs), take this a step further and maintain the infrastructure for large corporations. Mobile Internet Service Providers supply connectivity to link the devices to the Internet. Mobile Application Enablers provides data and services such as transaction security, data synchronization, and micro-database providers. This group also includes service, systems, and application integration providers. (Ebs, 2009)

Trends

Some actors in this segment are anticipating a shift away from a traditionally segmented, media channel-based approach to a much more holistic, user-based approach that includes multiple channels, among these are the mobile phone, the computer and TV media. (Boden, 2009)

4.5.3 ODM/ EMS

As described above in the mobile phone value chain, the ODM/EMS companies act as a manufacturer for hardware equipment which is eventually branded by another firm. These companies allow the brand firm, in this case the infrastructure vendors, to produce without having to engage in the organization or running of a factory. ODM/EMS companies often acts as manufacturers to several nearby industries such as mobile phones and computers.

Key Facts – ODM/EMS

- Manufacturing infrastructure equipment is a small part for the ODM/EMS business
- One dominating actor, Flextronics
- Few buyers (Infrastructure Vendors) of the products

Manufacturing of infrastructure equipment is a small part of the ODM/EMS business; only six percent of the market value comes from infrastructure equipment, compared to the computer part which is accountable for 34 percent. A few actors with a combined market share of 80 percent dominate this part of the segment. These actors are shown in Figure 26 below. (Venture Outsource, 2009)

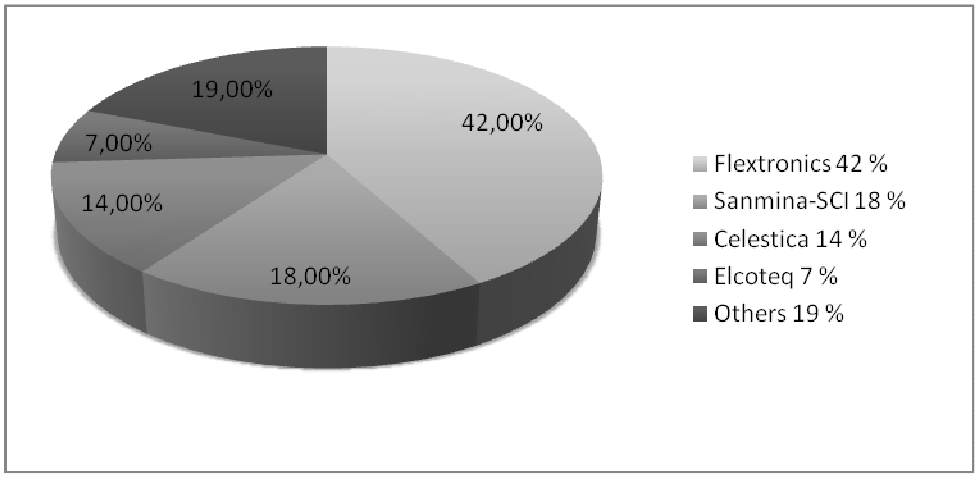


Figure 26: Market share among the ODM/EMS companies for the segment Infrastructure[24]

Until 2007, Flextronics largest business segment was the mobile phones accounting for about 30 percent of their total sales. However this changed with the acquisition of Solectron 2007, which had a market share of 16 percent of the infrastructure ODM/EMS market. This made infrastructure the largest segment for Flextronics, with major customers such as Ericsson. The infrastructure segment stands for approximately 32 percent of the total sales of Flextronics (Flextronics, 2009). Buyers, infrastructure vendors, which are demanding the volume that enables economies of scale in the manufacturing process is relatively few.

4.5.4 Infrastructure Vendors

The infrastructure vendors are building, installing and serving the infrastructure needed for fixed and mobile communications.

Key Facts – Infrastructure Vendors

- Few large actors
- Growing Asian vendors – Huawei and ZTE
- Few large suppliers
- Many buyers, operators, however in different regional markets
- Buyers are consolidating
- Nortel and Motorola struggling for survival

[24] (Venture Outsource, 2009)

- Technology shift towards 4G is ongoing, enabling new entrants from IT-suppliers such as Cisco
- Operators' level of investments is important for the infrastructure vendors
- The pull from the market for higher bandwidth equals demand for new infrastructure

This segment of the value chain is dominated by the so called *Big Four*: Ericsson, Nokia Siemens, Alcatel-Lucent and Huawei, these four actors account for approximately 81 percent of the total market value. Individual market share among these is shown in Figure 27.

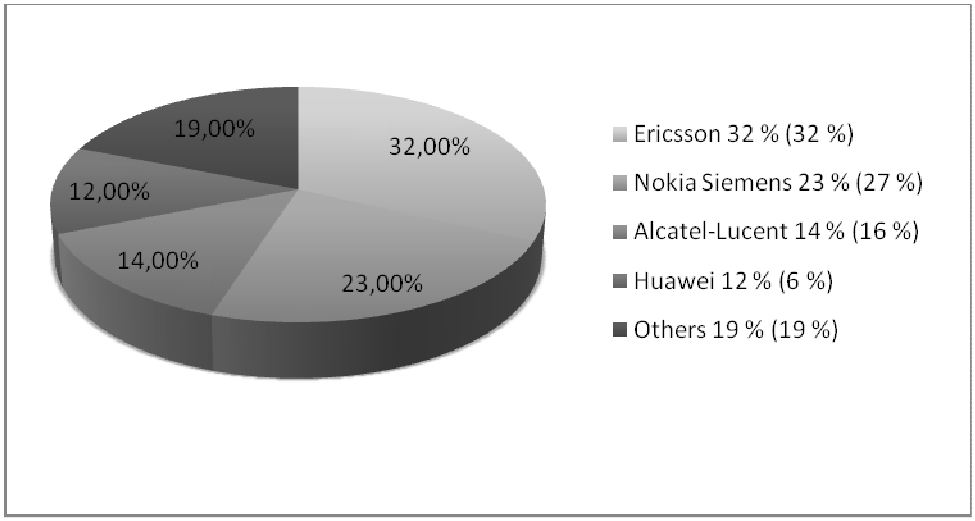


Figure 27: Market share among infrastructure vendors 2008 (2007)[25]

Traditional infrastructure vendors encounter more competition in selling network solutions as the operators' demand changes and new competitors in form of heavyweight IT suppliers and Asian vendors enters the market. More recent figures from 2009 shows that Huawei has gained an even larger market share, approximately twelve percent at the expense of large players Nokia Siemens, Alcatel-Lucent, and the smaller players Nortel and Motorola. (IE Market research, 2008)

The consolidation between the operators will lead to increased pressure from the buyers. The result of the consolidation leads to fewer and larger actors per region. Some large operators also aim for a global footprint. For example, Telefonica acts in Europe as well as in Latin America. This consolidation method makes the operators larger and gives them a better negotiation position against their suppliers. As a result

[25] (Reuters, 2009)

from the increased pressure the market value of the top five actors Ericsson, Nokia Siemens, Alcatel-Lucent, Huawei, and Motorola dropped almost 20 percent between March 2007 and early 2008 (Von den Hoff, Taga, & Jakopin, 2008).

The shift towards IP communications, over the wireless networks enables IT suppliers, such as Cisco, to enter the infrastructure equipment market. This could change the industry configuration within this segment and provide growth opportunities for the IT suppliers. The main reason for the IP technology is the high-bandwidth technology such as the ongoing implementation of 3G and the upcoming implementation of LTE. (Von den Hoff, Taga, & Jakopin, 2008)

In a study from late 2008, conducted by ABI Research the *Big Four* is dominating the market in terms of both market share and performance. The performance is a measure of the rate of the innovation and implementation. This study is taking parameters such as innovation rate and number of employees assigned to R&D into considerations. (ABI Research, 2008). The rank of this study is the same for the top vendors as the market share. Arthur D. Little that calls these four companies the leaders of the segments and makes the same conclusion in their report from the same year (Von den Hoff, Taga, & Jakopin, 2008).

Trends

Analysts and companies forecast that the market will shrink during 2009. This is mainly because the investments from the operators will slow down due to the economic uncertainty. Competition will also get even stronger from Asian vendors. (Reuters, 2009) Demand from the consumers will force the operators to require higher bandwidth and new infrastructure. (Sandström, 2009)

Large deals from operators building LTE in the western parts of the world or older communication standards in the developing countries have high importance for the actors. For instance, the total investments in infrastructure equipment by Chinese operator China Mobile will be worth approximately 40 billion dollars over the next three years. (Nyhetsbyrån SIX, 2009) In Europe joint ventures between operators is one way of sharing the large cost of investing in ubiquitous LTE coverage. The competing operators, Telenor and Tele2, announced in April 2009 that they will together build LTE in Sweden under the company name Net4Mobility. (Tele2, 2009)

These kind of cooperations have been called for before by international actors. At the Mobile World Congress in Barcelona 2009, the CEOs of both Vodafone and Telefonica made it clear that operators, mobile phone brands and media companies has to cooperate to foster more intelligent and focused innovations. (Tanner J. C., 2009)

The future development is likely to shake out some of the infrastructure vendors. When the operators investments slows down will actors such as Motorola and Alcatel-Lucent be face a tougher situation. (Wingren, 2009) When Asian vendors such as Huawei gains momentum this will be even more obvious. (Sandström, 2009)

4.6 Operators

The operators are basically companies that provide mobile services for their customers such as voice and data communication through the mobile phone.

Key facts – Operators

- High operating profit margin
- Few competitors on regional markets
- High bargaining power against mobile phone brands
- High investments in for example infrastructure and LTE
- Focus on ARPU
- Little identification from the end user towards the operators

Until today the operators have been consolidating intensively. Acquisitions to become the leading operator on the local market are common. This recently happened in USA when Verizon acquired Alltel to become the largest operator in the country (Verizon, 2009). The situation is similar around the world with a few dominating operators in each local market, creating almost oligopoly situations. The global market shares are shown in Figure 28 below. There are many incentives for this behavior, such as higher bargaining power against the suppliers, and to grow past the competitors. (Pradayrol & Cyrot, 2008)

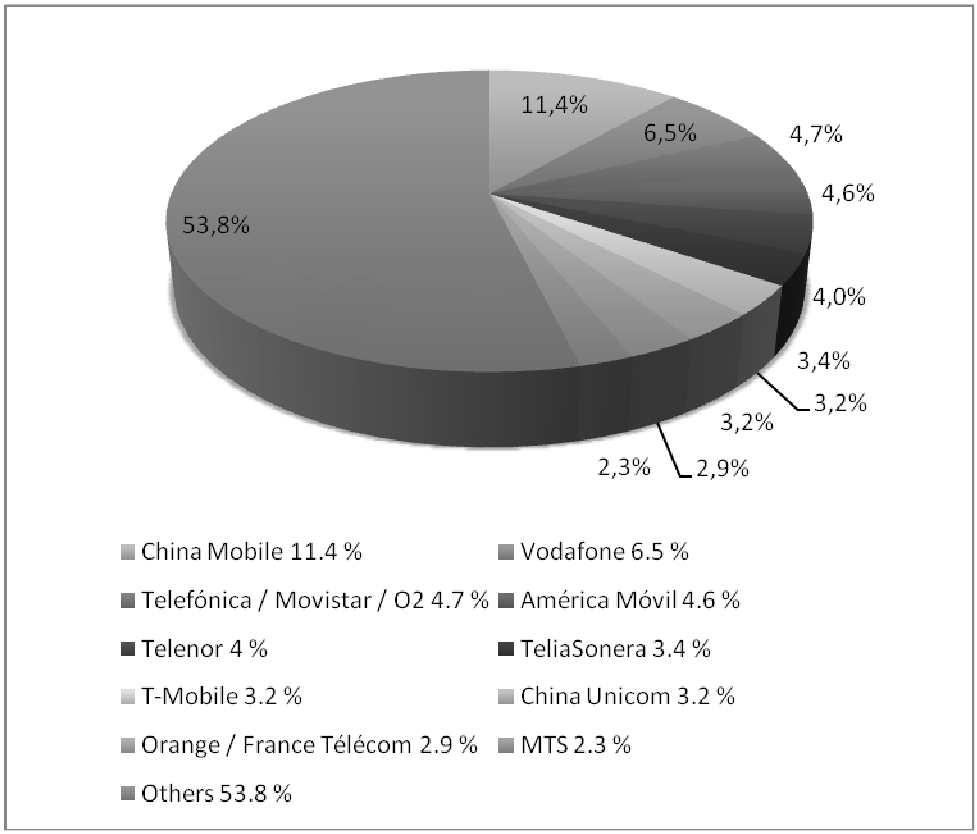


Figure 28: Global market shares of the mobile phone operators in subscribers[26]

The domestic consolidation is mainly driven by the fixed line services where the small broadband suppliers are under pressure when the larger operators offer bundled services such as triple-play. (Pradayrol & Cyrot, 2008) Small operators have been bought by the larger operators, for example the Telenor's acquisition of Bredbandsbolaget in Sweden (Karlberg, 2005). Telenor has now the opportunity to offer bundled services such as, triple play, due to their wide range of services. They also own the digital TV-distributor Canal Digital. (Pradayrol & Cyrot, 2008)

In the global perspective size is also a success factor. Building bargaining power against content providers, mobile phone brands and infrastructure vendors is important to handle the competition. Content providers will sign deals with the largest operators, therefore small operators will have the opportunity later to provide the subscribers with the same products and services (Pradayrol & Cyrot, 2008). The

[26] References are listed in Table 3: The ten largest operators worldwide listed, based on million of subscribers.

operators also play an important role when distributing the mobile phones. Large operators often have significant shares of the total units of sales for the mobile phone brands. (Nelson J. , 2009)

Consumers seldom identify themselves with the operator. This is a problem for the operators, suffering from high churn rates[27] and expensive customer acquisition costs. Consumers often focus on minimizing their subscription costs. In the western parts of the world ubiquity is equivalent between the competing operators and the main deciding factor for the consumer is the price of the subscriptions. In some cases the operators are competing with the price of mobile phone. This competition is mainly driven by the fact that the consumers are being offered a mobile phone at a reduced price and the subsidization is embedded in the subscription fee. Negative for the operators is the ease of change for the subscribers to competitors, which facilitates the rate of customer churn for the operators. (Rydbeck, 2009)

Global market

The global market penetration rate is varying between the different regions of the world. In general, the western parts of the worlds have higher penetration rate and therefore there are more sophisticated services available and used by the consumers in these regions. The market penetration is based on the amount of subscribers and the total population in the certain region. As shown in Figure 29, the largest actors in every region are shown.

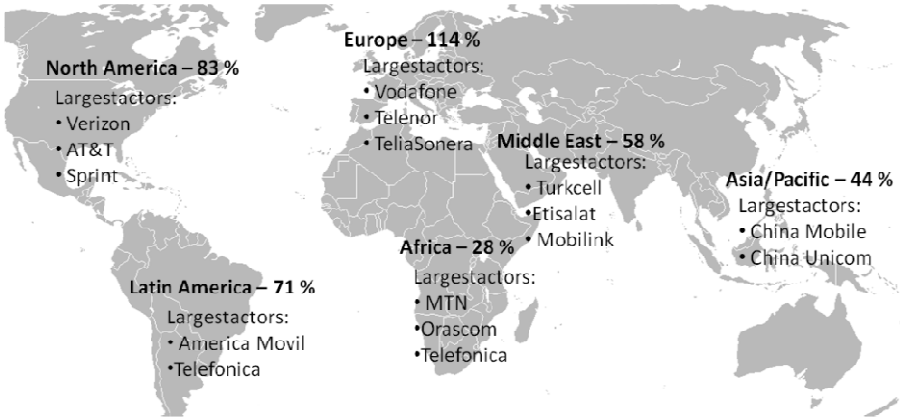


Figure 29: Market penetration by region.[28]

[27] The number of contractual customers or subscribers who leave a supplier during a given time period.

[28] Own illustration based on figures from (Portio Research, 2008)

Different regions means different characteristics

In the developed countries around the world the mobile phone penetration rate is often above 100 percent when it is much lower in the developing countries, as shown in Figure 29. Latin America, Africa, The Middle East and parts of Asia have the lowest figures. In these markets the demand for advanced services is not as high as in Europe and North America. Since the highest level of technology is found in Europe, North America and parts of Asia, the discussion below will be focused on these regions.

Largest actors worldwide

In Table 3 below the ten largest operators is presented based on the total number of subscribers in 2008. Notable is that no North American actors are represented. The two major North American operators are placed just outside the top ten, with approximately 80 million subscribers.

Rank	Company	Main Markets	Number of Subscribers (millions)	
1	China Mobile (China)	China	457,3	(China Mobile, 2008)
2	Vodafone (United Kingdom)	Europe	260,5	(Vodafone, 2008)
3	Telefónica / Movistar / O_2 (Spain)	South America	188,9	(Telefónica, 2008)
4	América Móvil (Mexico)	South America	182,7	(América Móvil, 2009)
5	Telenor (Norway)	Europe, Asia	159	(Telenor, 2008)
6	TeliaSonera (Sweden)	Europe, Asia	134,8	(TeliaSonera, 2008)
7	T-Mobile (Germany)	Europe	128,3	(T-Mobile, 2009)
8	China Unicom (China)	China	127,6	(China Unicom, 2008)
9	Orange / France Télécom (France)	Europe, Africa	117,6	(Orange, 2008)
10	MTS (Russia)	Russia, Central Asia	91,7	(MTS, 2008)

Table 3: The ten largest operators worldwide listed, based on million of subscribers.

Trends

There is an ongoing transition from fixed line services to mobile alternatives. The increased sales of laptops, which can be connected to the Internet via the mobile wireless network, wider coverage of high-speed mobile networks, lower prices and more sophisticated mobile phones for Internet use, all support this transition (Richards, 2008).

The trend is that operators are becoming larger and present in more regions. The customer base has a large impact to the negotiation of the partnerships regarding the content distribution. This will make it hard for the smaller players to offer the same

content and services. The opportunity for the smaller players lies instead in diversification and the offering of unique services. The negotiation situation with large content companies will also be disadvantageous for smaller players due to the difference in size. (Pradayrol & Cyrot, 2008) Oligopoly situation is the reality in most regional markets. Without any extraordinary interventions this situation is likely to be strengthened. (Wingren, 2009)

Currently operators receive approximately 70 percent of the revenues from voice services. This is a category that is being pressured by a continual decrease in ARPU. There is a natural shift in focus towards the more attractive revenues from data and services for the operators, but this overlooks a critical element of user preferences. Voice represents the most natural, efficient and convenient way of acquiring information that suits all scenarios and surroundings. Operators are all trying implement content and media services, on top of their traditional pipe offerings to increase ARPU. New capabilities from content and media require new skills and levels of user interaction which will challenge the operators. The service experience, development methodology and business models must change dramatically to meet these requirements from the new types of businesses, such as the community-based. Building new complex offerings, such as location-based services, requires an eco-system with developers, customers and system providers. It is difficult to reach a sufficient experience level that creates opportunities for the customer to experience high value. (telecomasia.net, 2009)

Operators are looking at whatever growth they can find to sustain their business, especially in these troubled economic times. One of the potentially new sources of revenue is international voice calls, one of the segments oldest businesses and it is still growing (Tanner J. C., Untangling voice termination, 2009), and this is also supported by the analyst firm IBIS World. They claim that VoIP is currently number one on its list of the top ten industries expected to come out of the downturn with positive growth. IBIS World are expecting VoIP revenues to increase by 20.1 percent during 2009, and thereby exceeding other *recession-proof* sectors, such as e-commerce, biotechnology and community housing services. (8el, 2009) Even though the competition is getting stronger and prices are dropping, the international traffic volumes are increasing. According to Telegeography, a telecom research company, the international voice traffic was at the end of 2008, 385 billions minutes, compared to 343 billion minutes in 2007. (Tanner J. C., Untangling voice termination, 2009)

According to a recent news release from Gartner, mobile VoIP poses a huge challenge for traditional operators, which over time will face the risk of losing a major share of their voice traffic and revenue to new non-infrastructure players that

use VoIP. They estimate that the global mobile voice market is worth approximately 692.6 billion dollars. Nevertheless, this will not take place until the 4G technology is fully implemented, which is predicted to take place in 2017. (Gartner, 2009)

Due to the recent trend of cheap international mobile price plans and strong mobile phone subscriber growth in emerging markets, mobile alone is a key growth driver for international direct dialing (IDD). According to a research made by Telegeography, almost a third of IDD calls originated from mobile phones in 2007, and 45 percent of them were ended on mobiles. If it continues at this rate, 2009 will be the first year that people will place more IDD calls to mobile phones than fixed lines. (Tanner J. C., Untangling voice termination, 2009)

Tsahi Levent-Levi, seasoned product manager and system architect at RADVISION, states that it may be too soon for VoIP on mobile phones and that there are not made to stay, especially not if the operators get to decide. Scott McElroy, VP of operations at AT&T says "With Skype and VoIP clients in general, we don't prohibit them on our network, but at the same time we don't encourage them on our network". (Gabriel, 2009)

During the Mobile World Congress 2009 one of the most interesting news was the fact that one of Nokia's mobile phones, the N97, comes with a preinstalled Skype client and is able to run both on 3G and WiFi. Something operators Orange and O2 not are thrilled about. (Levent-Levi, 2009) Operators, such as Deutsche Telekom, claim that the main reason for them being negative to Skype and other VoIP clients is because they cannot guarantee the application performance. However, this does not stop users from downloading the client software. The iPhone Skype version were downloaded by 1 million users in the first two days, according to the software house. (Gabriel, 2009)

Mobile VoIP will not be a mass market phenomenon as long as the operators do not open the door for such integration into the mobile phones. Therefore, VoIP clients should not yet be downloadable. For an integration to take place, operators should embrace IMS[29] and start setting it up. There is a risk that the operators will become the bit-pipes they fear to be if they wait too long, as Skype and other internet based VoIP service providers will get their way. (Levent-Levi, 2009)

Both George Van Horn, senior analyst at IBISWorld, and Stefania Viscusi, writing for tmcnet.com, state that VoIP networks generates cost benefits due to enabled

[29] IP Multimedia Subsystem, a set of specifications for delivering IP multimedia to mobile users

productivity enhancements, for example through streamlining telephony systems and reduce reliance on business travel. (8el, 2009)

The offering of more services, such as triple-play, to the customers is probable to be even more important in the future than today. Soft walls is important for customer retention, this is achieved by such offerings. This makes it more user-friendly, receiving only one in-voice from a single company. (Rydbeck, 2009) The customers often have a trust towards the operators. The customers are used to receive invoices from the operators and therefore have a payment history with the operator and feel secure with this situation. (Nelson J. , 2009)

On the contrary, lock-in of consumers through long subscriptions has a negative effect on mobile phone sales. The ease of change between different operators has made the subscriptions longer to make it more difficult for the customer to change operator. This leads to that the customer does not have the possibility to subsidize new handsets by extension of the subscriptions. However, subsidization of mobile phones is not allowed in the whole world. For instance, Finland does not allow it. (Mäkitalo, 2009)

An opportunity for the operators is vertical integration. Branding the mobile phone with the operator's brand has been done for several years now. One well-known example is when Vodafone branded both the hardware, and customized the software with logos and a different user interface. This however was not successful in the beginning since the consumer experienced the user interface as not as good as the original setting in the mobile phone. (Barge, 2009)

Operators use vertical integrations as a method to prevent high churn rates. They are refer to the development process as ecosystem and ask for more cooperation between operators, mobile phone brands, media companies and other actors to foster more intelligent and focused innovation. Networks, devices and services have the ability to meet the demands of these cooperations. One way to achieve this is to encourage mobile investment through deregulation. Until now the industry was partly to blame for its unstable relationship with regulators by not emphasizing enough the positive social impact that mobile phones can have. (Tanner J. C., 2009)

As an important customer to the mobile phone brands, the operators also possess a strong bargaining position. All mobile phone brands are eager to get their phones sold through large operators. The mobile phone is a rather expensive device that becomes much easier to sell with subsidization through subscriptions from the operators. (Mäkitalo, 2009)

An important trend is that operator is moving towards becoming only a bitpipe provider, offering the bandwidth and accessibility for the consumers. On the contrary, the operators does everything they can to increase their revenues. An example of this is customization of the mobile phone with for instance, an Internet start-page set to the operator's portal, linking to different offerings of content. (Nelson J. , 2009)

The operators must reinvent their role in the value chain. Which are the operator's major suppliers and customers? Communication alone is often only a small part in a larger context. When the user of the mobile phone want to participate in the service offering, it is not obvious the user is the customer to the operator. Often the user identifies himself/herself with the content or service provider which can be media companies or organizations from other business. (Mäkitalo, 2009) New actors from other industries could be interested in adding mobile communication to their own service offerings. (Gerhardsson, 2009)

4.7 Change in profitability

There have been major changes in profitability within the mobile telecom industry during the recent years. The change varies a lot between the different segments, shown in Figure 30. The application and OS segments are not represented in the figure below. This is due to the varying profiles and the number of different companies. Regarding the OS, the major actor is a non-profit organization, two of the major mobile phone brands RIM and Apple has proprietary systems limited to one phone brand and the financial performance for the OS is therefore not available. Application providers have similar characteristics, with the different profiles and many open source alternatives.

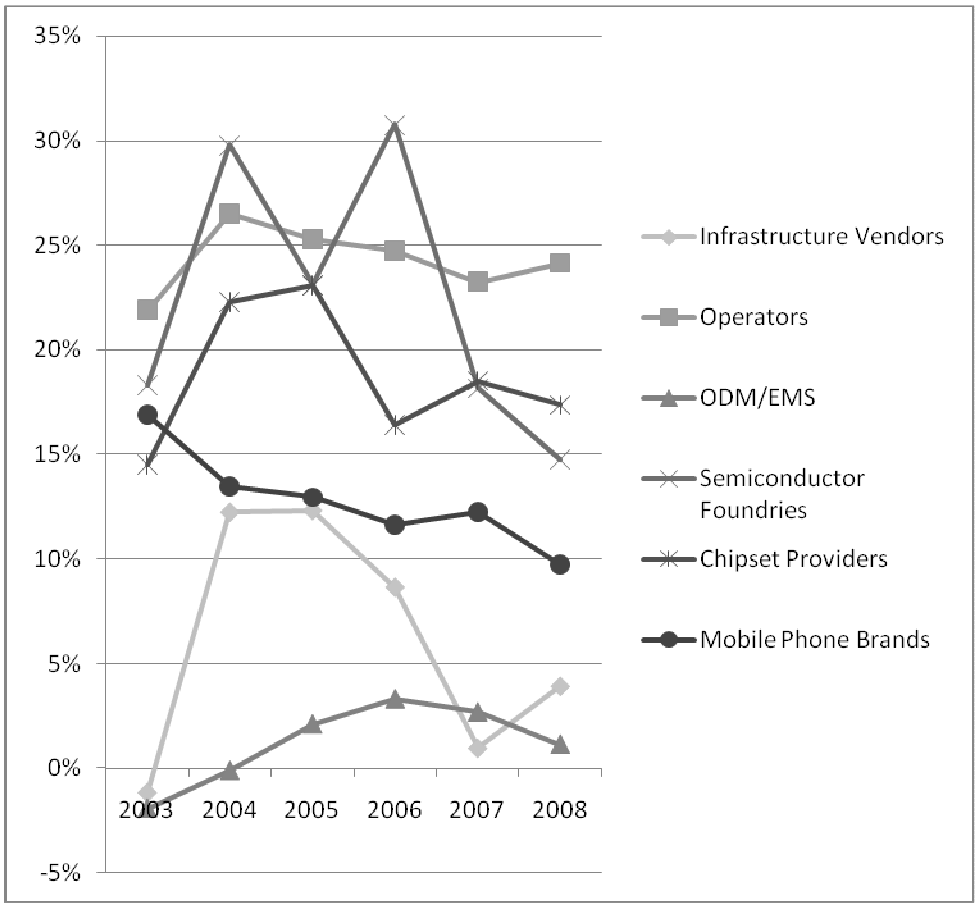


Figure 30: Operating profit margin for the major actors in each segment[30]

The actors included in the calculations for Figure 30 are infrastructure vendors, operators, ODM/EMS, semiconductor foundries, chipset providers, and mobile phone brands. The infrastructure vendors are here represented by five actors with a combined market share of 86 percent. Eight actors with a combined global presence and market share of 37 percent represent the operators. The ODM/EMS-graph is represented by four actors with a combined market share of 74 percent. The curve of the semiconductor foundries embodies four actors with a combined market share of 80 percent. There are three actors representing the chipset providers with a combined market share of 74 percent, while the mobile phone brands are five actors with a combined market share of 80 percent. Complete calculations for the figure can be found in Appendix II.

[30] References are listed in **Fel! Hittar inte referenskälla.**.

4.8 Summary of the Industry Configuration

The structure of the industry is complex. Figure 31 is a simplification and highlights the main areas of the industry. In reality the relations between the different organizations and segments are far more complicated.

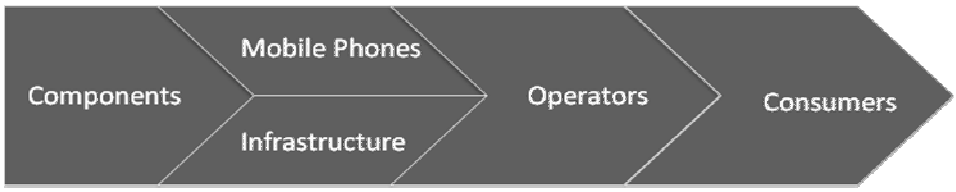


Figure 31: Interconnection between infrastructure, mobile phone brands, operators and consumers.[31]

For the general understanding aimed for in this thesis, the figure is sufficient. It will also be adequate to use in the analysis regarding the industry configuration.

[31] Own illustration

5 ANALYSIS

This chapter uses the 4C-process to analyze the industry. Each step of the process will be used with a summary at the end of each step. The analysis will start with a rather general perspective for the industry structure and become narrower and focusing on the impact of value on the industry.

The analysis will follow 4C-process as shown in Figure 2: The 4C-process. In each step of the process the output will be summarized and used further in the next step. The last output from the value capture-step will then be used as a foundation for the foreseeing of the change in power balance.

5.1 Industry Configuration

There is difference in the power balance configuration between the segments in the value chain. The theories regarding the power balance have only one focal company. In this analysis the theory is applied to the interface between entire segments in the mobile telecom industry, and has a supplier perspective. Initially, in each segment the dyadic relationships between the buyer and supplier will be investigated. Several aspects have been considered when determining the power balance between two segments. For example, the number of buyers and suppliers, the buyer's share of the total market share for the supplier, switching costs, and in what extent the supplier offerings are standardized. Each segment of the industry is discussed below.

5.1.1 Semiconductor Foundries

The semiconductor foundries are the first step in the value chain. Besides the mobile telecom industry, this segment has several buyers within other industries, such as the computer industry and the home electronics industry. Companies rely on a stable demand for consumer electronic goods to maintain a high utilization in the production. Orders from the buyers are attractive since the utilization must be kept at a high level. Large orders are therefore a necessity to maintain a stable demand and in order to avoid extra unwanted setup times in the production. Since economies of scale are very important, it is hard for the smaller actors to compete with segment dominator TSMC. The difference in price between the actors' product offerings are marginal, often only some US cents. TSMC dominates the segment totally and the

performance for the segment is consequently very dependent on the performance of this company.

Despite the fact that there are few suppliers in this segment, there is a buyer's dominance situation for the semiconductor foundries, see Figure 32. This is because semiconductors are a commoditized product and the switching cost is therefore low for the buyers; in this case the chipset providers.

Figure 32: The power balance between semiconductor foundries and chipset providers

5.1.2 Chipset Providers

Buyers of the chipsets in the mobile telecom industry are relatively few and at the same time the switching to another chipset is both complicated and expensive. Patents and standards related to the chipsets is an important factor when developing the mobile phone and the software, since patents regulates much of the product development. These patents are often possessed by the larger chipset providers, such as Qualcomm or ST-Ericsson. Large orders and close relationships with the buyers are important, especially for the smaller actors since these actors do not possess the patents as the larger companies do. Receiving large might be a reason for acquiring a larger market share and thereby strengthening ones bargaining position.

Since there are relatively few suppliers and buyers of the chipsets, the relationship between buyers and suppliers can be considered as interdependent towards the mobile phone value chain as well as towards the infrastructure value chain, see Figure 33. The fact that the switching cost for the buyers is high, both from the infrastructure and the mobile phone value chain, is also an element for interdependency. The competition in this segment will be reduced since TI will focus their business on other industries than the mobile telecom industry. The companies that might benefit from TI's exit will be Qualcomm and ST-Ericsson, since they already have the size and power in order to claim TI's current market share, compared to the other companies within this segment. Smaller actors will not be able to provide the necessary capacity needed to fill the void after TI.

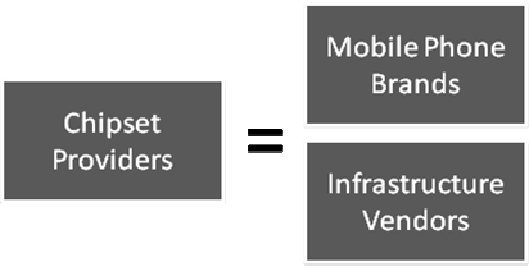


Figure 33: The power balance between chipset providers and their buyers

5.1.3 Operating Systems

For the most lucrative mobile phone segment, the Smartphones, the proprietary option is eliminated due to the lack of advanced features necessary for these types of mobile phones. This is not the fact for the Smartphone specialized actors Apple and RIM, since their proprietary OS is a very central part of the mobile phone and integrates well with the hardware. The opinions differ regarding the choice between licensed and open source system. There are basically only three options here, Windows Mobile because it is the only licensed alternative, Symbian because of their significant market share and Android because of the strong brand name of Google. There are of course several other OS options, such as LiMo, but for this open source alternative it is hard to compete with such a strong brand name as Google.

The OS providers are dependent on the success of the specific mobile phone in order to receive momentum in sales revenue. For instance, the dependency Microsoft has regarding the sale of HTC Smartphones. HTC on the other hand is reliant on Microsoft providing a system that meets the demands from the customers. On the contrary, the open source alternatives are reliant on the number of companies choosing their alternative. If several mobile phone brands choose a specific OS to their products, the OS will develop more rapidly which means that solutions and applications will be added more frequently. Recently, the OS have become a more central part of the mobile phone for the consumer. For example, the success of HTC's G1 phone is mainly due to Android and the strong brand name Google.

There are several advantages for using an open source OS. It opens up for new creative ideas and is co-creation friendly since several parties are involved. The development costs can be kept at a lower level compared to development costs of a proprietary OS. On the other hand, the disadvantages are that it is more difficult to control the quality of the product. In general, the advantages with an open source alternative are the disadvantages with a proprietary OS, and the same can be said for

the disadvantages with an open source OS – they are advantages with a proprietary alternative.

Interdependency is current between the buyers of the OS, the mobile phone brands, and the OS providers, see Figure 34. The sales of the OS are dependent on the sales of the mobile phones to a rather large extent, since the OS is distributed with the mobile phone to the consumers.

Figure 34: The power balance between OS providers and mobile phone brands

5.1.4 Application Providers

This is a complex segment with a lot of different actors offering diverse products. The applications necessary for the mobile phones have to deal with the complexity of several standards for different OS. The development process can therefore become rather time consuming with customization of the application for each OS and/or device.

It is relatively difficult to succeed with an application since there often are many similar alternatives already available on the market. Nowadays, the most difficult obstacle is to design an appropriate business model for the application in order to acquire revenues. Many applications are based on open source, which makes it difficult to identify the value created by each involved actor. Open source makes it also easier for the buyers, mobile phone brands, to switch application since no significant investment has been completed.

Buyer dominance is the reality for this segment, see Figure 35. This means that open source enables companies to customize an application for a specific OS or hardware, but it is difficult to charge for it considering the fact that it is open and free for everyone. There are also several suppliers of content for the mobile phone brands to choose from. These suppliers often have similar offerings of simpler types of content, such as media for the mobile phone. If the buyer is not satisfied with the content provided, it is very easy to change to the competitors' alternative the next time.

Considering more advanced types of content, such as Facebook and Spotify when user involvement is a central part, it is no longer easy to switch to another application provider. For a service such as Facebook, when the users are many and the bargaining power for the content provider is high, the buyers are almost forced to offer

compatibility for such a service. Facebook users will probably not buy a mobile phone that is not compatible with Facebook. When the content provider becomes this influential, the power balance has more of an interdependency characteristic.

Figure 35: The power balance between application providers and mobile phone brands

5.1.5 ODM/EMS – Mobile Phones

Few actors have the capacity to produce mobile phones at the low cost and the high volumes demanded by the mobile phone brands. Therefore the number of actors competing is relatively low. However, these actors all strive for economies of scale and are consequently large companies.

Since there are only a few companies competing within this segment and the potential buyers also are relatively few, the ODM/EMS are dependent on the mobile phone brands' orders. There are not as many buyers for the ODM/EMS companies when it comes to contracted manufacturing of mobile phones. Only a few companies will employ the large volumes necessary for achieving the profitability generated from the economies of scale. Not receiving any large orders can be devastating for an ODM/EMS company, since the large volume orders often employ the company for a long time. How long the order can employ the company is dependent on how well the buyer performs and how well the specific mobile phone is selling. Long employment is also important due to the high fixed costs and long setup times in the production. Therefore a stable and high consumer demand is critical for ODM/EMS segment.

The operating profit margin for this segment has been very low over a period of time. Recently the consumer demand has declined for key products such as mobile phones which have lead to even lower profit margins. It is likely that some of the smaller actors will become smaller, be acquired by a larger company or even disappear over the next few years. As for now, the situation for this segment is buyer dominance, see Figure 36.

An opportunity for the ODM/EMS is to circumvent the mobile phone brands and negotiate directly with the operators. The mobile phones will then be branded by the operators, as seen in the United Kingdom by operators Vodafone and 3. If the ODM/EMS circumvents the mobile phone brands it would probably put the mobile phone brands in a weaker bargaining position against the operators when these substitutes arise.

Figure 36: The power balance between ODM/EMS and mobile phone brands

5.1.6 Mobile Phone Brands

Interesting is that most of the specialized mobile phone brands among the top ten companies focuses on the same business segment – Smartphones. Nokia is the most successful full range supplier, in terms of largest market share. Nokia are by many considered as the definition of the mobile phone industry. It is crucial for them to maintain the economies of scale in order to sustain the level of profitability. Economies of scale are not that important for smaller players. Instead, they are offering specialized products which meet specific demands from narrower consumer segments.

The mobile phone brands are trying to integrate forward in the value chain and move closer to the end consumer by offering new services and content to their products. Nokia's *Ovi*, Sony Ericsson's *Play Now* and Apple's *App Store* are good examples of this trend. Vertical integrations in order to encourage innovation by acquiring software and application companies are common among mobile phone brands. In this way the mobile phone brands might decrease the operators' ability to affect the end product and the mobile phone brands can control the consumer for a longer period of time. This enables the mobile phone brands to collect valuable information regarding the consumer behavior and might make it more natural to involve the consumers in the product development and therefore facilitate co-creation.

Since the volume of sales is dependent on the sales from the operators, cooperations with operators are important for mobile phone brands. This is important due to the mobile phone brands opportunity to reach consumers throughout regions over the world. It is even more significant considering the subsidization of high-end mobile phones such as Smartphones. Consumers in general are more likely to buy a new mobile phone when it is subsidized to avoid the high initial cost. The mobile phone brands can chose to distribute their mobile phones either through operators or through retailers. However, the main distribution channel is via the operators since the retailers are more limited due to the fact that they are often smaller actors than the operators.

Industry shake-out

It is likely for a shakeout to take place among the mobile phone brands, partly because of the current financial crisis that decreases the consumer purchase

willingness, and partly because of the tough competition within the segment. 2008 was the first year the industry showed a decrease in sales. Nokia keeps its strong position as number one. The smaller actor such as Apple and RIM are not in the danger zone due to their niche strategies. It is between Motorola and Sony Ericsson. Most probable is that Motorola, in its current form, will disappear from the mobile phone brands segment due to the fact that they have struggled with profitability for a long time. Another argument for this is that Sony Ericsson is backed up by the giants Sony and Ericsson, and also possess many important patents through Ericsson and consumer brands through Sony[32].

New entrants in this segment are mainly emerging from smaller actors offering either low-end or high-end mobile phones. As the market and the technology become more mature, it is easier for new entrants to copy others' technology and market strategies. However, as mentioned before, it is difficult for these smaller actors to enter the mobile telecom market due to large volumes and the numerous tests and approvals that are required to be a global actor. Apart from this, one should not exclude Huawei and ZTE, since they already operate in the industry and have the required knowledge, the strategic capabilities and the size to become a global mobile phone brand.

There is an independency situation between the mobile phone brands and the operators (the buyers) because it does not involve any significant switching costs, neither for the mobile phone brands nor for the operators, see Figure 37. Single operators have often only a small share of the mobile phone brands total revenues.

Figure 37: The power balance between mobile phone brands and operators

As discussed above regarding the potential circumvent of the mobile phone brands, the power balance could change. If the ODM/EMS and the operators implement this cooperation more often and create a substitute, and the mobile phone brands bargaining power will probably be reduced.

5.1.7 Wireless infrastructure software

Services and software for the infrastructure vendors are becoming more important due to the higher bandwidth and more advanced services available in the wireless networks. Actors such as Ericsson are nowadays not only providing the hardware for

[32] Such as, Cyber-shot, Walkman and Bravia

the infrastructure but also operating the entire data and voice traffic. It is therefore important to have well-functioning software solutions.

There is interdependency between the providers and the infrastructure vendors since the actors within the wireless infrastructure software segment are specialized in the different services or completely embedded in the infrastructure vendors, see Figure 38. This segment is not in focus of the study and therefore further deeper analysis regarding this segment will not be made.

Figure 38: The power balance between WISPs and infrastructure vendors

5.1.8 ODM/EMS – Infrastructure

Since infrastructure is only a small part of the ODM/EMS industry it is important for these companies to become suppliers for other parts of the industry as well, such as mobile phones. There is one dominating actor in the segment, Flextronics, which has become even larger after a recent acquisition of the competitor, Solectron. The other smaller players are also relatively large and therefore the space for competition is rather limited.

The buyers of the products, the infrastructure vendors, are relatively few the ODM/EMS are dependent on the revenues from the buyers' orders. Adding the fact that LTE will combine the different standards of telecommunication for the first time making the products offered by the ODM/EMS more standardized buyer dominance is the reality for this segment, see Figure 39. Commoditization puts the buyer, the infrastructure vendors, in a stronger bargaining position.

Figure 39: The power balance between ODM/EMS and infrastructure vendors

5.1.9 Infrastructure Vendors

There is an ongoing shake-out in this segment of the industry leaving more space for the remaining actors to acquire when an actor or actors eventually disappear. The actors in the middle are having the toughest time. When world leader Ericsson retains

it position and Asian vendors Huawei and ZTE are growing, the actors in between, Nokia Siemens Networks and Alcatel-Lucent, are loosing market shares.

The shift towards 4G is ongoing and the demand from the market for higher bandwidth drives the investments from the operators to provide 4G services for the consumers. It is obvious that this segment, to a large extent, is dependent on the investments from the operators. Besides 4G, the fact that there are still regions and countries in the world which need basic communication infrastructure, 2G, secures some revenues for the infrastructure vendors for a couple of years to come. There is still a strong demand for 3G in large parts of the world, such as Asia. The revenues generated from 2G still exceeds the one for 3G, so the economic impact from 4G is likely to take a while.

Other opportunities are to operate the traffic in the network and act as a service provider as well as a hardware provider. This is likely to be more common in the western parts of the world where the networks are already built.

Since the infrastructure vendors are very dependent on the investments from the operators, the reality for this segment is interdependency, see Figure 40. When the operators are performing well, the infrastructure vendors are too.

Figure 40: The power balance between infrastructure vendors and operators

5.1.10 Operators

The operators have shown the highest operating profit margins in the industry for several years since this segment is not sensitive to the market fluctuations to the same extent as the other segments are. Consumers have a tendency to keep using their mobile phones in the same degree, even in these current economic times, but instead they tend to renew their subscription instead of purchasing a new mobile phone. This mainly affects the mobile phone brands and actors further back in the value chain, and not the operators.

On a regional basis the competition is often of a lighter character. In some cases the regional situation can be considered oligopoly and the barriers of entry for new actors are often high. In each regional market there are often only three to five large operators competing, as said by Nils Rydbeck former CTO at Ericsson Mobile, Per-Arne Sandström former VP at Ericsson, and Tord Wingren CEO at Nanoradio. This

makes the pricing situation more favorable for the operators. The churn rate among consumers are therefore a highly importance issue for the operators and there is a balance between keeping a high ARPU and still retain the customers. One issue the operators are dealing with is the fact that the consumers in the western part of the world are showing less identification with the operator comparing to the mobile phone brands. This is of course a generalization. When the service offerings will become more sophisticated in the future, competition from other segments will be even tougher. These services are a popular business for many segments and the competition will therefore become tougher.

The power balance is to some extent dependent on which part of the world the operator is acting in. In the western parts of the world the cost of retaining the subscriber is significantly lower than the retention cost. Therefore subscribers are often soft-walled by subscriptions and bundled offerings, which make it more difficult to change operator. Taking into consideration that there are still equivalent options for the subscriber to choose from and that the usage in some extent varies with the financial situation in the world, interdependent power balance is the reality for the operators, see Figure 41.

Figure 41: The power balance between operators and consumers

Summary: How is the power balance configured?

Figure 42 visualizes the power balance between the segments. It maps the different segments from a supplier point of view. For instance, the buyers of the semiconductors, the chipset providers, have power over the semiconductor foundries.

Buyer Dominance • Semiconductor Foundries • ODM/EMS Mobile Phones & Infrastructure • Infrastructure Vendors • Application Providers	Interdependency • Chipset Providers • Wireless Infrastructure Software • Operators • Operating Systems
Independency • Mobile Phone Brands	Supplier Dominance

Figure 42: Mapping of the power balance in the industry

Notable is that there are no segment that possess supplier dominance. The power relation has a tendency to make value convert down streams in the value chain, towards the consumers. This observation will be discussed further on in the analysis.

5.2 Value Creation

The concept of value has different meanings for different segments of the industry. In this analysis the value for the consumer is the main subject for discussion.

5.2.1 What is Value?

Knowing what the customers perceive as value is clearly important. The fact that the industry boundaries are being razed and mobile communication becomes only an enabler in a larger context emphasizes the importance on the value creation process. To fully understand the customer demands is vital in order to create the right prerequisites for consumer to experience high value. Moving from a company centric space past the solution based space and into the experienced based space is key to achieve this understanding.

Becoming a part of the development process is important. The high impact of Android amplifies this statement. Since the actors in the industry long have been asking for a strong open source alternative among the OS, Android and Symbian Foundation were very welcome.

For the operators the open source alternatives among the OS enables co-creation opportunities. However, they have been unsuccessful in customizing the OS and advancing in this way in the value chain before. The value for the consumer is perceived when the applications are functioning and simplifies the commonly used tasks for the consumers. This is something the operators have not achieved in earlier attempts. It is more likely that other actors will act as the nodal organizations in these experience networks.

Considering LTE, there are still issues regarding what will actually be the value creating. The question is whether there is sufficient motivation for consumers to switch from 3G to 4G. In other words, do they have a need for 4G? It was the same issue when 3G was launched and consumers questioned why they should switch from 2G to 3G. In a larger context, higher bandwidth is only an enabler for more data traffic. If it becomes standard in more devices than the mobile phone, perhaps new business opportunities will be found. On the other hand, the issue of getting consumers aware of the need for 4G could be easier to understand if the consumers, or customers, were more involved in the development of products and services using 4G. In that way they would also find it easier to understand how the specific products and services can be used, and thereby consumers exploit a larger part of the mobile phone capability, which means that those who are selling to the post market, in this case both mobile phone brands and operators, can make more money. This will be discussed further in the value capture section of the analysis. The above mentioned reasoning emphasizes the importance of knowing what the customer and the consumer perceive as valuable, and how to create this value.

5.2.2 Prerequisites for Co-Creation

The increase in use of Smartphones over the recent years indicates that the possibility to use more advanced applications and services is a strong trend. These functions have been embedded in the devices for a long period of time. Previously, consumers have experienced it as difficult to use the advanced applications and services available in a Smartphone because the average user does not possess the knowledge of, for instance, configuring the e-mail function in the phone. This means that the perceived value for the consumer was lower than the potential value.

Consumers often value simplicity high when dealing with high-tech products such as mobile phones. If all functionalities can be used in a simple way without any barriers to experience the values of these functionalities, this will increase the consumer surplus. There are two ways of increasing customer surplus in the mobile phones, either a user interface that makes it easier for the consumer to use the features and applications, or by involving the consumers in the development process and thereby

increase the understanding of the consumer behavior, which makes it easier to develop the right features demanded by the consumers.

Some companies and cooperations have a better foundation for co-creation than others. The success of iPhone is partly based on co-creation. Apple's focus has shifted from a product centric view to a more experience based one. This has lead to an increased ability to forecast and combine technological capabilities to maintain a high level of user experience. Only after Apple's launch of the iPhone, other mobile phone brands started to move towards the experienced space when they focused more on user interface. Another good example is Sony and Ericsson, Sony with the design and user orientation and Ericsson with its high-end technology. Other successful examples regarding co-creation are Next Generation Mobile Networks, were operators join together to provide a coherent vision for 4G and LTE, and to achieve competitive delivery of mobile broadband wireless services. Another example is the Open Handset Alliance, which includes several companies, that now develops Android.

5.2.3 Strategies for Value Creation

Symbian Foundation is a good example of an initiative embracing the concept of customers-as-innovators. When several actors constantly elaborate with the same product, the solutions become more sophisticated and the value proposition can be expanded.

The vertical integration from mobile phone brands towards the services and content arena is likely to continue. This enhances their possibilities to control a larger part of the value creation process and the offerings to the consumers. There are two conclusions that can be extracted from this. The potential profit will be larger and the mobile phone brands can make their mark on the final product.

Another important aspect to successfully implement co-creation is that the products must have a certain amount of continuity for the customers. A way to achieve continuity in the mobile phone considering content is to create a similar user interface in the mobile phone as in the computer. Business models from Internet solutions are also applicable to the mobile phones. It even enables opportunity only available through the mobile phone, such as location based services. The mobile phone will then become a central part in a larger experience space context, the ecosystem. Google's ecosystem has been extended into the mobile telecom industry through the launch of Android. Google is not only present in the computer industry but now also in the mobile telecom industry.

It is important for organizations to have different ways of controlling their ecosystems. Google can easily be considered the keystone in their own ecosystem.

Google increases the ecosystem productivity by making the creation of new products by third parties more efficient via the SDK. They also consistently incorporate technological innovations, such as Android, to their ecosystem. However, the challenge to make Android successful is to avoid fragmentation by providing reliable point of references and to control the development. Another important aspect for a successful strategy is to share the value created in the ecosystem in a way that increases the health of the entire ecosystem, hence Android is a good initiative for Google. Another example of enhancing the ecosystem is when events such as profile updates or receiving messages triggers the users to interact and therefore increase the experience space.

An unsuccessful controlling example is the operators approximately 100 000 requirements on the mobile phone. This slows the development and leads to increased time-to-market for the products. Amplifying this example is when Apple put these request a side and developed the iPhone with the consumer at the center.

As mentioned above, when it comes to creating value based on the performance allowed by LTE, the strategies must change to facilitate value creation through co-creation. Ubiquity and high bandwidth alone is not sufficient for the customers to perceive value. The services must become more sophisticated and the central part of the value must be something other than the bandwidth. The big question is who will offer these services and thereby create more value?

New actors will fill the bandwidth with useful content and become the new customers for the operators. Operators will only act as enablers for these actors. These actors will not necessarily be traditional content or application providers. New industries will discover business opportunities through mobile communication, perhaps insurance companies or companies from the food industry. All these new organizations expand the experience space and therefore increase the value.

When these actors offer value in the mobile networks, operators will become a bit-pipe provider, offering the service of suitable bandwidth. Therefore, the operators will only become an enabler in a larger affair in the same way that the energy industry is only a small part of larger affair, to simplify the everyday life. Communication will become a commodity. This commodity service can just as well be offered directly by the infrastructure vendors. Many infrastructure vendors are already focusing on offering services to the operators such as running the networks.

One of the advantages the operators have is the fact that the consumers have a history of payments with the operators. It is convenient and safe for the consumers to accept

the bills from the operators instead of smaller companies for each service or content bought. This requires the business models of today, where content is paid for upfront.

It is likely for the business models to change and convert the transaction from the consumers to other parts of the value chain. This is discussed further in the value capture section of the analysis.

Output: What creates value?

The ability to create value comes with the knowledge of the customer. It is essential to understand what the consumer perceives as high value. Co-creation is a suitable approach for this and it is easy to find successful examples. This approach is applicable in the latter segments of the value chain. It is more natural to incorporate co-creation in the latter segments, since they are already closer to the consumer. Taking into consideration that these segments also have stronger bargaining power, they have a good starting position to implement co-creation in their product development process. Facebook is a good example of an actor that has succeeded in creating value for the consumers, what is left is to adapt the business models to the current situation in the mobile telecom industry to capture the value.

It is relatively difficult to create value through co-creation further back in the value chain. For these segments preparing their products to facilitate co-creation in a later stage, can be the right strategy. The segments can use this facilitation to become a supplier that highlights the importance for co-creation and act as a sales pitch towards their buyers. The co-creation approach could be applied for actors within these segments in order to make activities such as product planning and product development more efficient. For example, in the chipset segment this could be achieved by building interdependencies with the mobile phone brands by offering tailored chipset facilitating customer involvement.

5.3 Value Conversion

5.3.1 Value Migration

We have considered both entire segments and single companies when analyzing how value migrates within the industry. When applying Slywotzky's three phases of value migration, shown in

Figure 9: The three phases of Value Migration in chapter 3.4.1 Value Migration, it is interesting how the segments can be placed into the phases in order to determine the relative value-creation power.

The current market situation, partly because of the prevailing financial crisis, has called up for an industry shakeout, which is not to be mistaken for a value migration. However, this is most common in mature industries which the mobile telecom industry has not yet become. Even though the profit margins in the mobile telecom industry have decreased recently, the industry is still characterized by market growth, for example the Smartphone segment. Nonetheless, well-positioned companies such as Nokia, Apple and RIM, have the opportunity to benefit from this shakeouts by stabilize and gain market power either by being the market dominator or a successful niche-player.

Quantification has been concluded in order to determine in which phase of the value migration each segment is within. The criterions taken into considerations have been; growth, where 3 means high growth, profit margins, where 3 means high margins, competition, where 3 means low competition, and finally convertibility, where 3 means high convertibility. Convertibility is the ability for the actors within the segment to change their business models. The classification is shown in Table 4.

Segment	Growth	Profit Margins	Competition	Convertibility	Mean value
Semiconductor Foundries	1	2	1	1	1.25
Chipset Providers	2	2	3	1	2
OS Providers	3	N/A	1	2	2
Application Providers	3	N/A	1	3	2.33
Mobile Phone Brands	2	2	1	1	1.5
ODM/EMS	2	1	1	1	1.25
Infrastructure Vendors	2	2	1	1	1.5
Operators	3	3	2	1	2.25

Table 4: Quantification in order to determine the value migration phase

Since the data is not available for each segment or criterion, the mean value is used as a foundation when deciding the migration phase for each segment.

- Value outflow phase < 1.5
- 1.5 ≤ Value stability phase ≤ 2
- 2 < Value inflow phase

The segments which are placed close to, or on the boundaries, are being discussed further below.

Value Inflow Phase

The most obvious segments in this phase are the application providers and the operators.

Operators are in an inflow phase due to their operating profit margins as it has been stable between 22-27 percent 2003-2008. As concluded in section 5.1 Industry Configuration, the power balance is pushing the value forward in the value chain. Comparing this fact with Figure 30: Operating profit margin for the major actors in each segment, it is obvious that the value is converting forward towards the operators. This figure clearly shows that the operators are and have been in the best position in the industry with an operating profit margin at a considerable high stable level. The recent growth for the operators has made them larger but less effective. New innovations have changed the industry in a way that could favor the operators. Mobile broadband and the increasing number of content available to the consumers could have been managed better by the operators and lead them into a new inflow phase. On the other hand, all these innovations have been developed by other segments of the value chain.

As mentioned above, application providers is a fragmented segment. The value flows towards this segment since services and applications are very popular for the mobile phone brands and operators to offer.

Smartphones, which can be considered a smaller segment within the mobile phone brands, would have been placed in the value inflow phase if being a value chain segment of its own. The growth and margins are high, and the competition is rather low. When it comes to the convertibility, it can be considered to be rather easy as the Smartphones have users outside the initial market segment, the business-users. Many regular consumers are now using Smartphones because of its ability to use advanced applications and browsing the Internet. The Smartphones are unfortunately migrating towards a stability phase. The growth and operating profit margins have declined and the competition have intensified.

Value Stability Phase

Infrastructure vendors, chipset providers, and mobile phone brands are present within the value stability phase due to their competitive stability and relatively stable operating margins.

The infrastructure segment showed a large decrease in operating profit margin between 2006 and 2007 due to decline in investments and the mergers of Alcatel and Lucent as well as Nokia and Siemens. This segment has few large actors which indicate that the barriers of entry are high due to technological challenges. Therefore the infrastructure vendors have relatively low bargaining power against their buyers, the operators. The ongoing technology shift to 4G that will enable new entrants from IT-players will probably increase the competition within the segment. The rapid growth from the Chinese Vendors Huawei and ZTE will also intensify the competition.

The chipset providers are very dependent on the sales of mobile phones and in the latter years the operating profit margin follows the one for the mobile phone brands, which means that they are also suffering from decreasing operating profit margin, just as shown in Figure 30: Operating profit margin for the major actors in each segment. As mentioned, TI will probably leave the mobile chipset business, but it is interesting to point out that they have had the largest increase in market share between 2007 and 2008.

Mobile phone brands have been in a value inflow phase for several years. They have suffered from decreasing margins during the recent years; nonetheless the five largest actors within this segment have been almost the same. These arguments indicates that the segment have moved into a stability phase during the last year, 2008. An interesting fact is that, when studying Figure 20: Mobile phone brands worldwide market share for 2008 (2007) in sold units, one could see that Nokia strengthened its position marginally, while Samsung, Motorola, LG and Sony Ericsson have lost market share to the smaller players; RIM, Apple and HTC. Clearly, the smaller players have some advantages being niche players. However, Motorola has had largest decrease in market share; it dropped 5.6 percent between 2007 and 2008.

Apple employed a new business model within the industry when they launched iPhone, which triggered a value migration shift: the value normally gained by operators is now flowing directly to the mobile phone brand. This is a tendency that can strengthen the mobile phone brands position in relation to the operators.

Value Outflow Phase

The semiconductor foundries are in this phase are due to the recent declining sales and their low bargaining power against their buyers. This segment is dominated by one large actor and the performance for the segment is therefore dependent of this. The segment is suffering from declining sales and the competition among the smaller companies within this segment is intense. This is due to the current financial crisis and the fact that many customers to these actors are emptying their stocks. The smaller actors are suffering from this the most. Due to the low switching cost for buyers; semiconductor foundries have relatively low bargaining power against chipset providers. One could say, due to a market share of 50 percent and that the second largest company only has 16 percent market share, that TSMC owns this segment.

5.3.2 Positioning based on Profitability

As Christensen, Raynor and Verlinden state, money will not be made where most companies are headed. This is clearly due to the increasing competition. The hype around Smartphones is a good example; the segment is experiencing strong growth and many companies are heading towards Smartphones. Competitive forces compel the subsystem suppliers to create architectures that are ever more interdependent and proprietary as they try to raise the bar of their maximum performance. This can be affecting the interdependence between the buyers and suppliers.

The value will not be in communication services, communication as a product will turn into a commodity, and instead the value must be created in new ways, for example co-creation. Just like Östen Mäkitalo, former CTO of Telia Mobile, states, the operators must reconsider its customers and extend their customer range to more than just end consumers. They must adjust to the providers of services and content and focusing on performing their job for them. The actor implementing this will probably be the first on the market. This will be further discussed in the next step of the analysis, 5.4 Value Capture.

Although operators have been making a lot of profit, there is a risk that they will lose shares of the mobile voice market worth 692.6 billion dollars if they do not take actions regarding mobile VoIP. This potential loss in revenue might have such great affect that they lose enough profitability and convert to the outflow phase. There are millions in lost revenue, and more frequent dropped calls (and in consequence unhappy customers) at stake. The operators must decide whether to sort it out by themselves, or if they should outsource their voice routing in order to be able to focus on the business of selling services to customers. Especially now when things is expected to get worse before they get better.

Output: Where the value converts to

Actors within the different segments will try to move towards the value inflow phase, since the value can easier be captured here. Example of attempts of moving towards the value inflow phase is the vertical integration attempts made from mobile phone brands and operators where they try to acquire businesses that are situated in the value inflow phase and therefore benefit from the advantages characterized in this phase. The convertibility will grow when integrating vertically.

Another example is the horizontal integrations where companies aim to be the largest actor within their segment. The competition will become lighter and therefore the possibility to capture more value will become better.

The value will convert to actors or segments that totally understand who their actual customer is. Are the company selling products or services or only enabling other actors to do this? The customer understanding is obvious, but vital. The segment likely to adopt this is the mobile phone brands. They have in some extent already moved towards this approach when they increased their focus on post-sales and service offerings through for example vertical integration.

5.4 Value Capture

5.4.1 Who captures the Value?

Historically the operators is the segment that has captured most of the value generated from the mobile telecom industry due to the fact that they control most of the post-sales and services, thus they have a constant inflow of cash from the consumer. The profit for these actors is much higher than for the segments further back in the value chain, since the competition on a regional basis is much lighter.

Vertical integration towards post-sale of services and content enables capture of the value in more than one segment of the value chain. However, this requires offerings of services with adequate value for the customer, for example, application stores provided by the mobile phone brands. The value that the mobile phone brands receive does not only contain monetary revenues but also important information of their customers and their behavior. This valuable information has earlier been exclusive for the operators. The information can be considered as an input to the co-creation process and used for forming new strategies regarding development projects. This is applicable for the software solutions such as applications in the mobile phone. Hardware on the other hand does not enable co-creation to the same extent as the software does. Therefore vertical hardware integrations towards the consumer is not

of any use. In this case the vertical integration must be aimed towards the components. Sony Ericsson is a good example. The brands from Sony such as Cyber-Shot and Walkman have successfully been implemented in the mobile phone together with a hardware-software solution.

AS mentioned above, the consumers are used to pay the operators for services, such as voice, and data services such as SMS, today and the barrier to pay for other types of content is therefore low. On the contrary, the track record for content selling via the operators is not optimal.

Mobile hardware becomes less important as the technological development have reached a phase when it is more advanced than the services offered in the networks and terminals. Selling hardware alone is not a sustainable strategy to capture value. Since adequate substitutes often are available, the products must be distributed with some kind of service offering embedded to capture the value. Regarding infrastructure this can be the offering of services based on the new possibilities that comes with LTE. The mobile phone brands have a clear substitute situation when it comes to choosing from the alternatives among the OS. Windows Mobile is the only actor with a business model based on developing the system all alone and then selling it. The substitutes are all either based on the proprietary systems or on an open source. The ecosystem will therefore be healthier with one of the latter options.

5.4.2 Strategies for Value Capture

Initiatives such as Android and Symbian Foundation can be considered to facilitate *coopetition*. The companies in this ecosystem are all working with the same product and helping each other at the same time as they are very aware of the intensions and maneuvers from the other companies. This is a type of strategic alliance where risks and profits are being shared. However the keystone actor with the strongest bargaining power captures the most of the monetary value, the profit.

When different types of organizations act together in the ecosystem they also strive for different value capturing methods. Facebook lets mobile phone brands customize applications for their users to access Facebook through their mobile phone. The mobile phone brands gain profit from this, since the consumers value the facility to use Facebook on their mobile phone. Facebook on the other hand is valuing the fact that their users can access Facebook more often. In other words, in this example the mobile phone brands and Facebook are sharing both the risks and the value. Another example of a win-win situation is Android. Mobile phone brands involved in this ecosystem, experiences lower developing costs, and Google on the other hand is receiving valuable inputs in form of metadata to their main business model.

Companies specializing in Smartphones, which have been discussed earlier, have shown higher margins than their competitors. This segment is also a good example of when the phone enables other actors to capture value, mainly through applications and new types of services. The application stores and the possibility for the customer to customize the phone and install the applications wanted will enable smaller actors to sell their software. This also increases the value for the customers.

As Mäkitalo states, "The risk of being early on a market is zero, while the risk of being late is that one will be hopelessly after and there is little value left to capture. Nobody has caught up with Intel and nobody can compete with Ericsson in terms of switchboard systems."

Although, there is great value that can be captured if being the first mover to a certain market, it is also important to consider the consumers' preferences. The product performance usually improves beyond the mainstream consumers' needs since companies strive to meet the needs of the most demanding and also most profitable customers. Smartphones is a good example; many people use a Smartphone but only approximately 20 percent of its full capacity because they do not need all the features or they do not know how to use them. When 3G was launched many people did not understand why they should upgrade to 3G or they were satisfied with 2G. This indicates the need for companies to enter the co-creation arena where they also can benefit from higher revenues. If companies enter the co-creation arena and involve their customers much sooner than they are doing now – the customers receive a better understanding for the product or service in question. The customer will then experience a higher value, more products or services will then be bought and the companies will capture the value they have created with their customers.

Output: Who is capturing the value?

It is the actors that enable new business models who control the value creation process that captures the value. It is not certain that the actor offering the best product will capture the most value. Instead the keystone of the ecosystem will gain the strongest bargaining power and therefore capture the value. Since both the risks and the value are being shared in the ecosystem, the other actors can also capture parts of the value.As mentioned, the keystone in the ecosystem will capture most of the created value. Horizontal integration is important to a certain extent to strengthen the position as a keystone. Becoming too large will suffocate the ecosystems creativity and making the keystone too inflexible. Google is a keystone in its own ecosystem including elements such as Android and their search engine as vital parts. HTC is for example a niche player in Google's ecosystem since they have developed and manufactures the G1 phone which runs Android.

Apple on other hand is a physical dominator which has integrated vertically and has tight control over their ecosystem. They also create and capture most of the value within this ecosystem. If Apple does not nurture its ecosystem they might risk going down with it. Inviting new developers and facilitating for new applications and services in the ecosystem is vital. Many mobile phone brands are aiming to become a keystone in their ecosystem. Nokia have made several attempts to change their value creation method towards models based on consumer networks, such as Ovi. This network has recently been opened to actors such as Facebook, to expand the experience space even further. With the size, economic strength and recognition that Nokia posses it is most likely that they even in the future is the most dominating actor in the industry.

6 CONCLUSIONS AND DISCUSSION

This chapter contains our conclusions and a discussion of the analysis. The application of the 4C-process will also be evaluated. Questions that arose in the problem discussion will also be answered.

6.1 Five main observations

Due to our reasoning and outputs from the 4C-process we have identified five major impacts that will influence the industry and change the power balance.

First, the integration is likely to continue

An example of vertical integration is when the mobile phone brands are offering different types of content, such as music, videos and ringtones. Mobile phone brands acquisitions of different application and content providers clarify this trend even more, for example Nokia's acquisition of NavTeq. A well-known example of horizontal integration is the joint venture Sony Ericsson. This was basically an integration of consumer devices, Sony, and mobile phones, Ericsson. This clearly shows how features from several devices have been integrated in the mobile phone, as shown in Figure 11: Schematic figure of which features that has been integrated into the mobile phone.

A horizontal integration is likely to take place among the infrastructure vendors. The Chinese government will probably not allow two large companies such as Huawei and ZTE to compete, since they would not want to risk them to knock out each other. It is likely that the Chinese government will promote a merger between these companies which have the possibility to become a world dominating actor, threatening Ericsson as the leader of the infrastructure segment. The consequence for this will be that Ericsson will lose their number one position to this new actor. Horizontal integrations are completed to become larger and take market shares and therefore increase the profits. Another reason for integrations is to increase the bargaining power towards the buyer and therefore maintain the value and profit in the company, instead of letting it flow towards the buyer.

Korean mobile phone brands LG and Samsung are also possible candidates for a horizontal integration. These actors are both focusing on the same type of mobile phones, touch-screens, and have grown a lot lately. Merging these companies would create a worthy competitor of the number one position to Nokia. The probability for this merger is however lower than for the Huawei-ZTE example. This is because the brand on the mobile phone is more important than the brand on the infrastructure

equipment. Consumers are more likely to be loyal their brand since mobile phone brands often have the customer ownership.

Vertical attempts to further expand the presence in the value chain have been made by mobile phone brands and OS. The mobile phone brands tries to extract a larger profit from the post-sale market through music services and the OS are trying to achieve the same thing by founding market places for application providers and provision from these sales. This trend is likely to be successful in the future. The openness that comes with OS such as Android and Symbian makes it easier for smaller developers to contribute with software to these application stores. Vertical integrations are often completed to acquire innovations and possibilities to own a larger part of the affair for a longer time.

There are always going to be companies wanting to vertically integrate other businesses. However, this will make the companies less flexible to changes on the market. Consider the example given by Fredrik Öijer: Microsoft has come a long way in vertical integration but they have not launched a Microsoft mobile phone, which is due to the realization of the fact that this would be both very costly and inflexible. Once they start to manufacture mobile phones they are stuck. Therefore it is difficult to be a fully vertical integrated supplier of mobile phones.

There are two opposite tendencies among segments in the industry: first, application providers and operators might work together to reduce mobile phone brands' bargaining power, and second, vertical integration from mobile phone brands towards services and content reduce operators' influence. Likely is to see another attempt from Google to further break the value chain by acquiring a mobile phone brand. Motorola is the company most likely to be acquired by Google. There are three main reasons for this statement; first, Motorola is an American company, just as Google, second, Motorola have announced that they will release mobile phones running Android, and third, Motorola have suffered from declining sales for a long time and is therefore in need of financial power, which Google can offer.

Second, getting closer to the customer

Access to content and the ease of use are two of the most important aspects for the end consumer. A good experience is a key to a satisfied consumer. Possibility to get access to the content the consumer demands is not sufficient, if the access is complicated the consumer will not use it and the potential revenues will vanish.

Good user interface will be very important in the future. The services and products are likely to have more substitutes than ever and the best way to win the affair will be

by offering simplicity by user interface. To continually develop this user interface the customers must have a central role in the development process.

An example of these new cooperations regarding the value creation process is Spotify and their attempts to get into the mobile. Spotify as an application provider along with music companies, mobile phone brands, and operators is included in an ecosystem were all creates value for the consumer and captures separate value in the process.

Not implementing the new ways of creating value will be devastating, and the power balance will change in favor of the competition. All the successful examples of co-creation clarify this assumption even more.

Understanding the customer as well as working closer together will be methods of getting closer to the customers. Nokia's Ovi is a good example of moving closer the customer. They will become a more vital part for the customer even after the sale and both selling applications and receiving valuable customer data with this initiative. This is a good way of redesigning the business model to move towards an inflow phase.

As mentioned before, Lindoff categorized the mobile phones on the market today, but an interesting question is how a mobile phone would be designed to be placed in the current segment gap, a mobile phone which can be profitable in the gap between the high-end and low-end phones. This is a market segment which every actor has avoided leaving room for a new actor to enter. Probably, some kind of low-end 3G phone to the emerging markets could be the right device for this gap. As the emerging markets are growing and the 3G coverage becomes ubiquitous, a market is made possible for this type of mobile phone. Actors likely to fill this gap are the companies with a strong position in these emerging markets such as Huawei.

Third, the operators must reinvent their position in the value chain to maintain high profitability

To avoid becoming a bit pipe-provider we believe the operators must find new ways of creating value for their customers. They will of course manage with the profitability they have today from fixed lines for a few years, but in order for the operators to achieve higher profitability they must reinvent their current position hence the importance of fixed lines will probably diminish in a few years since the capacity of mobile broadband is increasing. In order to reinvent their position, the operators must first of all find out who will be their most important customers in the future. As the bandwidth gets higher, which enables the operators to offer more advanced services, we believe they can also increase the customer base. As the bandwidth increases, companies such as white goods companies and insurance

companies to offer services via mobile infrastructure. For example, the refrigerator could communicate with the owner and tell him or her when groceries are getting old or if new groceries need to be purchased. This is only one example of what the future technology can be used for. We believe this opens up for thousands of new improved solutions.

Our interpretation is that the value chain will not be reconfigured to any large extent within the upcoming few years. The profits however are likely to continue the downward trend due to the fact that communication will eventually become a commodity. It will be even more important to find new ways of offering services to new industries and companies. This service segment is fairly unexplored and there are still great possibilities for the operators to exploit. The operators' business model will not be designed as they are today. If all electronic devices will have an IP-address in a few years, it will probably be difficult for the operators to charge per MB as they are currently doing. A future business model will probably be a combination of flat rate pricing and available services and content in the network. However, most of the revenues will migrate from the traditional operator services into content and application. This is already happening with the application stores, were the mobile phone brands and OS providers is circumventing the operators.

Fourth, keystones will capture the value

Changing the power balance will be a key strategy to capture value. The keystone in each ecosystem will be the actor that captures most of the value. In the case of Android the most value will in some way return to Google, in form of valuable metadata to their original business model, and HTC which initially was the only manufacturer of a mobile phone running Android.

When it comes to other actors such as the mobile phone brands, they will also benefit from taking a central part of the ecosystem. In the Spotify example, they could easily become the keystone and control the developing process. This will make them more powerful in the bargaining situation and enables more value capture possibilities.

Regarding the other segment the main power attribute is size. TSMC controls half of the market and has the highest profit margin of the segment. Ericsson controls a third of the infrastructure vendor market. They also maintain their market share when second and third actor, Nokia-Siemens and Alcatel Lucent are losing their shares.

In the OS segment, Microsoft has lost both market share and bargaining power with the strong entry of Android and Symbian Foundation. They have to revise their business model in order not to fall to far behind. They have the size and the money

from their other business segments that can be injected in the mobile OS, so it is likely to experience a revival from Microsoft in the mobile telecom industry.

Once again, the successful example of application stores is applicable. Becoming the keystone in the ecosystem comes rather natural in this example, and the potential value to capture is rather large. This is mainly since the offerings are so diverse that all types of customer easily find what they are looking for.

Fifth, flexibility will become even more important

Flexibility will become even more important in the future, especially when considering open source, integrations, and what the 4G technology will enable. Since open source is one of the future trends among OS providers, more interested parties will have the opportunity to affect the design of an OS. This is also in line with the fact that customers will be more and more involved in the development of products and services; open source is therefore a kind of enabler for co-creation with customers. The entrants from open source OS also puts pressure on the mobile phone brands to reduce the time to market for their phones.

Before, the OS on PC and mobile phones were two complete different kind of software, but now they are becoming more and more similar. The mobile phones that were sold used to run proprietary OS, but they are rapidly changing to open source OS, which is more flexible and can be easily adjusted to the changes on the market. This in turn, accelerates innovation and creativity by involving other interested parties, such as customers, who can help create value and thereby increase profitability.

The new 4G technology will enable a more flexible use of the mobile phone due to larger capacity and more features and applications in only one device. The integration of mobile broadband and broadband through fixed lines will also make it more flexible and increase internet accessibility. The services offered by the operators must therefore become more varied depending on customer type and demand.

For hardware and components, the increased standardization will make it easier to become flexible. Since LTE will combine the communication standards between different regions of the world, the chipset providers' product development and production will be less complex and their products could serve larger regions of the world.

6.2 Concluding the five observations

Both horizontal and vertical integration makes the companies larger and less flexible, which in turn makes it more difficult for them to adapt to the market and the rapidly

changing consumer needs. However, it is through size, integration and cooperations that a company can take a keystone advantage position. To become a so called keystone, and be able to capture most of the value created within the industry, it is important to have the customer in focus and apply co-creation and the customers-as-innovators approach. By taking in the consumer early in a product development process, the risk of loosing flexibility to changing consumer needs. Currently, it is the operators and the mobile phone brands that are competing for the position as keystone within the mobile telecom industry.

6.3 Value chain development

The segments most likely to change their position in the future will be the mobile phone brands. For the first time the technology is more advanced than the demands from service offerings. This enables for full integration of the technologies and the limits now lies in the services. Since the mobile phone brands possess the expertise regarding the technology it is most likely that they become the keystones in the ecosystem that develops the new value for consumers in the future.

Open source have opened up for new smaller actors to enter the competition and redefine the industry configuration. The development will become less expensive and the time to market will become shorter. Small actors could then in some way reconfigure the value chain and circumvent large actors.

When it comes to new segments it is more likely to see larger cooperation within the current value chain that incorporates actors from related industries, such as the Internet industry. The actor becoming the keystone in these ecosystems will be the most profitable actor in the industry. For example, Google will become an indirect part of the mobile telecom industry via Android. They are letting other actors use their brand name when developing and selling devices running Android. Google will therefore capture value, both in form of profit and metadata, with a smaller risk and effort than the smaller actors in the ecosystem. Other actors from within in the mobile telecom industry that becomes the keystones will capture value because they already posses the strategic capabilities that is suitable for the industry, such as a consumer base, distribution channels and supplier relations. The most obvious actor that can become a great keystone is Nokia. They have already come a long way in becoming a keystone already, with their Nokia Club evolving into Ovi, their control over Symbian Foundation, and their market dominance in mobile phones. If Nokia becomes to dominating it could scare away the smaller actors in the ecosystem, the niche players, which will weaken the ecosystem. Symbian is in the risk zone of this, when Android entered many actors chose Android instead of Symbian.

In general the mobile phone brands have the possibility to enjoy the keystone advantages, since it is most logical to have the mobile phone and its performance as a central part of the development process in the ecosystem. Bringing together all the various actors in the ecosystem is likely to be performed by the mobile phone brands while they already have the vital relationships to implement this.

Segments that will experience harsher conditions will be the ones offering commoditized products with many substitutes. For the semiconductor companies the development process is long and costly, but the production is relatively simple. This makes it hard for those companies to be flexible. It is therefore likely to see more differentiation in this segment. Perhaps one semiconductor company will move towards becoming the low-end alternative, offering only cheap products to companies focusing on emerging markets. Besides the semiconductor foundries and the ODM/EMS companies, which both are offering relatively simple products and services, the operators will be at risk of commoditization. Communication alone will not be a value added service in the future. Therefore the bargaining power for the operators will be reduced in the future, which will lead to lower margins and less control of the industry for the operators.

6.4 The industry as a value chain

As stated early in the thesis, the mobile telecom industry is a complex industry. For our purpose the value chain simplification has been sufficient. However, if trying to analyze any deeper the value chain will become limiting, since the theories chosen only uses a dyadic approach. A value network would be more explanatory for the industry, since the relationships would be closer to the reality. Nevertheless, the theoretical framework regarding the dyadic power balance would have been too complex to analyze using a network based structure to explain the industry. The dyadic approach had been impossible to implement, in reality the relation between segments and industries are multi faceted.

Using a different point of view for the industry configuration would require theories either complementing or replacing Cox' dyadic relationships. Perhaps an analysis with the classical five forces from Porter for each node in the value network could have been completed for a deeper analysis. On the contrary this would have been too time consuming and difficult to complete, which would have been outside our limited time frame.

6.5 Evaluating the 4C-process

To claim possession of a theoretical process in order to predict the future is not to recommend. This study does not make such a claim. Instead, it has presented a way to

describe, analyze and present a possible future outcome. The process is based on subjective assessments and assumptions, which means that it will not give the same conclusions when applied by others. However, it is possible to adapt it to analyze other industries and areas of interest. The process is to some extent customizable due to the possibility to change some of the theories used in the process. However, the theories should remain within the selected areas. We believe that these four areas are important when analyzing an industry.

6.6 Further studies

We have based our research on the 4C-process which has been developed for the purpose of the thesis. Since the process were developed during a limited time, we believe there are plenty improvement potentials.A suggested future study is to further develop the 4C-process. It could be applied to new whole industries or segments of industries. It could also be of interest to see how it works with only one focal company. When developing the 4C-process, new concept for industry configuration than power balance could be implemented. When the industry structure is hard to simplify with the value chain and dyadic relations between the segments, the theory of power balance will not be sufficient.

An important future study could be to implement a case study using the 4C-process. Either a specific segment or a company could be analyzed using the process. It would be interesting to investigate the outcome of the process based on a case study involving new phenomenon such as Spotify, application stores or Android. When applying a specific case to model, it would be easier to conduct marketing surveys regarding the perceived value for the customers. One central aspect is currently missing in the 4C-process, the ability to quantify. This would be of high interest to incorporate in the model and is therefore the last suggestion for further research.

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Respondents

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Sandström, Per-Arne. Former VP and COO at Ericsson.

Wingren, Tord. CEO at Nanoradio. Member of the Board at Obducat. Former: Chairman Advisory Board at TAT AB, EVP & CTO at Digital Imaging Systems and MD at Samsung Electronics. He was, as the first CEO, successfully heading Ericsson Mobile Platforms into becoming the world´s leading mobile phone platform provider.

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APPENDICES

Appendix I

Semiconductors	
TSMC	(Taiwan Semiconductors Manufacturing Company, 2004-2009)
Chartered	(Chartered Semiconductor Manufacturing Ltd., 2004-2009)
SMIC	(Semiconductor Manufacturing International Corporation, 2004-2009)
UMC	(United Microelectronics Corporation, 2004-2009)
Reference Hardware	
TI	(Texas Instruments Incorporated, 2004-2008)
Qualcomm	(Qualcomm Incorporated, 2004-2009)
STMicro	(STMicroelectronics N.V., 2004-2009)
Infineon	(Infineon, 2004-2009)
Broadcom	(Broadcom, 2004-2009)
Intel	(Intel, 2004-2009)
Mobile Phone Brands	
Nokia	(Nokia Group, 2004-2009)
Samsung	(Samsung Electronics, 2004-2009)
LG	(LG Electronics, 2004-2009)
Motorola	(Motorola Incorporated, 2004-2009)
Sony Ericsson	(Ericsson, 2004-2009)
ODM/EMS	
Flextronics	(Flextronics International Ltd., 2004-2009)
Celestica	(Celestica, 2004-2009)
Sanmina-SCI	(Sanmina-SCI, 2005-2009)
Foxconn	(Foxconn International Holdings, 2005-2009)
Infrastructure	
Ericsson	(Ericsson, 2004-2009)
Nokia Siemens	(Nokia Group, 2004-2009), (Siemens, 2004-2007)
Alcatel-Lucent	(Alcatel, 2004-2007), (Lucent, 2004-2007), (Alcatel-Lucent, 2008-2009)
Huawei	(Huawei Technologies Co., 2004-2008)
ZTE	(ZTE Corporation, 2004-2009)
Operators	
China Mobile	(China Mobile Limited, 2004-2008)
Vodafone	(Vodafone Plc Group, 2004-2009)
Telefonica	(Telefónica, 2004-2008)
Verizon	(Verizon Communications Inc., 2004-2009)
Telenor	(Telenor, 2004-2009)
T-Mobile	(Deutsche Telecom Group, 2004-2009)
Orange	(France Telecom, 2004-2009)
TIM	(Telecom Italia, 2005-2008)

Appendix II

Segment	Company	(In 1000 USD)	2003	2004	2005	2006	2007	2008
Semiconductor Foundries	TSMC	Revenue	6250067	8331114	8103600	9739400	9966700	10608000
	Chartered		551911	932131	103300	1415000	1355486	1661120
	SMIC		359779	974664	1171319	1465323	1549765	1353712
	UMC		2626955	3817841	2913780	3405787	3386997	2824000
	TSMC	Operating profit	1712258	3048838	2845100	3642100	2355900	3549000
	Chartered		-282611	11345	-145000	91000	10255	-97038
	SMIC		-72746	88841	-87040	-13870	-35932	-376937
	UMC		434005	1036323	225548	1211051	620685	-653000
		Operating margin	**18,3%**	**29,8%**	**23,1%**	**30,8%**	**18,1%**	**14,7%**
Chipset Providers	TI	Revenue		12580000	13392000	14255000	13835000	12501000
	Qualcomm		3847000	5031000	5673000	7526000	8871000	11142000
	STMicro		7234000	8756000	8876000	9838000	9966000	9842000
	Infineon		7675510	9770725	8019011	10410337	6305266	5723122
	Broadcom		1610095	2400610	2670788	3667818	3776395	4658125
	Intel		30141000	34209000	38826000	35382000	38334000	37586000
	TI	Operating profit		2207000	2791000	3367000	3497000	2437000
	Qualcomm		1565000	2566000	2809000	3155000	3626000	3826000
	STMicro		242000	672000	275000	764000	-494000	468000
	Infineon		-429190	426408	-317960	-73525	-70042	51977
	Broadcom		-1301625	206940	292197	243680	84975	172130
	Intel		7250000	10128000	12045000	5866000	8373000	7198000
		Operating margin	**14,5%**	**22,3%**	**23,1%**	**16,4%**	**18,5%**	**17,4%**

Segment	Company	(In 1000 USD)	2003	2004	2005	2006	2007	2008
Mobile Phone Brands	Nokia	Revenue	29263506	30101166	24697677	42862387	55019683	49306792
	Samsung		12805165	19051919	21431573	23331264	23860113	22912301
	LG		4674787	8400347	8647509	10223248	11868877	12481716
	Motorola		10978000	17108000	21459000	28383000	18988000	12099000
	Sony Ericsson			7741389	8622899	14388559	18847215	15795480
	Nokia	Operating profit	7162728	5359979	5260585	7114846	11231574	9879902
	Samsung		1893722	2826605	2541276	2232623	2447191	2032266
	LG		224541	533132	393488	119826	1007200	1375424
	Motorola		479000	1728000	2192000	2690000	-1201000	-2199000
	Sony Ericsson			659982	609820	1704202	2296804	-116598
		Operating margin	**16,9%**	**13,5%**	**13,0%**	**11,6%**	**12,3%**	**9,7%**
ODM/EMS	Flextronics	Revenue	13329197	14479262	15730717	15287976	18853688	27558135
	Foxconn (Hon Hai)			16236900	29500200	40595300	51833300	61834700
	Celestica		6735300	8839800	8471000	8811700	8070400	7678200
	Sanmina-SCI			7638042	7644932	7645118	7137793	7202403
	Flextronics	Operating profit	-148766	-411368	262845	164736	324953	65667
	Foxconn (Hon Hai)			1062500	1692900	2495300	3078900	2301400
	Celestica		-237200	-582200	24300	-73500	58300	-673000
	Sanmina-SCI			-117649	-678084	-174933	-1142027	-490331
		Operating margin	**-1,9%**	**-0,1%**	**2,1%**	**3,3%**	**2,7%**	**1,2%**

Segment	Company	(In 1000 USD)	2003	2004	2005	2006	2007	2008
Infrastructure Vendors	Ericsson	Revenue	14185734	18279290	17529136	23856472	19488973	17912989
	Nokia Siemens		15897489	18144080	22253675	26958690	19518453	21505960
	Alcatel Lucent		24081778	25700725	25024623	24921585	25892000	23858986
	Huawei		2694000	3827000	5982000	8504000	12560000	18329000
	ZTE		2126000	2651000	2700000	3029559	4819590	6649463
	Ericsson	Operating profit	-829475	3453402	3812963	3815647	2628097	1405422
	Nokia Siemens		-729872	1493787	1513872	1432422	-1908653	-422842
	Alcatel Lucent		192218	2547112	2671653	1580183	-1033000	-78668
	Huawei		511860	688860	837480	595280	879200	2382770
	ZTE		183000	216000	223000	134509	239433	186963
		Operating margin	**-1,1%**	**12,2%**	**12,3%**	**8,7%**	**1,0%**	**3,9%**
Operators	China Mobile	Revenue	19583884	23715607	30617410	38544899	49469082	61902210
	Vodafone			54116058	40611307	52931249	57654776	48208820
	Telefonica		35432859	41176781	44351930	69456078	82359526	81402073
	Verizon		61754000	65751000	69518000	88182000	93469000	97354000
	Telenor		7758952	9480991	9779449	14380579	16902165	13849839
	T-Mobile		69369044	77812722	70710617	80483499	91200906	86675662
	Orange		57542620	64038648	57045435	67881858	77278541	75139511
	TIM			38420201	35496493	41062340	45658822	42365715
	China Mobile	Operating profit	6569326	7332224	9282691	11996424	17193936	21409806
	Vodafone			20553336	14373578	18370165	19033205	14699590
	Telefonica		7894971	9825316	7838675	8880757	15590248	15333304
	Verizon		7480000	16769000	18608000	18853000	21088000	23312000
	Telenor		1109071	1151095	1680398	17708000	2738950	2163387
	T-Mobile		10355451	8555325	9016790	6958606	7733837	9833544
	Orange		21587996	24798222	20788447	19447334	27593746	25353685
	TIM			10324784	8896962	9764368	8410912	7674378
		Operating margin	**21,9%**	**26,5%**	**25,3%**	**24,7%**	**23,2%**	**24,1%**