
The Mobile Handset Evolving

- The effect of IT-players' entrance in the mobile handset industry
-

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Abstract

- Title:** The Mobile Handset Evolving - the Effect of IT-players' Entrance in the Mobile Handset Industry
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- Problem discussion:** The telecom and the IT-industry are converging, which creates new possibilities and threats for both existing mobile handset vendors and new entrants originating from the IT-industry.
- Purpose:** The purpose of this thesis is to explain how IT-players'¹ entrance in the mobile handset industry affects the industry in regards of key success factors and value chain structure.
- Methodology:** This study has used dynamic theories to describe the mobile handset industry. The theories have helped us in understanding the characteristics and drivers of the industry and thereafter to identify the key success factors. The empirical material is mainly collected from the Internet and interviews.
- Conclusions:** The possibilities for IT-players to affect the mobile handset industry have been identified. Although the IT-players lack some KSF, they should be considered a threat in the future. We have concluded that value seems to be migrating from the mobile handset provisioning to services and applications, granting further possibilities for IT-players.
- Key Words** Convergence, mobile handset, IT-industry and PC-like

¹ IT-players refer to companies related to provisioning or usage of a personal computer.

Preface

Our master thesis which has resulted in this report has been very instructive and of great challenge. We would therefore like to thank all of the people that have made this possible.

We would like to thank Martin Jönsson at Ericsson Mobile Platform (EMP), for his invaluable support. His inspiration and comments has pushed us in the right direction and forced us to be better than our best. We would also like to thank, all employees at EMP that have participated in our seminars and interviews. These interviews and seminars have been of utmost significance for our thesis.

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1 Introduction

This chapter will discuss the background of our thesis, which will lead us to the problem discussion and subsequently the purpose. Furthermore contribution, delimitations, target audience and the thesis' disposition are included.

1.1 Background

Traditionally the *mobile handset*, a device which communicates with cellular technology, was used for voice services, whereas today an increasing amount of data, such as SMS, MMS and e-mail, is driven through networks. The mobile handset has shaped consumer behavioral patterns by enabling mobility and availability. We are no longer tied to either time or space as we anytime and anywhere are able to reach and to be reached by both people and information. Moreover, it is evident that the mobile handset is becoming more *PC-like*, featuring services such as Internet access and instant messaging. Thus, the telecom industry and the IT-industry are converging, which creates new possibilities and threats for both existing mobile handset vendors and new entrants originating from the IT-industry. *Convergence* is when previously separate industries overlap, in terms of activities, technology, products and customers². As referring to customer it concerns both customer and end consumer, but as referring to consumer it concerns only the end consumer.

The mobile handset industry has historically been shaped by different *drivers of change*, drivers that affect the industry's development. When the mobile handset industry emerged, mobile handset vendors focused on decreasing size and weight of the mobile handset, as well as increasing stand-by time, in order to appeal to a broader consumer base. When the mobile handset met mass market demand, design, brand and user-friendliness became important parameters as consumers desired more personalized products. Subsequently, multimedia functions such as MP3 player and camera were also incorporated in the mobile handset as an attempt to differentiate products and attract new consumers. The mobile handset market evolved from being a one-phone market to a segmented market. Today mobile handset vendors offer a broad product portfolio, ranging from low-end to high-end products to support all segments in both emerging and replacement markets. *Emerging markets* mainly consist of first-time users and are characterized by growth while *replacement markets* are mature and characterized by experienced users.

The transition of the mobile handset industry from technology-oriented to consumer-oriented granted consumer electronic companies the possibility to enter the market. *Consumer electronic companies* manufacture a broad field of electronics devices purchased for entertainment usage, such as TVs, radios and walkie-talkies³. Their entrance affected the industry structure and the intensity in competition. Consequently, the factors needed for success in the competitive landscape changed. The consumer electronic companies that could manage the factors entered successfully and those mobile handset vendors who did not manage to adapt, were left in crisis.

² Johnson, G et al. (2005) *Exploring corporate strategy*. p 77

³ PC Magazine, www.pcmag.com/encyclopedia_term/0,2542,t=consumer+electronics&i=40255,00.asp, 2007-04-13

In our thesis, the term *industry* denotes a group of companies producing the same principal product⁴ and *market* is where those companies make their profit. Further, the *telecom industry* includes companies which provide both fixed and mobile voice communications, as well as services related to these activities. The *mobile handset industry* is a sub industry to the telecom industry and includes players which are related to the provisioning and usage of the mobile handset. When discussing the mobile handset industry our main focus is on the *mobile handset vendor*, which provides and sells mobile handsets. The *IT-industry* is an umbrella term for companies involved in provisioning and usage of a personal computer, including components and accessories, applications and services, both in hardware and software. Examples of applications and services are word-programs, internet browsers and community sites. The players in the IT-industry are referred to as *IT-players*. The IT-players are companies related to provisioning and usage of a personal computer and cover a wide spectrum, reaching from Internet companies, hardware producers and software producers.

The mobile handset industry is a high-tech industry evolving in a dynamic environment. Rapid technological development and changing consumer demand creates a new and fast changing competitive landscape. It is therefore significant to understand the industry's *key success factors (KSF)*, the factors within the company's market environment that determine its ability to survive and prosper⁵. In the battle to achieve temporary competitive advantages in an environment characterized by *hypercompetition*, the rules of the game shift, strategic alliances are formed and new ways of serving consumers are created. If companies do not want to see their *value migrate*, they now more than ever need to use *creative destruction* to keep up with *sustaining* or *disruptive innovations*.

1.2 Problem discussion

Today's business environment is characterized by an accelerating pace of change⁶. Deep pockets, cutting edge technology, a leading distribution system, cost leadership and first mover advantages no longer provide long term security⁷. As boundaries between the telecom and IT-industry blur, involved players seek to find the most profitable possibilities for the future and create value adding products and/or services. Companies strive to form strategic alliances, block new entrants and create industry standards. In this new business environment, what is required to become successful?

The mobile handset industry has historically proven difficult to master, both for incumbents and newcomers. While several consumer electronics companies attempted to penetrate the mobile handset industry only some survived. As they entered, the industry structure reshaped and the rules of the game changed, leaving some incumbents struggling for survival. Why did some companies succeed while others failed in the mobile handset industry? What can we learn from the past and will history repeat itself, but in a different way?

⁴ Johnson, G et al. (2005) *Exploring corporate strategy*. p 77

⁵ Grant, R. (2005) *Contemporary strategy analysis*. p 92

⁶ Sengupta, S. et al (2006) *Strategic opportunities at the intersection of globalization, technology and lifestyles*. Handbook of Business Strategy. p 43-50

⁷ D'Aveni, R. (1994) *Hypercompetition*. pp 1-7

The present mobile handset industry is still complex. The volumes in the mobile handset market have grown large and almost one billion devices were sold worldwide in 2006⁸. The size of the volumes is impressive when put in relation to PC shipments, which reached 230 million in 2006⁹. The majority of the mobile handsets sold pass through the sales channel, namely the operator which thus advantage in first-hand consumer information. Could the large volumes be handled by IT-entrants? What is needed in order to sell the volumes required to become an incumbent and market leader in the mobile handset industry?

The mobile handset is facing a new transformation as it is becomes more PC-like, being equipped with a QWERTY keypad and an open operating system which enables third party applications. Services previously related to Internet usage, such as downloading, e-mail, browsing and instant messaging, are found in the mobile handset. Most of these features and services are the home arena of IT-players, perhaps providing possibilities and giving them a lead in the field. Can the IT-players manage the factors needed to succeed in the mobile handset industry?

The mobile handset industry's value chain has changed from vertically integrated to vertically specialized. In this thesis, a *value chain* shows the inter-organizational links between actors, which add value to a product or a service. In a vertically *integrated* value chain, one company performs most value adding activities itself, while in a vertically *specialized* value chain; several companies conduct specific activities. Vertical specialization grants possibilities for new entrants, since interfaces between activities become standardized. What possibilities will the vertically specialized value chain grant IT-players?

The mobile handset industry will probably see IT-players' attempts to enter as more than a temporary threat. The top five mobile handset vendors, Nokia, Motorola, Samsung, Sony Ericsson and LG, are all investigating new technologies, creating strategic alliances and adapting their product portfolios to retain their strong positions in the future. But as IT-players enter, the industry structure and value chain will most likely reshape. The question is not *if* the IT-players will enter, but *how* and *what* key factors are needed to succeed in this new business environment? What impact does IT-players' entrance have on the mobile handset industry?

1.3 Purpose

The purpose of this thesis is to explain how IT-players'¹⁰ entrance in the mobile handset industry affects the industry in regards of key success factors and value chain structure. In order to achieve this purpose, three research questions are formulated.

What key success factors for the mobile handset industry can be identified by describing the historical and technological development of the mobile handset industry?

⁸ Ny Teknik. www.nyteknik.se/art/49350m, 2007-04-12

⁹ Linuselectrons, www.linuxelectrons.com/news/hardware/worldwide-pc-shipments-grew-8-7-fourth-quarter-2006-says-idc, 2007-04-13

¹⁰ IT-players refer to companies related to provisioning or usage of a personal computer.

When describing the mobile handset industry value chain evolution and present structure, where do possibilities in the value chain exist?

Do the IT-players possess the key success factors needed in the mobile handset industry?

1.4 Delimitations

This thesis is written from the perspective of the mobile handset vendor. Companies originating from the IT-industry have entered or are entering the mobile handset industry which pose a threat for mobile handset vendors. In this thesis, we assume that they will further strive to enter and establish themselves. We also presume that consumers are susceptible for new technology and applications that could derive from the entrance of new players.

The purpose of our descriptions of the mobile handset industry and the cases of mobile handset vendors (chapter 6) is to build the foundation for the identification of key success factors. Therefore, the description is not exhaustive instead it is focused on the period from 1997 to April 2007. However, a brief retrospect of the development in the 1980s and 1990s is found. The case study of IT-players (chapter 8) is likewise non-exhaustive.

Although there are numerous technologies emerging, we have focused on the cellular technology standards used globally and two mobile internet technologies, WiMax and WiFi, since we believe these are of great importance. We have thereby left out other potential technologies.

The open operating systems presented in this thesis are Symbian, Windows Mobile and Linux, since they are the main open operating systems. By this choice, we exclude all other open operating systems.

1.5 Target audience

The target audience of this master thesis is students of strategy and technology, as well as people with academic interest in the dynamic theories presented in this thesis, namely *disruptive innovation*, *hypercompetition*, *creative destruction* and *value migration*. The target audience is also Ericsson Mobile Platforms and other companies in the telecom industry and IT-industry, as well as people with a special interest in these.

1.6 Disposition

This thesis will not follow conventional layout, where theory, empirical material and analysis are presented in individual chapters following each other. Instead the chapters are arranged in an order which intends to keep the reader more interested by letting the analysis of the research question directly follows the empirical study. Further the layout follows the sequential order of our research questions (see Figure 1-1).

The problem discussion and purpose underpins the foundation of this master thesis, and were presented in this chapter. The theoretical framework (chapter 3) aims to support the description of

the mobile handset industry and IT-players and is an important ingredient in our analysis. To acquire an extended perspective of the core essence of each presented theory and their correlations, a theory discussion is presented (chapter 4).

The descriptions of the technological development (chapter 5) and the evolution of the mobile handset industry (chapter 6) aim, exemplified by case studies of mobile handset vendors (chapter 6) aim to identify key drivers of change and key success factors, thereby answering to our first research question (chapter 6). The mobile handset industry value chain evolution and present structure (chapter 7) respond to the second research question.

Case studies of various IT-players and whether these IT-players possess the key success factors needed in the mobile handset industry answers to the third research question (chapter 8). The determination is specific and case-wise and makes out the foundation to the general discussion (chapter 9) and comprehensive empirical conclusions (chapter 10) about how the IT-players affect the mobile handset industry. Chapter 9 thereby fulfills the purpose of this thesis. Conclusions (chapter 10) aim to determine the comprehensive conclusions, this thesis' contribution and further research areas.

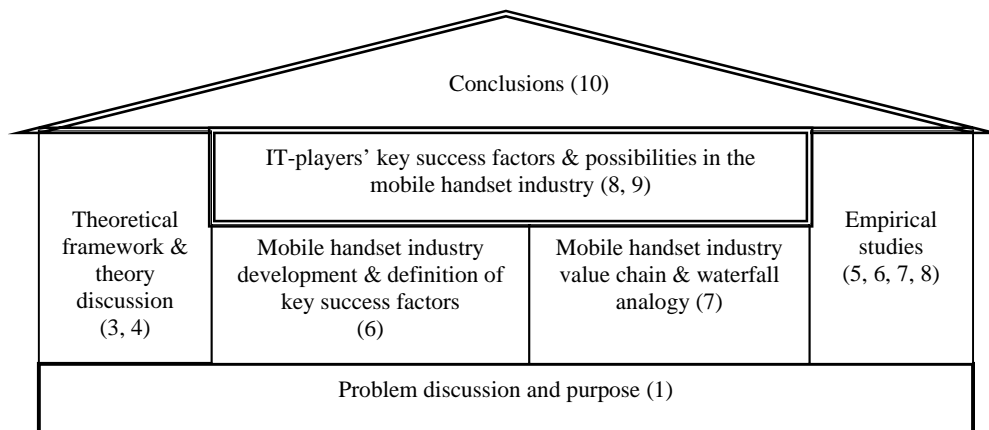


Figure 1-1: *Disposition and working process of the master thesis.*

Throughout the master thesis, choices and trade-offs have been made. These alongside with our working process, data collection and source criticism are discussed in the methodology section (chapter 2).

In Appendix I, definitions are collected, as a help for the reader throughout the thesis. Appendix II collects figures and tables used in the thesis. Appendix III presents the list of all success and failure factors of the mobile handset vendors. The full matrix of IT-players' key success factors is presented in Appendix IV.

2 Methodology

This chapter aims to clarify which methodology has been used to fulfill our purpose and it will further explain the progress of our work and the choices made throughout the study. The chapter is divided into three parts. The first part, comprehensive approach, will discuss our reasoning methods. The second part, practical approach, will describe how and why we have chosen to collect and work with used information. The term key success factor is defined and the verification of these is discussed. Finally we will take a critical standpoint to our work process and achieved results.

2.1 Comprehensive approach

This study has its starting point in the mobile handset industry structure; the players, the industry characteristics, the value chain, drivers of change, different factors of success or failure and the key success factors in the industry. In order to obtain a thorough understanding, a global perspective is required, where both current and emerging players are studied. The mobile handset industry changes rapidly, thus it might seem as the history does not provide useful information and should not be considered. The mobile handset industry is, though, regarded from both a historical and a contemporary perspective, since we believe that there is much to learn from the historical events that have shaped the industry. To capture both the most possible and the most recent indications on changes in the industry we have continually updated our empirical studies until April 2007, thereby it is of our expectation to present an understanding of the industry today and how it is evolving.

The convergence between the mobile handset industry and the IT-industry results in threats and possibilities for companies in the mobile handset industry as well as the IT-industry. The convergence gives rise to new services and provides possibilities for new entrants. Our focus will be on how the IT-players will affect the mobile handset industry upon entering. It is not possible to determine the future and this should not be seen as a study of the future. Instead we aim to, with knowledge of the past along with our theoretical framework, determine patterns and trends of the present development.

We are aware of that our attempt to create an understanding for the development of the industry has implicated on details and each player's individual impact. The aim with having a macro perspective in this study is to increase the value and to a larger extent visualize tendencies of change.

2.1.1 Methodology approach

When producing knowledge, two mainly different ways of reasoning exist. Either deductive, the proof of evidence, or inductive, the explorative. In our study, the deductive reasoning has had some influence on the inductive reasoning and vice versa, hence it can sometimes be hard to separate the two.¹¹ We have used an explorative reasoning but not as the inductive reasoning

¹¹ Andersen, I. (1998) *Den uppenbara verkligheten*. p 29-30

states, based our theoretical choices on the outcome from the empirical studies¹². We have as in the inductive reasoning described, most peoples' point of view based on the comments from one or a few persons.¹³ The deductive reasoning has also been used, since the results of our observation are achieved with help of the theoretical framework¹⁴. The working process has, in opposition to the deductive, not been of linear nature. Therefore, we have used an abductive reasoning, also called the golden mean, which combines the two ways of reasoning and is about choosing which hypothesis best describes stated problem¹⁵. The abductive reasoning has been combined with a qualitative view¹⁶ which was most suitable for this study as the environment of chosen industries are dynamic and fast changing. These circumstances demanded, to create a deeper understanding of the industry and its development, time for reasoning and reflections among people interviewed.

2.1.2 Perspective

This study is conducted from a company point of view. Both our problem discussion and purpose discuss how the settings in the mobile handset industry; its structure, players and key success factors, might change for the mobile handset vendors. The focus of our analysis changes from company to business view, namely business relations between mobile handset vendors and IT-players.

2.1.3 Purpose and Problem discussion

Initially in a study, different choices have to be made concerning the problem discussion. These choices not only concern what to study, but more importantly what not to study. It is important that the author is aware of the choices available and also what consequences that follow a certain choice.¹⁷ The purpose and problem discussion presented in this study are therefore a result of an iterative process, with reasoning among us as the thesis' authors and tutors.

In our case, an intensive design is chosen, combined with both descriptive and explanatory problem discussion. An explanatory problem discussion assumes description, thus need for knowledge about the phenomenon itself before an explanation can be made.

2.1.4 Theoretical approach

The theoretical framework lays the foundation for data interpretation; therefore the theories can be seen as instruments for the analysis ahead¹⁸. We have used theories that help us understand the dynamics and complexity in technology-intensive industries. Many of theories related to studied areas have emerged recently. Authors in the field are *Christensen (1997, 2002, 2004)*, *D'Aveni (1994, 1995)*, *Slywotsky (1996)* and *Schumpeter (1942)*.

¹² Bryman, A. et al. (2005) *Företagsekonomiska forskningsmetoder*. p.590

¹³ Andersen, I. (1998) *Den uppenbara verkligheten..* pp. 29-30

¹⁴ Bryman, A. et al. (2005) *Företagsekonomiska forskningsmetoder*. p. 588

¹⁵ California State University, www.ecst.csuchico.edu/~amk/foo/csci222/notes/Diagnosis.html, 2007-05-02

¹⁶ Bryman, A. et al. (2005) *Företagsekonomiska forskningsmetoder*. p 25

¹⁷ Jacobsen, D. (2002) *Vad, hur och varför?* pp 65-82

¹⁸ Arvinus F. et al (2006) *Managing Positions in a Dynamic Environment*.

Christensen's, D'Aveni's and Schumpeter's theories were chosen to identify and explain the mobile handset industry dynamics, as well as for the accentuation on disruptive events in the environment and the effect on mobile handset vendors. We also found it interesting to achieve a schematic understanding of the industry structure, with an identification of the value-adding activities. The value migration theory is usable in order to understand how and why the value has moved in the mobile handset industry. As we assume that the IT-players have more or less already entered the mobile handset industry, we have focused on theories describing the industry, thus leaving out theories regarding entrance in an industry.

2.2 Definite Approach

2.2.1 Data collection

Collection of theoretical and empirical data has proceeded throughout the process. Our main focus was to describe the mobile handset industry dynamics and structure and obtain deeper knowledge in relevant theories to complete the theoretical framework.

As for the empirical studies, numerous data sources were used in order to meet quality criterions and make our analysis based on multiple perspectives. Primary data was gathered from interviews with employees at EMP, but also externally. Initially, open and semi-structured interviews were conducted, in order to obtain a broad picture and not influence the interviewed person's answers. It also ensured us to take part of new aspects, which might have been missed if we had asked more specific questions. Subsequently, structured interviews were conducted to gain a deeper knowledge of areas of certain interest. Informal interviews have also been carried out, practically at daily basis with mainly EMP personnel, as questions have arisen.

Data gathered during the interviews was rewritten and structured shortly thereafter to avoid information loss. It was also verified by all interviewers, and sometimes also by the interviewed person, securing that the information written was accurate and nothing was left out. Later, the data was deconstructed, weeded out and regrouped in order to enhance the most important information. Furthermore the regrouping reinforced the patterns noticed.

Secondary data was gathered from articles, literature, whitepapers, scientific publications, business reports, industry-related web pages and newspapers. At EMP we have accessed Ericsson's intranet. By using its intranet and Internet we have gained access to most recent industry updates. Many times throughout the empirical study, one data source led to another. The data has also changed as updates or new information was revealed.

2.2.1.1 Choice of empirical/case study objects

During the empirical study, players of special interest were chosen as case studies. A *case study* holds a detailed study of the situation or environment of one single case, often associated with a certain place, for example a company¹⁹. It is our aim to study cases of players from different parts of the value chain and of different structure, historical background and product portfolio. The case studies will be analyzed in depth per case, followed by a general analysis. Due to the differences of the IT-players, we do not consider them further comparable.

¹⁹ Bryman, A. et al, (2005) *Företagsekonomiska forskningsmetoder*. p. 71

Mobile handset vendors

Nokia is and has since 1998 been the foremost player in the mobile handset industry. The company still has an integrated value chain, earns the highest industry margins and has stayed atop in the competitive industry year after year, which is the reason to why we found it interesting to study.

Samsung was chosen since it made an ascent, coming from the consumer electronics industry and successfully penetrating the mobile handset industry in a short time. Samsung symbolizes the late enterer which managed to become the third largest mobile handset vendor.

Siemens Mobile was one of the top five players in the mobile handset industry. Something went wrong, market share plunged and the company was sold off, followed by a bankruptcy. We found it interesting to study what made an incumbent with years of experience in the mobile handset industry, diminish so quickly.

IT-Players

Apple has as a newcomer in the mobile industry attracted a significant amount of industry attention. Even though its iPhone initially only will be sold in the USA to one single operator, it is feared by the industry and mobile handset vendors carefully watch Apple's every step.

Dell was found interesting based on two aspects. The first aspect is Dell's direct-sell strategy and ability to handle large volumes in PC-industry, which might be an advantage in the mobile handset industry. The role of the former Motorola CEO, who now is head of Dell consumer goods, is the second interesting aspect concerning Dell as a case object.

Google is a newcomer in the mobile handset industry, focusing on content and services. Google has created the world's most used search engine and the company is expanding its business. The case is interesting to study since it solely profits from advertising and therefore separates it from the other case study objects.

Microsoft is the giant of PC operating systems (OS) and has a variant of it for mobile handsets. As open OS in mobile handsets has augmented, it was a given case study object. Microsoft has also during some time tried to penetrate the mobile handset industry with its open OS, Windows Mobile, and tries today to penetrate the industry with its Internet services, MSN. It was therefore considered interesting to see if Microsoft can become the standard in the mobile handset industry as it has done in the PC-industry.

2.2.2 Determining key success factors

2.2.2.1 Defining key success factors

Grant defines key success factors (KSF) as those factors within the company's market environment that determine its ability to survive and prosper. In order to prosper, a company must meet two criteria; supply what customers want and survive competition. The purpose of identifying key success factors is to understand the aspects of the industry environment in regards

of what motivates customers and how competition works, which are prerequisites for an effective business strategy.²⁰

Nevertheless, this does not imply that companies within an industry have the same strategies. Every company consists of a unique set of resources and capabilities and therefore it will select different strategies to link its resources and capabilities to the industry's key success factors.²¹ Companies mastering an industry's KSF must differentiate themselves from average performers to survive in the long run. Therefore a company must master capabilities that differentiate the company in the eyes of its stakeholders. Ketelhöhn proposes in his article that there are KSF for practically everything that challenges a company, for example a product launch or brand management.²² A certain company's ability to survive and prosper in a market environment we therefore term *success factors* (SF) and thereby differentiate it from Grant's definition.

Furthermore, we believe that it is not only of importance to understand the factors of success, but also factors of failure, since it would indicate what factors were managed inadequately. We would therefore like to introduce the term *failure factors* (FF), which are those factors that contribute to a temporary or eternal fall of a company. FF are identified by studying companies that have failed to supply consumer demand and survive competition. By identifying the reasons to a company's fall; other companies can avoid making the same mistakes.

The *key success factors* are industry generic and determine what is important to manage in the industry, which is to understand the aspects of the industry environment. The identification of these is based on success and failure factors of various companies, along with the key drivers of change (see Figure 2-1).

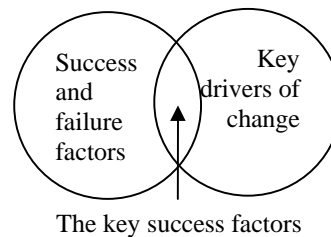


Figure 2-1: The SF and FF combined with the KDC generate the key success factors.

Key drivers of change (KDC) are those drivers likely to affect the structure of an industry, sector or market and determine the outcome of history. The purpose of identifying key drivers of change is to gain a better understanding of the industry dynamics rather than to control them. Although there will be multiple changes occurring in the macro-environment simultaneously, it will be the combined effect of these that will be important.^{23, 24} By pinpointing the key drivers of change in the mobile handset industry we aim to see what has affected and affects the industry

²⁰ Grant, R. (2005) *Contemporary strategy analysis*. pp 92-96

²¹ Grant, R. (2005) *Contemporary strategy analysis*. pp 92-96

²² Ketelhöhn, W. (1998) *What is a Key Success Factor?* European Management Journal.

²³ Johnson, G et al. (2005) *Exploring corporate strategy*. pp 69-71

²⁴ Ehrén, M. et al (2000) *Musik i mobiltelefonen*.

2.2.2.2 Verifying key success factors

When analyzing IT-players ability to affect the mobile handset industry structure, three elements are taken into account. Firstly are the key success factors and, how well the IT-players possess these. Secondly, the drivers of change that presently have impacted the mobile handset industry are considered. Finally, the value chain analysis which provides possibilities for new players and also can give indications to where value is migrating is included. The kernel in Figure 2-2 shows the possibilities for a company to succeed in the industry.

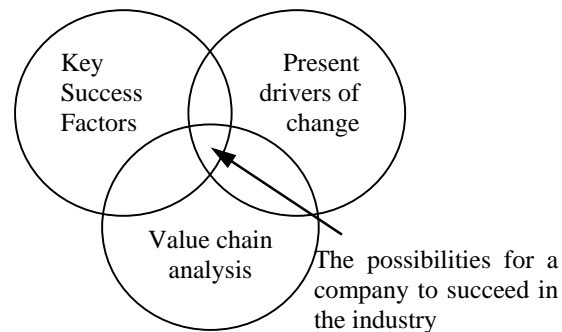


Figure 2-2: The SF and FF combined with the KDC generate the key success factors.

Since the KSF make out an important part of the analysis and conclusions of this study, it is of great importance to verify these. By studying the historical evolution of the mobile handset industry and the cases of mobile handset vendors, the KSF are determined. Thus, the history has influenced the key success factors of today, even though the mobile handset industry is fast changing. The complex of problems also regards the application of the key success factors for the future. Noteworthy is that the IT-players most likely will affect the key success factors needed in the mobile handset industry. We therefore state that the key success factors identified are valid in present, and have been influenced by the historical evolution of the industry, and we further will discuss the KSF which will possibly change due to IT-players' entrance.

2.2.3 Analysis of theoretical and empirical studies

The analysis is an enrichment of original information. New terms are created in order to put words to the phenomenon we find, categories are formed to give new insights and information is combined so patterns are shaped.²⁵ The analysis is also a way to create order out of chaos. Our analysis intends to find variables that point in the same direction. Collected data will be analyzed in a qualitative way as it will be based on written text. It is though complemented by quantitative data, which was collected to achieve an objective and trustful point of view.²⁶

The analysis was conducted through an iterative method, thus created from discussions among us as authors and at seminars which we held at EMP. The seminars have been of great value for our study and enabled us to gain access to comments and viewpoints of people with insight in the industry. It has also had a function of verifying the key success factors and the rating of these applied on IT-players, which has brought the study to an extended level.

²⁵ Jacobsen, D. (2002) *Vad, hur och varför?* pp. 215-218

²⁶ Andersen, I. (1998) *Den uppenbara verkligheten.* pp 48-49

The presentation of the empirical study and the analysis does not follow the conventional layout. Instead, the analysis of the research question directly follows the empirical study. The reason to this is not only to gradually present the findings to the reader, but also because the order of research questions depends on the previous question's findings, it is namely hard to identify if the IT-players possess the KSF before the KSF have been identified.

2.3 Methodology criticism

2.3.1 Literature criticism

One issue regarding Christensen's innovations theory, hypercompetition and creative destruction is that they all describe the industrial environment. This might give the study a shallow and diversified approach. The question is whether all three theories add something special to the study, or if they more or less describe the same thing. It has therefore been our intention to link the theories and use it as a starting point for the analysis. The similarities between chosen theories might also confirm the importance of these factors.

Another criticism is the possibility of forcing the theories upon the empirical study and create a pattern that does not exist, thus we see what we want to see. It is therefore important to note that it often is as valuable to define a theoretical connection as defining that the chosen theory is not applicable. In the theoretical research we have studied many different theories which all, to some extent could have been used. When deciding the theoretical framework we chose only the most relevant theories for our purpose, leaving out authors like *Samli (2006)*, *Stacey (1994)*, *Normann (2001)*, *Moore (1991)*, *Torres (2003)*, *Teece (1997)* and *Arthur (1996)*.

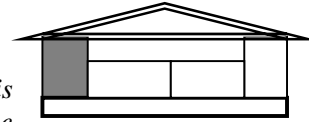
2.3.2 Source criticism of primary data

Most interviews conducted have been with EMP personnel. Of course their perspective is somewhat subjective and has most likely influenced our study. However, our close cooperation with EMP has also facilitated information gathering. The internal sources have mostly been used in fact-based areas and not in areas such as market trends which are more subjective by definition. Those market trends that EMP personnel have pointed towards have been verified by external third party sources to assure reliability.

2.3.3 Source criticism of secondary data

Our secondary data is collected from web pages and various publications, which most often have been found on the internet. The information gathered from company websites is often subjective and has in some cases been verified with other sources. Various internet sources have to a certain extent provided information. These sources might exaggerate and release information not confirmed by the designated party. Furthermore, the mobile handset industry is an industry with a never-ending flow of press releases, speculations and ongoing rumors. Since the news of yesterday could be obsolete by tomorrow, we have devoted time to keep our information updated throughout the study.

3 Theoretical Framework



This chapter will present the theoretical framework used in this thesis. It includes the innovations theory, hypercompetition, creative destruction and value migration. Furthermore a piece on value chain restructuring is included.

Different industries change and evolve at different speeds. Two factors primarily drive change: technological innovation and competitive intensity. In the past, technological innovations only had local effects, but in today's world, the impact is global and immediate. In addition, the competitive intensity has increased. Because of this development, advantages are merely temporary.²⁷ The theories presented in this chapter will therefore handle the issue of innovations and the competitive environment.

“In the natural world, species evolve – that is, they change to meet new challenges – or they die. The same genetic imperative operates in business.” - Charles H. Fine

3.1 Christensen's innovations theory

As a result of Clayton Christensen's research on the disk drive industry the theory regarding *disruptive innovations* emerged in the book, *The innovators dilemma* and aims to describe the impact of different kinds of innovations on a company's existence. Christensen identified more than 100 innovations which were classified as either *sustaining*, providing the market with better and more profitable products, or *disruptive*, initially offering a weaker performance but in dimensions the market valued more (see Figure 3-1). Disruptive innovations can be further divided into either *low-end* or *new-market*.^{28,29}

Christensen stated that most organizations that have *died* or been displaced from their industries could see disruption coming, as a new paradigm of customer offerings, but did not act until it was too late. Christensen's findings concluded that incumbent firms can cope with sustaining innovations but fail when facing disruptive innovations, often originating from small firms. Disruptive innovations are contradictory to accepted principles of management because they state that it sometimes can be right to pursue small markets and develop lower-performance products with lower margins.³⁰

The mainstream market, the majority of the customers, is located in-between the low- and high-end demand of the market, in the Figure 3-1 represented by the dashed lines. In the mainstream market, incumbents have a strong incentive to innovate and move up-market along the sustaining innovation trajectory. Thus, the performance of established products is improved along the dimensions that the average customers historically have valued, eventually becoming high-end

²⁷ Fine, H. C. (1998) *Clockspeed*. pp 3-29

²⁸ Christensen, C. (2002) *The innovator's dilemma*. p xv

²⁹ Christensen, C. et al (2004) *Seeing what's next*. p xvii

³⁰ Christensen, C. (2002) *The innovator's dilemma*. p xv

products that solve the high-end customers' problems. Since customers usually are willing to pay premium prices for these, companies attain high profit margins.^{31,32}

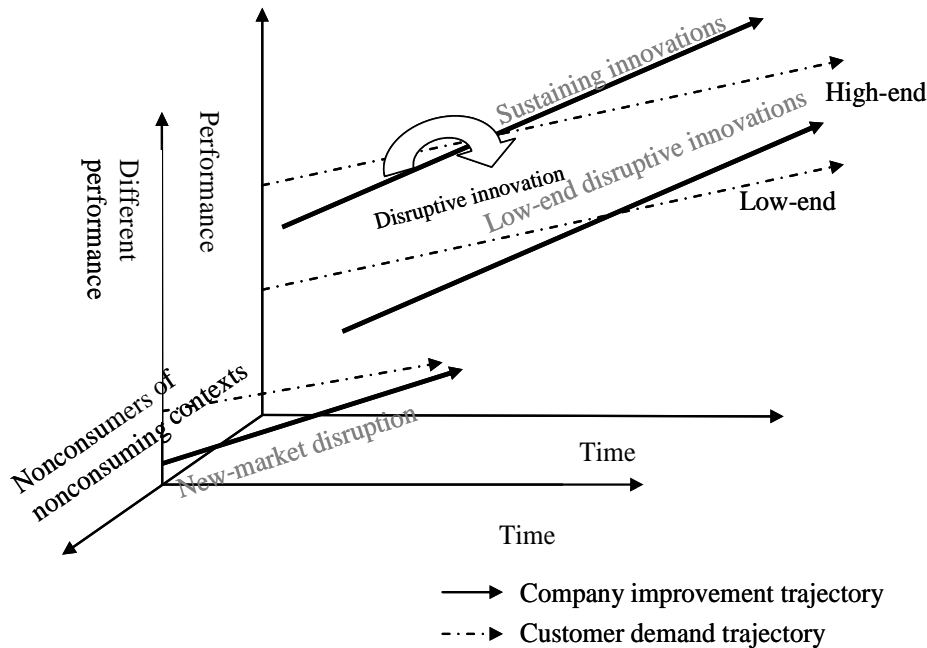


Figure 3-1: The impact of sustaining and disruptive innovations.³³

Also shown in the Figure 3-1, is that companies can innovate faster and beyond market demand, creating an overshoot. This *overshoot* is a result of efforts to provide better products and earn higher margins than competitors. Overshooting is the driver of commoditization, leading to companies being unable to profitably differentiate their products. Eventually, the overshoot results in a market range high above what customers need and are willing to pay for, thus opening for disruptive innovations. When functionality and reliability have become good enough, the dimensions companies can compete in relate to ease of use instead, such as convenience, flexibility and customization. The products low-end disruptive innovations bring to market are underperforming the existing and are often, smaller, cheaper, simpler and more convenient to use.^{34,35}

New-market disruptive innovations occur when existing products limit the number of potential consumers or force consumption to take place in inconvenient settings. They can create new growth by making it easier for people to do something that historically required deep expertise or wealth.³⁶ As the disruptive innovation moves up-market, it becomes sustaining, thus following

³¹ Christensen, C. (2002) *The innovator's dilemma*. p xix
³² Christensen, C et al (2004) *Seeing what's next*. pp xvi, 277-279
³³ Christensen, C. (2002) *The innovator's dilemma*. p xix
³⁴ Christensen, C et al (2004) *Seeing what's next*. pp 12-20
³⁵ Christensen, C. (2002) *The innovator's dilemma*. p xix
³⁶ Christensen, C et al (2004) *Seeing what's next*. p xvii

the trajectories of product enhancements in order to capture higher margins, it meets the demands of the mainstream market. Incumbents are at this point forced further up-market or out.^{37,38}

Peter Drucker had similar theories and argued that innovation is necessary in order to meet change successfully. What keeps an organization from failing is its ability to innovate.³⁹ Drucker also pointed out that established companies focus on defending what they already have and do not counterattack when a newcomer challenges them. As market and industry structure change, the incumbents neglect fast growing segments since they rarely fit the traditional manner of approaching a market, leaving the opportunities to innovators and giving them a possibility to become a future threat.⁴⁰

3.1.1 Resources, processes and value

The *resources, processes and value* (RPV) -theory by Christensen aims to explain why existing firms fail or experience difficulties in managing disruptive innovations. The theory states that an organization's strengths, weaknesses and blind spots are defined by what the company has (resources), how it works (processes) and what it wants do to (values).⁴¹

Resources are assets which can be transformed across organizational boundaries, such as people, equipment, product design, brands and information. Companies with access to rich and high-quality resources increase their chances of dealing with change. Noteworthy is that the same resources in different companies do not necessarily give the same result. The capability to transform inputs into goods and services to greater value lies within an organization's processes and values.⁴²

The interaction, coordination and communication that transform input of resources to products and/or services are *processes*. Processes are often tailor-made to fulfill a task efficiently and correctly, and are therefore consistent and difficult to change. It is important to not only focus on the value-adding processes such as manufacturing and development, but also to examine the background processes such as supporting investments and decision-making.⁴³

Motorola's Razr – a disruptive innovation

As the other mobile handset vendors were enlarging mobile handset size to increase storage, photo and music capabilities, Motorola did the opposite and downsized. The result of this disruptive innovation was a thin device made of aircraft-graded aluminium and a nickel-plated keypad. Motorola managed to achieve a wow factor even though the mobile handset was surprisingly simple. Space was saved by rearranging the innards, which lead to an increased width. However the mobile handset became a success and Motorola saw significant growth in market share during 2005 as a direct result of the Razr.

(www.cellular-news.com/story/16398.php, www.diamondconsultants.com/PublicSite/ideas/perspectives/downloads/INSIGHT%20-20Structural%20Innovation.PDF)

³⁷ Christensen, C. (2002) *The innovator's dilemma*. p xix, 180-181

³⁸ Christensen, C et al (2004) *Seeing what's next*. pp xvi, 277-279

³⁹ Wren, A. D. (1998) *Management Innovators*. p 233

⁴⁰ Drucker, F. P. (1985) *The discipline of innovation*. Harvard Business Review. p 67-73

⁴¹ Christensen, C et al (2004) *Seeing what's next*. pp xvii-xviii

⁴² Christensen, C. (2002) *The innovator's dilemma*. p 187

⁴³ Christensen, C. (2002) *The innovator's dilemma*. pp 187-188

The *values* of an organization decide which prioritizations to make within the company and can be created for example by ethic value, safety or corporate social responsibility. The values also decide whether an order is attractive or unattractive.⁴⁴

Recalling Christensen's disk drive research, 116 innovations were identified whereas 111 of these were sustainable. The remaining five innovations were disruptive. Yet as these disruptive innovations entered the market, none of the industry's incumbent firms remained atop. For the majority of the companies, mastering sustainable innovations was a part of the companies' processes and values. The incumbent firms had the prerequisites to succeed, but the processes and values of the companies constituted obstacles to succeed with disruptive innovations. In order for a company to change, not only the right resources are required, the company itself has to be prepared with values and processes that suit the change.⁴⁵ Despite incumbent firms' assets and resources to invest in disruptive innovations, they experience difficulties in doing things not aligned with their model on how to make money. Since disruptive innovations rarely seem promising during the initial years, managerial wisdom at established firms also becomes a barrier.⁴⁶

3.2 Hypercompetition

Cost and quality, timing and know-how, stronghold and deep pockets have always played an important role in competition; the difference today is the speed and ferocity. Powerful brands, once seen as a sustainable advantage, have been shaken as prices have dropped and quality demands have increased. As competition has intensified, product life cycles have been compressed, and the pace of technological innovation has increased. Entry barriers which previously exerted a stabilizing force on competition, have fallen with the rapid changes of the information age. Small companies have used alliances in order to gain access to deep pockets and take on more powerful competitors. An environment symbolized of D'Aveni terms *hypercompetition* is created, where players must shift to build advantages and erode their rivals' advantages.⁴⁷

In hypercompetitive environments, a condition of constant disequilibrium is created by the frequency, boldness and aggressiveness of dynamic movements from different players. Hypercompetition is characterized by rapidly escalating competition where sustainable competitive advantages are non-existing. In addition, as different industries merge, radical redefinitions of market boundaries

Slim trend – driven by hypercompetition

Motorola's immediate success when launching the Razr triggered competitors to do the same thing. The Razr was the ignition to the slim trend and competitors' releases of thin devices were a direct consequence of hypercompetition. As Motorola gained revenue and market shares due to its temporary competitive advantage, competitors were driven to want a piece and erode the rival's advantage. In this competitive environment, companies constantly try to outperform each other and make more profitable products to meet market demand.

(www.cellular-news.com/story/16398.php)

⁴⁴ Christensen, C. (2002) *The innovator's dilemma*. pp 188-193

⁴⁵ *ibid*

⁴⁶ Christensen, C. (2002) *The innovator's dilemma*. pp. 258-260

⁴⁷ D'Aveni, R. (1994) *Hypercompetition*. pp 1-7

occur, which add in to the uncertainty, hostility and dynamic characteristics of the market. Firms aggressively position themselves against one another as an attempt to disadvantage opponents. Advantages and profits are only achievable until competitors catch up.⁴⁸

Failure or success in a hypercompetitive environment is based on a company's ability to leverage on given advantages. As companies realize that their advantage is not sustainable, they seek new advantages, thus escalating competition. The presence of simply one hypercompetitive company is enough to drive an industry into hypercompetition. As one company obtains a competitive advantage other companies are forced to act, starting an endless cycle.⁴⁹ D'Aveni proposed a set of strategies called the "New 7S", for attempting to disrupt status quo and achieve temporary competitive advantages. They are further divided into the following three groups:⁵⁰

The first group of 7S called *vision for disruption* includes superior stakeholder satisfaction and strategic soothsaying. It is directed to serve existing customers better or new customers by creating opportunities for temporary advantages. Companies need to identify and create needs that customers themselves are not yet aware of. Locating new customer groups that no one beforehand has served, as well as predicting changes in customer need are also necessary aspects.⁵¹

The second group, *capabilities for disruption*, contains positioning for speed and positioning for surprise. A company's ability to surprise and thereby extend the period of an advantage and at the same time move quickly from one advantage to the next is crucial. The last group, *tactics for disruption*, handles actions that shape or influence the direction of the competitors' responses. Shifting the rules of the game, signaling strategic intent and simultaneous or sequential strategic thrusts are actions that can create a sudden move in the industry, confusing or throwing competitors off balance.⁵²

The only sustainable competitive advantage is the set of actions that sustains the momentum, the actions to continuously develop new advantages, not waiting for the competitors to undermine the old before moving on to the next.⁵³

3.3 Creative destruction

In Joseph Schumpeter's work *Capitalism, Socialism and Democracy*, from 1942, he coins the term *creative destruction* to denote "a process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroys the old one, and incessantly creates a new one." A short description of creative destruction will therefore be the phenomenon that occurs as something new kills something older.⁵⁴ As market changes with increasing speed, it becomes more and more difficult to achieve long term competitive

⁴⁸ D'Aveni, R. (1995) *Coping with hypercompetition*. Academy of Management Executive. pp 45-59

⁴⁹ D'Aveni, R. (1994) *Hypercompetition*. pp 213-234

⁵⁰ D'Aveni, R. (1995) *Coping with hypercompetition*. Academy of Management Executive. pp 45-59

⁵¹ *ibid*

⁵² *ibid*

⁵³ *ibid*

⁵⁴ Investopedia, www.investopedia.com/terms/c/creativedestruction.asp, 2007-02-10

advantages. Schumpeter warned that to sustain market levels of long-term performance, creative destruction is necessary.⁵⁵

The market acts according to the rules of Darwinism by removing the weak players, taking no notice of culture, leadership or emotions. According to Foster and Kaplan, there is a fundamental difference between companies and the market as the market assumes *discontinuity*. In opposite, companies operate on the assumption of *continuity* and attempt to accommodate discontinuity. An exception is private equity companies, which make money by finding and expanding the potential in the companies and as the companies mature, they are sold off.⁵⁶

One problem for companies when adapting to the discontinuous environment is *cultural lock-in*. As companies grow and mature, the company culture becomes more evident. The cultural lock-in disables the company to change, even when facing clear market threats or opportunities in respond to changing market demand. A cultural lock-in can be caused by either the fear of cannibalization of an important product line, the fear of channel conflict with important customers, or the fear of earnings dilution that might be the result of a strategic acquisition. The fears contribute to decisions that aim to protect existing businesses instead of focusing on the future, which paralyzes the acts of creative destruction.⁵⁷

A company constitutes of a *corporate architecture*, the models, information, decisions, actions and systems of control. The nature of corporate architecture is the reason to declining innovativeness, leaving the companies more vulnerable to smaller, newer companies. The evolution of corporate architecture is predictable and follows the four stages: (1) *foundation*, (2) *growth*, (3) *dominate* and (4) *cultural lock-in*. Companies in the *dominate*-stage (3) have a hard time identifying threatening *foundation*- companies (1), who lurk in the periphery and appear differently than what stage-3 companies are used to. Their attack might be directed at a dissatisfied group of customers, a potentially risky new technology or simply at the slow reaction speed of the stage-3 company.⁵⁸

The idea of the long lasting superior performing company is a myth, based on due to the new shifting environment invalid assumptions. Markets based on the assumption of creative destruction might have the answer for long-term performance, namely mastering and managing continual change. "Only companies that change at the pace of the market can hope to match or exceed the overall market's performance."⁵⁹In a world of discontinuity, it is not enough to manage for survival, companies need to be redesigned based on the assumption of discontinuity and to operate rather than evolve.⁶⁰

⁵⁵ Foster. R. et al (2001). *Creative Destruction*. pp 9-10

⁵⁶ Foster. R. et al (2001). *Creative Destruction*. pp 20-21

⁵⁷ Foster. R. et al (2001). *Creative Destruction*. pp 16-18

⁵⁸ Foster. R. et al (2001). *Creative Destruction*. p 76

⁵⁹ Foster. R. et al (2001). *Creative Destruction*. pp 59-63

⁶⁰ Foster. R. et al (2001). *Creative Destruction*. pp 22-24

3.4 Value Migration

The concept of value migration presented by Slywotzky describes the shift of value-creating forces. *Value migration* theory aims to create understanding of how value constantly moves from outdated business designs to designs better aligned with customer priorities. *Business design* refers to the way companies make their earnings including choosing customers, allocate resources, approach the market etcetera. By understanding how value migrates, companies can track indications to where the value is headed and create value by forming successful business models for the future. An analysis of the history can be a first step towards understanding how value migrates since it can give answers to why and how value has migrated in the past.⁶¹

As a result of the more competitive environment, many industries saw the pace of value migration increase, thereby changing the game of business. This new competitive environment can be compared to a game of chess, consisting of moves and countermoves. The strategy in this environment has to be effective and develop dynamically as one player carries out a series of moves, creating temporary strategic advantages. In the next move, the business chess board changes and advantages has to be recreated.

*“To play chess well, you need to learn patterns. By examining patterns, you see how specific positions can lead to specific outcomes. By then looking several moves ahead and envisioning the implications of your current position, you can identify and focus on the most important pieces and positions – the linchpins of your strategy. One way of learning to recognize the patterns on the chess board is by studying the games of others“.*⁶² - Adrian Slywotzky

Companies need to identify the changing patterns of customer needs, acquire a dynamic picture of them as well as learning moves, techniques and understanding the interaction between customer priorities and business design.^{63,64} It is also vital to expand focus when identifying the competitors. Often newcomers and companies in the periphery will attract value and capture the next cycle of value growth because they are more sensitive to emerging customer priorities, able to construct their business design according to customers' priorities and do not suffer from institutional memory. Discovering new competitors is more important than keeping an eye on old ones. Rather than defining competitors as companies that do the same things we do, competitors should be defined by, those business designs that customers can choose from in satisfying their priorities.⁶⁵

It is also important to keep in mind that business designs do not stand alone; interdependencies, combinations and relationships affect the ability to create and capture value. A company that alone does not pose a threat possibly does so combined with other business designs.⁶⁶

⁶¹ Slywotzky, A. et al (1997) *Capturing value in five moves or less*. Strategy and leadership.

⁶² Slywotzky, A. (1996) *Value Migration*. p 83

⁶³ Pugh, D. (2004) *Behavioral Advantage*. p 85

⁶⁴ Slywotzky, A. (1996) *Value Migration* pp 3-21, 43-61

⁶⁵ Slywotzky, A. (1996) *Value Migration*. pp 61-83

⁶⁶ *ibid*

3.4.1 The phases of Value Migration

Value migration arises as profit, growth opportunities and shareholder value transfers from one company or industry to another, as a result of either changing customer needs or preferred ways of doing business. It is therefore crucial for companies to rebuild its business in regard to customer needs. Since value migrates rather than diminishes, the possibility of chasing value exists, as it moves to competitors or vertically through the value chain.⁶⁷ A business design exists in one of the three phases of value migration: value inflow, stability and value outflow.⁶⁸

Phase one, *value inflow*, is characterized by a new business design replacing an old one. If the new design has a superior ability to satisfy customer needs, companies using this design will absorb value from companies using the old design. Limited competition, high growth, customer focus and entrepreneurial management are distinguishing features in this phase⁶⁹. As business designs meet customer priorities, the new design will become mature and competition will increase while it transforms into phase two. The value inflow phase represents glory days for a company. The main issues are to determine how large and long the inflow will be, positioning, what other organizations are benefiting from the inflow, their strategies and identifying the indicators that signal ending of the phase.⁷⁰

The second phase, *value stability*, is characterized by high volumes and growing revenue, yet not as rapidly as before. The companies do no longer see their consumers as crucial for the firm's survival and focus shift to internal matters. Companies focus on superior execution of those activities that have led to success in the past and the inward focus makes the company miss the signals from customers and competing business designs. Main focus is to optimize *the existing business design* and secondly to *capture the next wave of value migration*. The following transition has a threat in the shape of *institutional memory*, which is established norms, values and behavior and limits an organization's ability to detect and respond to the need for change. As customers begin to detect that competitors and new business designs better meet their needs, the value outflow phase starts.⁷¹

Value migration in the PC-industry

As a way to meet Apple's launch of the personal computer, IBM outsourced the microprocessor to Intel and the operating system to Microsoft. Due to all the following clones of both microprocessors and OS, IBM marketed its products as those with the original microprocessors and OS, leading to a value migration from IBM to Intel and Microsoft.

(Techworld, www.techworld.com/applications/features/index.cfm?featureid=1603&Page=1&pagePos=5, 2007-03-12)

In the third phase, *value outflow*, performance and market confidence begin to erode. A company in this phase need either to protect value, detect how fast they can get out or capture the value flowing out.⁷²

⁶⁷ Slywotzky, A. (1996) *Value Migration*. pp 21- 43

⁶⁸ Slywotzky, A. (1996) *Value Migration*. pp 6-7

⁶⁹ Slywotzky, A. et al (1997) *Capturing value in five moves or less*. Strategy and leadership.

⁷⁰ Slywotzky, A. (1996) *Value Migration*. pp 6-7, 55-59

⁷¹ Slywotzky, A. (1996) *Value Migration*. pp 17, 43-60

⁷² *ibid*

The transition between two phases is difficult, but important, for companies to identify, since they are of greatest vulnerability and opportunity. A systematic mapping of the value migration status of each business design can help identify those transitions, enabling an effective respond. As the business design moves between the phases of value migration, profit generated by the business design rises and falls accordingly (see Figure 3-2).⁷³

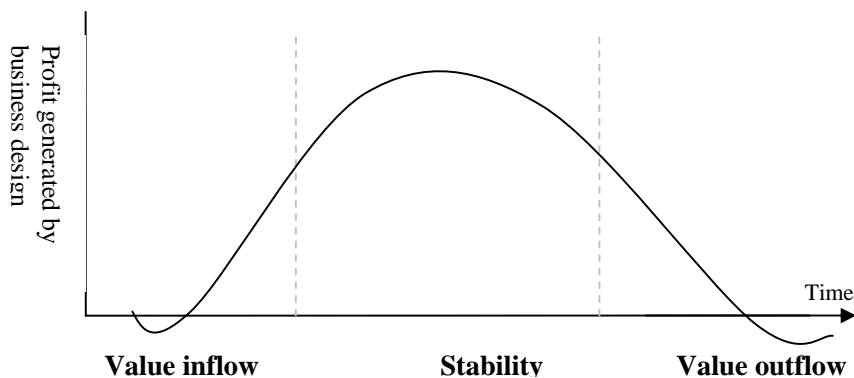


Figure 3-2: Business design profit curve.⁷⁴

3.5 Value re-structuring

The value chain evolution theory, by Christensen, points out that integrated companies earn most of an industry's profit, when a product's functionality and reliability is not yet good enough to meet mainstream customer needs. Since integrated companies control the entire production and delivery process, this enables efficient coordination. With advances in products, competition becomes more based on speed, flexibility or convenience and the benefits from being integrated no longer exist. Standardized interfaces between various parts of the product are an effort to develop products more quickly. Product architecture becomes modular and enables companies to decrease time-to-market and outsource. Modularity opens for specialized companies that develop products which fit the interfaces.⁷⁵

Similarly, Fine talks about the double helix, which is an infinite industry structure phenomenon, cycling between vertical and horizontal states (See Figure 3-3). Internal and external forces like niche competitors and the challenge of keeping ahead of competitors drive vertically integrated companies toward disintegration and a horizontal structure. When in horizontal structure, powerful component suppliers, both technological and market power in the subsystem, pressure back towards vertical integration. These different loops determine the fate of companies and industries. It is of importance for companies to predict the coming changes and choose which capabilities will be of greatest value.⁷⁶

⁷³ Slywotzky, A. (1996) *Value Migration*. pp 43-60

⁷⁴ *ibid*

⁷⁵ Christensen, C. et al (2004). *Seeing what's next*. p 281-283

⁷⁶ Fine, H. C. (1998). *Clockspeed*. pp 46-50

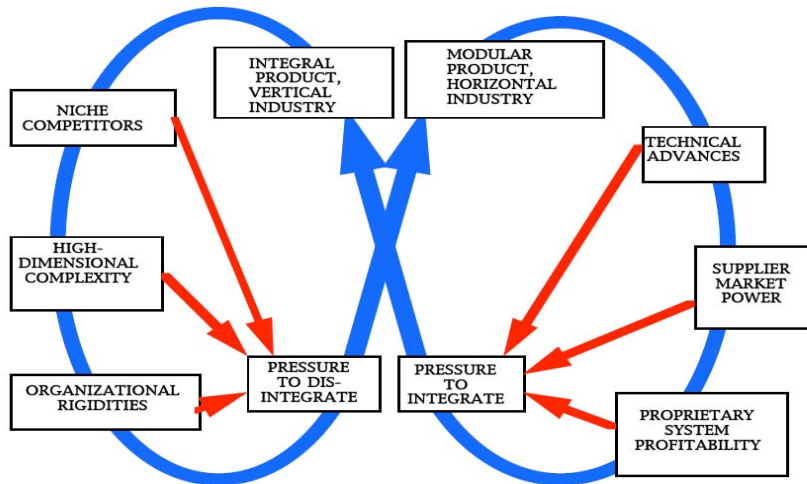


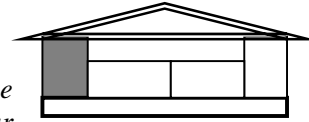
Figure 3-3: *The double helix*⁷⁷

The horizontal structure opens for fierce competition within each sub-segment. After a while, a shakeout occurs where only the stronger players survive. Once a company has enough market power in its own sub-system, there is an opportunity to expand vertically. An example is Microsoft, who has moved from only working with operating systems, to application software and multimedia content.⁷⁸

⁷⁷ Fine, H. C. (1998). *Clockspeed*. p 49

⁷⁸ Fine, H. C. (1998). *Clockspeed*. pp 46-50

4 Theoretical Discussion



The aim of this chapter is to discuss the theories presented in the preceding chapter on a more general level including our interpretations. In addition, correlations and similarities between the theories will be identified to further clarify different conceptions described in the different theories.

4.1 Correlations

Studied theories follow a certain pattern and are in different ways related and connected to each other. The linkage is illustrated in Figure 4-1.

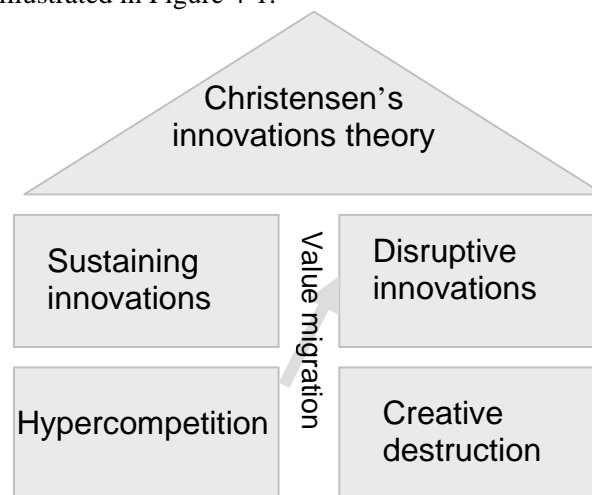


Figure 4-1: The linkage between the four theories.

The roof of the house constitutes of Christensen's innovations theory. The innovations theory covers other discussed theories. The house is divided into the two different types of innovations: disruptive and sustaining. The *sustaining* innovation provides the market with; for the consumer better and for the company more profitable products. Merely developing sustaining innovations is not a successful long-term strategy since it eventually leads to a market overshoot. Companies end up innovating faster than market demand develops, making products too advanced even for high-end users. *Hypercompetition* is related to sustaining innovations as it describes the industry phenomenon which drives these innovations. Companies in an industry characterized by hypercompetition, constantly try to improve their products and outperform competitors, thus driving the product advancements through a trajectory of sustaining innovations and reaching overshoot.

According to D'Aveni, disruption is the strategy for challenging and managing a hypercompetitive environment and the only way to achieve temporary competitive advantages. The *disruptive* innovation introduces a new value proposition, for example a cheaper, smaller, simpler or easier-to-use product. The introduction of the disruptive innovation creates a new market or changes the existing. According to Christensen, a good survival strategy is to pay more attention to the disruptive innovations and if not lead the development, be attentive to signals on

coming disruptive innovations. The same strategy is supported by *creative destruction*. Instead of trying to improve and follow the trajectory of sustainability for too long, creative destruction argues that it is better to kill the old to put an effort on the new innovation.

In order to kill of the old, a company needs to know what the new innovation is, namely where the new value is headed. By understanding how *value migrates*, companies can track such indications. Often, value migrates to a disruptive innovation, perhaps caused by an act of creative destruction. After disruption the innovation follows a sustaining trajectory, until the point where the mainstream market demand is exceeded, thus overshoot is reached and the value migrates again. Companies must learn to exploit their existing advantages and at the same time build new capabilities for the future. In order to capture the migrating value, companies need an ability to handle the transition and adapt to changes in the market.

4.2 Company elements evolution

Innovations theory, value migration and creative destruction all discuss the elements that constitute a company. They name them, *corporate architecture*, *business design* and *resources*, *processes* and *value*, but all refer to the same thing, namely how the company operates and the connections between the elements within the company, as well as how they address the external environment. The external environment is not static. It passes through different phases which demand different actions and business designs. *Value inflow* is characterized by a new business design replacing an old, for example a disruptive innovation and can be related to the stages of *foundation* and *growth* mentioned in creative destruction (See Figure 4-2).

The second phase, *value stability*, is equal to the *dominate* stage. A company in this phase must identify the transition between value stability and value outflow. Incumbents find it hard to identify threatening foundation-companies because of *cultural lock-in* which limits its actions and make *value outflow* inevitable.

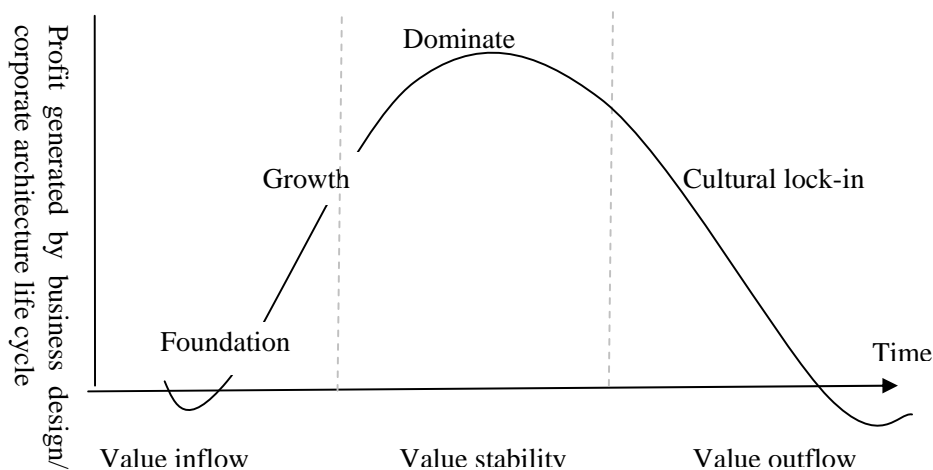


Figure 4-2: The corporate architecture life cycle and the profit generated by business design along with the phases of value migration.

4.3 Limiting factors

4.3.1 Defining competitors

The innovations theory, value migration and creative destruction further discuss the importance of noticing and defining competitors, explicitly to be attentive to newcomers and companies in the periphery. The newcomers are typically small companies, attentive to emerging customer priorities and most able to construct their business design according to customer needs. These companies might be hard to identify as competitors since they do not have the characteristics the incumbent companies are used to. The key is to view the market from the customers' point of view and define the competitors depending on the customer demand or the need they fulfill. It might not be until the disruptive innovations reach the mainstream market, that incumbents notice them as a threat, a time when they are more difficult, if not too late, to act upon. The incumbents therefore push themselves further along the sustaining trajectory, in a desperate attempt to further enhance and differentiate the product, which leads to overshoot.

As mentioned in value migration it is also important to consider interdependencies. Business designs that do not seem threatening can be so in cooperation with other business designs. Normally those interdependencies consist of a newcomer and an incumbent. The incumbents that form a strategic alliance do so to capture the value inflow together with the newcomer. These alliances can be useful for the newcomers since incumbents have the size, efficiency and process knowledge to reach more consumers at a faster rate.

A successful strategic alliance

Both Ericsson and Sony suffered from slip-ups within the mobile handset industry in the end of 1990s. Sony lacked technology knowledge and Ericsson had focused too much on technology and too little on consumer demand. By combining the two companies' knowledge, the successful joint venture Sony Ericsson was born.

(Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition.*)

4.3.2 Organizational factors

The phases of value migration can be related to the sustaining innovation trajectory as seen in Figure 4-3. After a successful introduction of a disruptive innovation, value flows in. In this phase there are few competitors, high growth and the innovation is gainfully continuing into the mainstream market and the stability phase. The stability phase is dominant in the mainstream market, where there are a number of competitors. Here focus shifts from customer to internal, but companies continue doing what was successful in the past. The companies get a false feeling of security and establish themselves as the new incumbents not realizing that they are moving towards cultural lock-in and value outflow. These companies must therefore react already in the comfortable stability phase, optimize the existing business design, which means drive the sustaining innovation further, but also find the coming wave of value migration, try to create disruptive innovations and look to new customers or threatening new competitors.

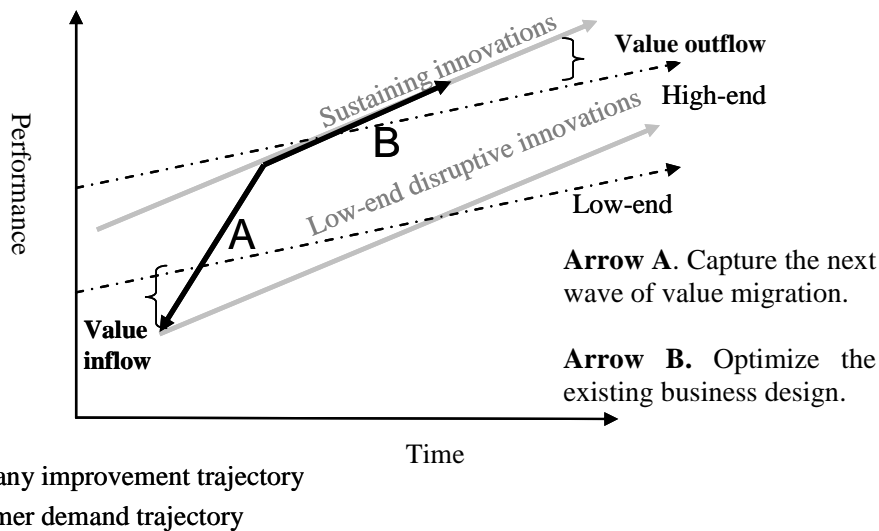


Figure 4-3: The phases of value migration related to Christensen’s innovation theory along with the challenges for a company in the end of the value migration’s stability phase (arrows A and B).

The theories also discuss the limiting factors that constrain companies to renew, innovate and adapt to the changing environment and customer needs. Christensen’s innovations theory, discuss this in the context of RPV. Processes and values by their nature are not meant for and therefore difficult to change. Hence, the company itself has to be prepared for the changes and have values and processes that fit the new problem. It is a challenge for companies as they must find processes and values that fit both sustaining and disruptive innovations. This is especially important in the transition between stability and value outflow, where the company is well-established and suffers from institutional memory and outdated managerial wisdom. Figure 4-3 also shows the challenges for a company in the stability phase. The company must be able to capture the value that is flowing out, namely to identify and locate the coming disruptive innovation, arrow A, and at the same time optimize the existing business design, arrow B. Mastering this can be difficult since it requires processes and values which are aligned with two very different ways of doing business.

Creative destruction mentions the same obstacle to change and names it cultural lock-in. Companies might be aware of this threat but are limited in their actions because of fear and aims to protect existing businesses instead of focusing on the future and need for change. Value migration also discusses this phenomenon which Slywotzky labels institutional memory. Not only does this phenomenon limit action, it could also be a deliberate choice by the incumbent, as it does not believe the disruptive innovation will be profitable and therefore actively chooses not to invest resources.

4.4 New competitive environment

Hypercompetition describes the industry dynamics and is a driver towards overshoot, since it pushes players to improve product performance. Hypercompetition also emphasizes the facts of advantages merely being temporary and dynamic moves of different players. These factors are similarly described in value migration, named the *new competitive environment* and *business*

chess game. The solution for companies when learning to play the business chess game and handle disruptive innovations is to assume discontinuity and act by surprise and speed. Disruptive innovations open for new contexts and ways of use and add to the phenomenon described in hypercompetition, that is merging of industries and markets as boundaries constantly are redefined. Therefore, flexibility and the ability to move fast and efficiently between different business designs and temporary advantages is necessary, as mentioned in hypercompetition, value migration and creative destruction.

The business chess game, hypercompetition and rapid commoditization discussed in value migration, together sign that the trajectory of sustaining innovations might have been shortened (see Figure 4-4). In the past, companies could live off of one disruptive innovation. Because of globalization, information and increased competition, temporary advantages are equal with temporary sustainable innovations and force disruptive innovations to be explored at a higher and broader rate than before.

The market is characterized by discontinuity, thus hard to predict. It demands flexibility and dynamic development of strategies and business designs. The processes and value and the assumption of continuity may constitute an effective ground for a company following a sustainable trajectory, but it is not as effective when handling disruptive innovations as it is of different nature.

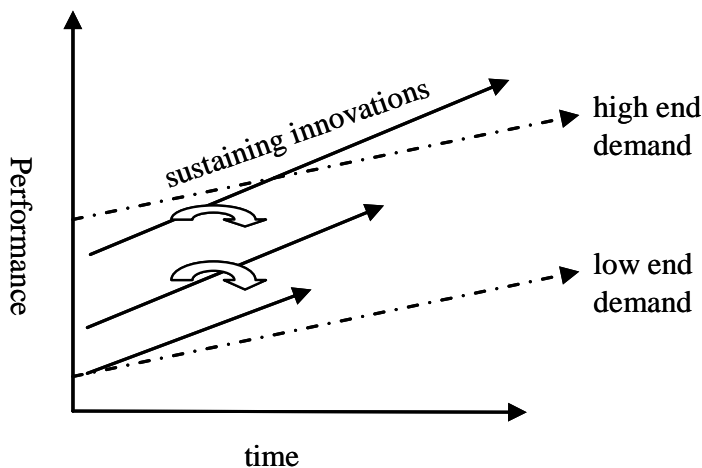
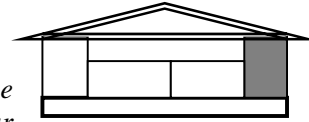


Figure 4-4: Shortened trajectories of sustaining innovations.

5 Technological Development



This chapter aims to describe the technological development in the mobile handset industry. Initially, the development of cellular technology will be described. Furthermore as a result of increased data transmission in mobile networks, parts of the mobile handset industry are currently adopting technologies and trends deriving from the IT-industry. The mobile internet technologies WiFi and WiMax, and open operating systems, will therefore also be described. The chapter will finally discuss the technological convergence between the two industries.

5.1 Cellular technology

*Cellular technology derives from the cellular layout of time, frequency or code reuse. First generation analog networks (1G), introduced in the 1980s, were developed and used on a local and national basis⁷⁹. The first system, starting in 1981, was the *Nordic Mobile Telephone System* (NMT), developed by the telecom administrations in the Nordic countries. After the launch of NMT, *American Mobile Phone System* (AMPS) was standardized in the US and *Total Access Communication System* (TACS) was specified by the UK authorities.⁸⁰ As mobile communication grew popular, networks became overloaded and the solution, which emerged in the early 1990s, was second generation *digital* networks (2G).⁸¹ The 2G development was characterized by a standards war between *Code Division Multiple Access One* (CDMAOne), *Global System for Mobile communication* (GSM), *Digital AMPS* (D-AMPS, later referred to as *Time division multiple access* (TDMA)), and the Japanese *Pacific Digital Cellular* (PDC).⁸²*

TDMA

TDMA is used in most 2G networks, for example GSM, D-AMPS and PDC. TDMA allows several users to share the same radio channel. Radio channels are divided in time by granting users certain timeslots to send and receive in. By converting information into digital format, senders can send in short bursts, thus creating room for more than one user on the same radio channel.

(Tech Support AB (2005) *Introduction to Mobile Telephony*)

The development of the third generation networks (3G) had two main focuses, increasing the capacity of handling voice calls and the ability to offer new and advanced services⁸³. 3G has two dominating standards; *Wideband-CDMA* (WCDMA) and *CDMA2000*. WCDMA is the development of GSM. CDMA2000 is the development of the CDMAOne (see Figure 5-1).⁸⁴ The first 3G technology was launched in 2000.⁸⁵

⁷⁹ 3G Today, www.3gtoday.com, 2007-02-23

⁸⁰ Tech Support AB (2005) *Introduction to Mobile Telephony*

⁸¹ 3G Today, www.3gtoday.com, 2007-02-23

⁸² Infonetics Research Inc. (2006) *Service Provider Plans for Next Gen Mobile and Wireless Broadband*. pp 13-14

⁸³ ibid

⁸⁴ Nawroth, M. Business Intelligence Manager. EMP. 2007-02-02

⁸⁵ 3G Today, www.3gtoday.com, 2007-02-23

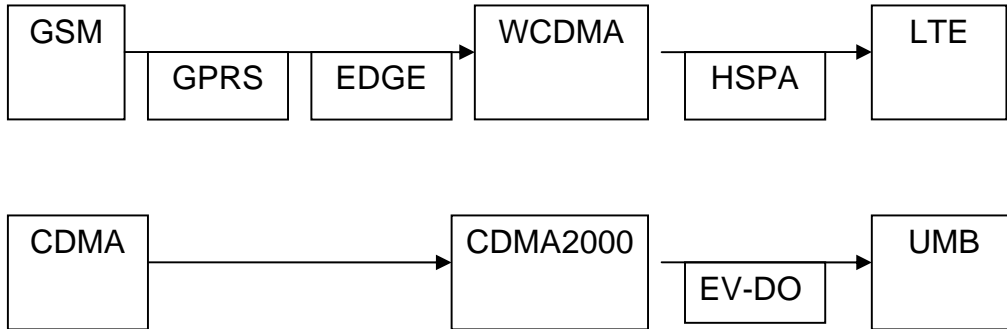


Figure 5-1: The development of GSM and CDMA.

The evolution towards a next generation network is driven by services that offer superior quality, greater bandwidth, as well as low cost and high data rate. Operators today face challenges on how to efficiently introduce new technologies based on internet protocols (IP).⁸⁶

5.1.1 2G: GSM vs. CDMAOne

GSM is used for transmitting mobile voice and data services. It differs from 1G as it uses digital technology and TDMA transmission methods. GSM is circuit-switched and divides each channel into eight time slots (see Figure 5-2). GSM supports data transfer at rate up to 9.6 Kbps.⁸⁷ When a call is put through in a circuit-switched network, a dedicated channel is established between the two parties. A call reserves this channel throughout the entire session. Circuit-switching is relatively inefficient since capacity is wasted on connections that are set up but are not in continuous use. Early telephone and mobile networks were and still are circuit-switched.⁸⁸

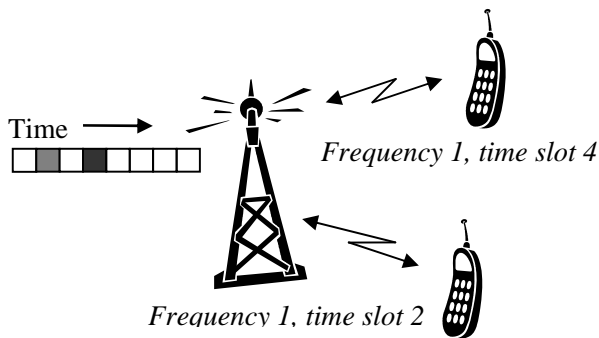


Figure 5-2: TDMA.⁸⁹

⁸⁶ Infonetics Research Inc. (2006) *Service Provider Plans for Next Gen Mobile and Wireless Broadband*. pp 14-15

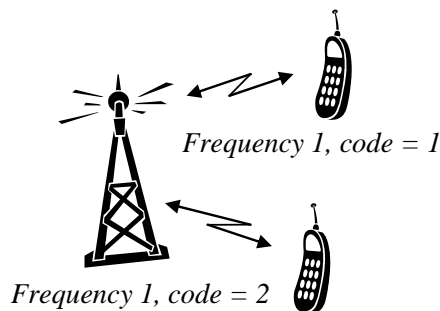
⁸⁷ GSM World, www.gsmworld.com, 2007-02-23

⁸⁸ Private Line, www.privateline.com/Switching/packet.html, 2007-03-16

⁸⁹ Tech Support AB (2005) *Introduction to Mobile Telephony*.

The competing standard CDMAOne was first created by the founders of Qualcomm in 1983, but was not standardized until 1993. CDMA is based on unique codes per communication in a frequency which enables more people to share the airwaves at the same time (see Figure 5-3)⁹⁰.

The CDMAOne market is mainly USA and Korea.⁹¹ CDMAOne offers increased capacity of 8 to 10 times that of an analog system; it has improved call quality, possibility for fewer cell sites and increased talk time for mobile handsets.⁹²



CDMA
In CDMA, many users share the same frequency and traffic is separated by code. CDMA is often resembled with a cocktail party: Everyone at the party speaks a language you do not understand. To you, their conversation is noise. Suppose then that someone speaking your language calls your name. To you, that information is sent with a code, your brain can decode and you react and respond. As a call is put through in CDMA, both parties are given a language or code, only those two can understand, therefore all the other calls in the room are not heard by you. See Figure 5-3. (Tech Support AB (2005) *Introduction to Mobile Telephony.*)

Figure 5-3: CDMA.⁹³

5.1.2 2.5G and 2.75G

General Packet Radio Service (GPRS), an evolution of GSM, is 2.5G packet-switched and enables higher data rate than 2G, more than 40 Kbps⁹⁴. Packet-switched networks divide data into groups, so called packets. As a packet is sent, routers decide the optimal, currently available route to destination. Therefore, packets sent from the same source heading for the same destination could be routed differently. Packet-switching derives from the world computers and internet.⁹⁵ As voice *average revenue per user* declines in most developed markets, there is a need to offer new data centric services⁹⁶. *Enhanced Data rates for GSM Evolution* (EDGE), 2.75G, is a development of GPRS and offers efficient coding and higher order modularity in the air interface and a tripled data rate compared to GPRS.^{97 98}

⁹⁰ CDMA Development Group, www.cdg.org/technology/index.asp, 2007-03-07

⁹¹ Qualcomm, www.qualcomm.com/about/pdf/Commonalities_CDMA2000_WCDMA.pdf, 2007-03-07

⁹² CDMA Development Group, www.cdg.org/technology/2g.asp, 2007-03-07

⁹³ Tech Support AB (2005) *Introduction to Mobile Telephony.*

⁹⁴ GSM World, www.gsmworld.com, 2007-02-23

⁹⁵ Private Line, www.privateline.com/Switching/packet.html, 2007-03-16

⁹⁶ Infonetics Research Inc. (2006) *Service Provider Plans for Next Gen Mobile and Wireless Broadband.* pp 12-13

⁹⁷ TechSupport (2005) *Introduction to Mobile Telephony.* pp 77-79

⁹⁸ Rydén, J. Technical Product Management, EMP. 2007-04-11

5.1.3 3G: WCDMA vs. CDMA2000

WCDMA is the 3G development of GSM while CDMA2000 is the follow-up of CDMAOne. They are both included in International Mobile Telecommunications (IMT)-2000, which is the global standard for 3G. They offer increased network capacity and enhancements to meet the growing demand for wireless services and high-speed data services, as well as reducing delivery cost, compared to 2G. Data rates in these systems are approximately less than 2 Mbps in most cases. Since the CDMAOne market mainly consists of USA and Korea, the Korean players Samsung and LG have alongside Motorola become the leading suppliers of CDMA2000 devices.^{99,100,101,102}

5.1.4 3G evolutions

High-Speed Packet Access (HSPA) is the evolution of WCDMA and enables time-sharing in addition to code sharing, thus making the usage of the cell more efficient than with dedicated channels. HSPA also enables increased data rates. eHSPA is the evolution of HSPA. The competing technology to HSPA is *Evolution-Data Optimized* (EV-DO), which is a development of CDMA2000 and has a number of revisions.^{103,104}

Future technologies are expected to have data rates in the range of more than 100 Mbps. *Long Term Evolution radio* (LTE) is a further evolution of 3G, which will be based on OFDMA instead of WCDMA. It will allow operators to offer wide coverage at lower cost and reach data rates of more than 100 Mbps. The standard will be complete in 2007 and LTE products will most likely be available in 2009. LTE is based on IP. *UMB*, ultra mobile broadband, is the evolution of CDMA2000. Commercially products of UMB will be available during 2009.^{105,106}

5.1.5 Technology standards and patents

During 1G, the markets were national and one-supplier connected to one-operator experienced monopoly. Because of the lack of competition, there was no need for patents. A *patent* gives a company a temporary monopoly, and is needed as an incitement for companies to invest money in R&D. The money invested is calculated in return in royalties from other companies when using the patented solution. Patents can be based on the work on a single company or on the cumulative work of a restricted number of companies. With the deregulation of the market and the development of 2G, the market opened for more and new players and patents became advantageous.¹⁰⁷

In 1998, the *Third Generation Partnership Project* (3GPP) was established as a mean for producing globally applicable *standards*, including technical specifications and reports, for 3G

⁹⁹ Ericsson, www.ericsson.com, 2007-03-07

¹⁰⁰ CDMA Development Group, www.cdg.org, 2007-03-07

¹⁰¹ Qualcomm, www.qualcomm.com/about/pdf/Commonalities_CDMA2000_WCDMA.pdf, 2007-03-07

¹⁰² Tech Support AB (2005) *Introduction to Mobile Telephony*.

¹⁰³ 3G, www.3g.co.uk/PR/April2006/2899.htm, 2007-04-17

¹⁰⁴ Qualcomm, www.qualcomm.com, 2007-04-17

¹⁰⁵ Ericsson, www.ericsson.com/ericsson/corpinfo/publications/review/2005_02/07.shtml, 2007-04-17

¹⁰⁶ 3G, www.3g.co.uk/PR/December06/4036.htm, 2007-04-17

¹⁰⁷ ABI Research (2007) *Mobile handset royalties*.

based on GSM. 3GPP consists of telecommunications standard bodies from Korea, Japan, USA, China and Europe (ETSI, the European telecommunications standards institute).¹⁰⁸ *The Third Generation Partnership Project 2* (3GPP2) is, just like 3GPP, a collaborative 3G specifications setting project, but regarding standards based on CDMAOne. The standardization bodies involved in 3GPP2 are Japanese, Chinese, Korean and North American.¹⁰⁹

Today, it is of importance to have a strong patent portfolio, especially containing technology standard patents, so called *essential patents*, since those patents are unfeasible to circumvent and thus blocking other companies¹¹⁰. Even so, companies with strong patent portfolios, often large incumbents, make cross-licensing agreements to avoid the respective royalties. Patents can thus constitute an obstacle for the smaller companies, and an entry-barrier to the market.¹¹¹

5.2 Mobile Internet technologies

5.2.1 Wireless Fidelity (WiFi)

Local Area Networks (LANs) emerged in the late 1980s allowing computers, terminals and other devices to share resources such as printers or servers. WiFi is today the dominating wireless-LAN (WLAN) standard and the terms WiFi and WLAN are often used as synonyms¹¹². WiFi enables devices such as laptops and mobile handsets to connect wirelessly to the internet. The coverage of WiFi is limited to a geographical area, called a *hotspot*. Unless the device is in reach of such, access is not possible, negatively affecting the mobility in the usage. An advantage of WiFi-based products is that unlike cellular technologies, WiFi operates in the unlicensed spectrum, so anyone can set up a network and cover an area of 100-500 feet. Consequently no expensive licenses are necessary, making the technology relative inexpensive. WiFi has become a universal standard and is widely used around the globe. WiFi equipment has therefore rapidly decreased in price. A downside with WiFi is placement, since the WiFi network operates at the same frequency as many cordless phones, bluetooth and microwave ovens, WiFi users have to choose an access point not close to the mentioned devices¹¹³. Interference can cause interruption and potential loss of data.¹¹⁴

The current generation WiFi offers data rates of 54 Mbps. The next generation, which will be launched in mid 2007/early 2008, will provide data rates of above 100 Mbps.¹¹⁵ WiFi technology was initially added to the enterprise focused device, smartphones, but ABI Research believes that it will move not only into high-end but also feature phones, a mid range mobile handset that includes features, relatively quickly.¹¹⁶

¹⁰⁸ 3GPP, www.3gpp.org, 2007-03-07

¹⁰⁹ 3GPP2, www.3gpp2.org/Public_html/Misc/AboutHome.cfm, 2007-03-07

¹¹⁰ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

¹¹¹ Ericsson Nestler.P. Manager Patent Unit Mobile Platforms, 2007-03-15

¹¹² Nokia, www.nokia.se/phones/technologies/wlan/works.php, 2007-03-16

¹¹³ Wi-Fi Planet, www.wi-fiplanet.com/tutorials/article.php/3116531, 2007-03-29

¹¹⁴ Al-Alawi, I. A. (2006) *WiFi Technology*. Journal of Computer Science 2. pp 13-18

¹¹⁵ Mellberg O., Mårtensson J. (2006) *Wireless Fidelity*. p 52

¹¹⁶ ABI Research, www.abiresearch.com/abiprdisplay.jsp?pressid=727, 2007-03-16

5.2.2 Worldwide Interoperability for Microwave Access (WiMax)

The mobile WiMax standard is a wireless technology which provides high throughput broadband connections over long distances. WiMax is based on Orthogonal Frequency Division Multiple Access (OFDMA) and IP technology. OFDMA provides high data rate capability and adapts depending on user need, by different time slots over different frequencies and sub frequencies (see Figure 5-4).^{117,118}

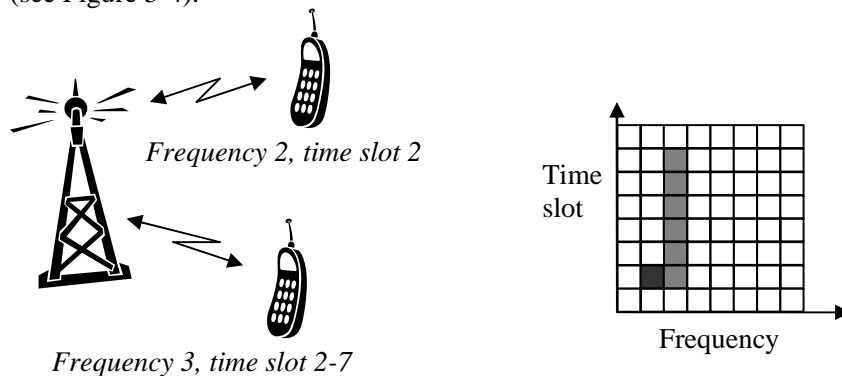


Figure 5-4: OFDMA.

WiMax supports *voice over IP* (VoIP), but is not expected to replace 2G or 3G for voice services, since WiMax will operate in higher frequency bands than 2G or 3G. Hence, coverage typically will suffer.¹¹⁹ Correspondingly, WiMax and WiFi are complementary and are expected to be incorporated in dual-mode chipsets, as WiMax provides better coverage than WiFi and in return, WiFi provides higher data rate (see Figure 5-5). The first WiMax supported mobile handsets were released in 2006. WiMax modules will be embedded in many data, consumer electronics and voice devices including notebooks, Personal Digital Assistants (PDA), MP3 players and smartphones.¹²⁰

The WiMax standard is formed by the WiMax Forum which is a non-profit organization with more than 400 members. Although not a founding member, Intel is seen as the most prominent and its name has been used synonymously with WiMax. Other members include Samsung and Motorola.^{121,122}

¹¹⁷ WiMax Forum (2006) *Mobile WiMax*. p 2-5

¹¹⁸ Malm, P. Senior Manager, EMP. 2007-05-02

¹¹⁹ *ibid*

¹²⁰ WiMax Forum (2006) *Mobile WiMax*. p 2-5

¹²¹ WiMax, www.wimax.com/education/faq/faq19, 2007-03-29

¹²² WiMax Forum, www.wimaxforum.org/about, 2007-03-29

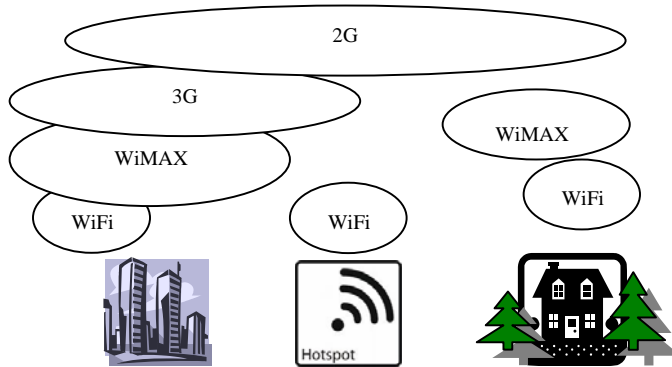


Figure 5-5: Coverage of WiFi and WiMax.¹²³

5.3 Technology Comparison

A comparison is made of cellular technologies (2G and 3G excluding LTE), WiFi and WiMax (see Figure 5-6). The factors mobility, quality of service (QoS, the matter of dropped calls or information, delays and out-of-order deliveries), coverage and data rate are all important and somewhat differentiating factors between the technologies, which is why they make out the overlook.

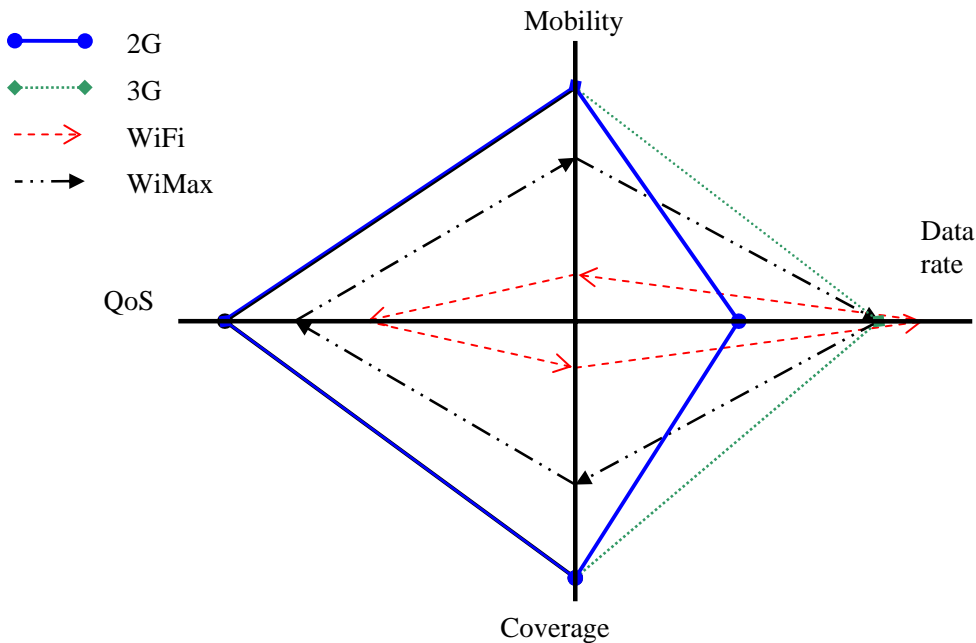


Figure 5-6: Technology comparison.

¹²³ WiMax Forum (2006) *Mobile WiMax*.

5.4 Open Operating system

The purpose of an *operating system* (OS) is to run the software and coordinate the resources to achieve optimum system performance¹²⁴. The operating system in a mobile handset determines its features, performance and security and provides an *application programming interface* (API) for additional applications¹²⁵.

Traditionally, operating systems for mobile handsets are *proprietary* and developed in-house by mobile handset vendors. A proprietary OS gives vendors the ability to control and design features of their products. The downside is that the proprietary OS is unique for the mobile handset manufacturer, therefore requiring all applications to be developed in-house or integrated. There is no or very limited availability of downloadable third party applications, with Java being the most known. Proprietary OS is now mainly used in low-end handsets, as it is cheaper than an open OS.¹²⁶

Open OS is an evolutionary result of mobile handsets advanced performance. The usage of standard components, such as an open OS, helps to lower test efforts and increase economies of scale. An *open OS* enables third party applications; any application software company can offer its product, giving the mobile handset manufacturer, the operator and the consumer, a larger range of choices, increased flexibility and control. Basically, it encourages the development of a value-added services ecosystem. As in a PC, consumers also have the possibility to install programs themselves in their mobile handset. The operator can add applications as it wishes, even after the mobile handset is sold, so-called post-customization.¹²⁷

The main open OS suppliers to mobile handsets are Symbian, Microsoft and Linux¹²⁸. In 2006, almost ten percent of all mobile handsets, which is approximately 100 million had an open OS. It is mostly used in high-end phones, but as the usage spreads to lower segments the market for open OS will grow. By 2010, more than 400 million mobile handsets or one third of total shipments will be open OS based. Symbian accounts for 71 percent of the worldwide smartphone shipments and their volumes will increase because of market growth, but will lose market shares to Linux and Windows. During 2007, analysts expect Linux to increase its market share as vendors move from proprietary OS, while Microsoft will receive a boost from the arrival of new models and brands using Windows Mobile.¹²⁹

5.4.1 Symbian

Symbian was originally created by mobile handset vendors Nokia, Motorola and Ericsson in 1998. Today Nokia is the main stakeholder of Symbian and due to Nokia's position as market leader Symbian is the most used operating system.¹³⁰ The idea was to create an industry standard

¹²⁴ Randell, B. *Operating systems: The problem of performance and reliability*

¹²⁵ Malykhina, E. (2007) *Phone Smarts*. Information Week. p 32

¹²⁶ *ibid*

¹²⁷ Persson, S. Product Manager. EMP. 2007-03-26

¹²⁸ Malykhina, E. (2007) *Phone Smarts*. Information Week. p 32

¹²⁹ Unstrung, www.unstrung.com/document.asp?doc_id=102926&print=true, 2007-03-05

¹³⁰ Persson, S. Product Manager. EMP. 2007-03-22

for the new generation smartphones.^{131, 132} A standardized and open OS would support growth by ensuring interoperability from the start. Also, R&D costs of mobile handset vendors could be pooled by delegating the development to a neutral third party. The *user interface* (UI) was not included in Symbian's platform but are made up by Nokia's Series 60 or Sony Ericsson's UIQ.¹³³ The two mobile handset vendors are the only to, up until today, never have made a mobile handset running the open OS Windows Mobile.¹³⁴

5.4.2 Windows Mobile

Microsoft is the producer of Windows Mobile which was launched in a new version in 2007. The new version features developments in security and e-mail, with ability to show html-format and also has extended connections to MSN Messenger and Hotmail.¹³⁵ An advantage of Windows OS is that users are familiar with the interface from their PCs, as well as Microsoft's brand and reputation¹³⁶. Windows Mobile offers a one-size-fits-all package, thus a more complete but less flexible system which demands less integration than Symbian and Linux (see figure 5-7). This makes it easier for ODMs or new entrants, who originally do not have a proprietary OS, to use Windows Mobile in their handsets.¹³⁷ Even so, previous versions of Windows Mobile have been slower than Symbian, which was designed from start to work on mobile handsets.¹³⁸

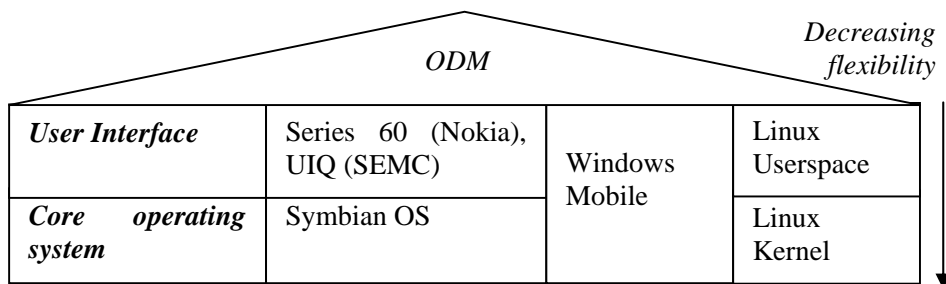


Figure 5-7: Operating systems and their integration.^{139, 140}

5.4.3 Linux

Linux is an OS with the source code and frameworks freely available for everyone. A great disadvantage for Linux is that there is no third party API, which means it has several variants.¹⁴¹ Applications designed for one Linux based handset do not work on other handsets. In late 2005 a

¹³¹ Gustafsson, M. Product Manager Marketing Material. EMP. 2007-04-24
¹³² Symbian, www.symbian.com/about/overview/history/history.html, 2007-04-03
¹³³ Persson, S. Product Manager. EMP. 2007-03-22, 2007-03-26
¹³⁴ Jönsson, M. Senior Manager Product Management. EMP. 2007-05-07
¹³⁵ Mobil.se, http://mobil.mkf.se/ArticlePages/200703/01/20070301101924_AHD559/20070301101924_AHD559.dbp.asp, 2007-04-11
¹³⁶ Visiongain (2005) *Mobile Linux*.
¹³⁷ Persson, S. Product Manager. EMP. 2007-03-22
¹³⁸ Malykhina, E. (2007) *Phone Smarts*. Information Week. p 32
¹³⁹ *ibid*
¹⁴⁰ Persson, S. Product Manager. EMP. 2007-03-26
¹⁴¹ Persson, S. Product Manager. EMP. 2007-04-19

Linux standards forum was formed to create specifications for mobile Linux and in January 2007, a foundation with purpose to create a Linux based platform with open API and foster collaboration, was formed.^{142,143}

5.5 Technology convergence

As the boundaries between the telecom industry and the IT-industry blur, these industries converge (see Figure 5-8).¹⁴⁴ *Convergence* is when previously separate industries overlap, in terms of activities, technology, products and customers¹⁴⁵.

Network convergence regards the integration of all traffic types - voice, data and video, onto a single network¹⁴⁶. The telecom industry has traditionally been associated with voice transmission but has, with 3G, increased capacity, allowing more data to be sent. Simultaneously, the IT-industry has developed mobile internet technologies with the emergence of WiFi and WiMax¹⁴⁷. Furthermore, internet telephony, so called VoIP, enables voice transmission via the internet¹⁴⁸. As these technologies are incorporated in mobile handsets, they may become a substitute and/or complement to existing cellular technologies¹⁴⁹.

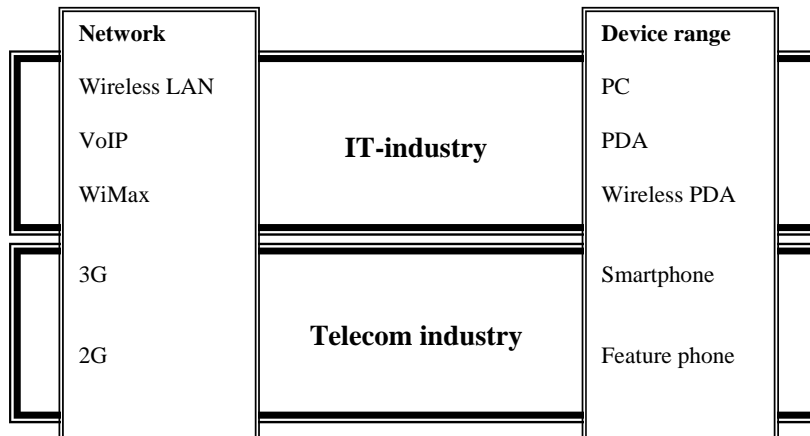


Figure 5-8: Convergence between the telecom and IT-industry.

The telecom industry traditionally produces *voice centric devices*, devices that rely on cellular technology, where voice transmission is the primary function, data the secondary. The IT-industry, on the other hand has been associated with *data centric devices*, devices made for data transmission, normally featuring an open OS allowing third party applications. The IT-industry

¹⁴² Malykhina, E. (2007) *Phone Smarts*. Information Week. p 32

¹⁴³ Linux, www.linux.com/article.pl?sid=07/01/29/1936201, 2007-03-14

¹⁴⁴ Jeppsson, H. Strategic Product Manager. EMP. 2007-03-16

¹⁴⁵ Johnson, G et al. (2005) *Exploring corporate strategy*. p 77

¹⁴⁶ Bitpipe, www.bitpipe.com/tlist/Network-Convergence.html, 2007-02-22

¹⁴⁷ Al-Alawi, I. A. (2006) *WiFi Technology*. Journal of Computer Science 2. pp 13-18

¹⁴⁸ WiMax Forum (2006) *Mobile WiMax*. pp 3-5

¹⁴⁹ Jeppsson, H. Strategic Product Manager. EMP. 2007-03-16

has moved from PCs to handheld computers, *PDA*s, which eventually were equipped with cellular technology, so called *wireless PDA*s. By equipping data centric devices with voice transmission technology, the IT-industry has moved closer to the telecom industry. The telecom industry has in its turn moved closer to the IT-industry, with the emergence of so called *smartphones*. These mobile handsets offer, besides cellular technology, business functions usually found in a PC such as word processing and internet browser. Furthermore, smartphones are equipped with an open OS, a QWERTY keypad, larger display, features which derive from the IT-industry. As smartphones and wireless *PDA*s feature similar capabilities, one can speak of *device convergence*, the transition from one-function and specialist devices, into multifunctional and converged devices.^{150,151,152}

There are some questions regarding the device and network convergence: order in which information is received, real-time shifts and priorities. In cellular technology, the order in which information is received is critical. During a phone call, the receiver must receive the information in the order that it was sent, otherwise he or she will not be able to make out what the sender is saying.¹⁵³ The mobile device also needs to handle shifts between functions and incoming calls. The incoming call should receive top priority and should not be affected by what function the consumer is presently using. The mobile handset should handle the transition in real-time, without losing the call.¹⁵⁴

The players in the mobile handset industry have since the beginning of the era focused on decreasing power consumption in order to increase standby time. The devices from the IT-industry, on the other hand, were originally designed to be connected to an electric socket. Despite improvements with the laptop, this does not reach the standby time of mobile handsets.¹⁵⁵

¹⁵⁰ Jeppsson, H. Strategic Product Manager. EMP. 2007-03-16

¹⁵¹ Gartner (2006) Mobile Communications Worldwide

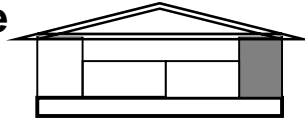
¹⁵² Telecoms, www.telecoms.com/itmcontent/tcoms/features/articles/20017413697.html, 2007-04-25

¹⁵³ Jeppsson, H. Strategic Product Manager. EMP. 2007-03-16

¹⁵⁴ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

¹⁵⁵ *ibid*

6 Key Success Factors in the Mobile Handset Industry



This chapter will explain the historical evolution of the mobile handset industry. Thereafter, an analysis will be performed to identify its drivers of change. Furthermore, success and failure factors in the mobile handset industry will be identified, by case studies of mobile handset vendors. The success and failure factors will be identified throughout the case studies and the full list is presented in appendix II. Finally, the key success factors of the mobile handset industry will be defined and presented.

6.1 Mobile Handset Industry Evolution

The description of the mobile handset industry evolution spans from the 1980s up until present. Some years have experienced similar characteristics and thereby been divided into a period. The mobile handset industry evolution thus consists of the five periods; *the rise of an era, the golden age, market maturity, multimedia* and *present* (see Figure 6-1). Each period will give a brief overview of the mobile handset vendors, the market demand and technologies developed.

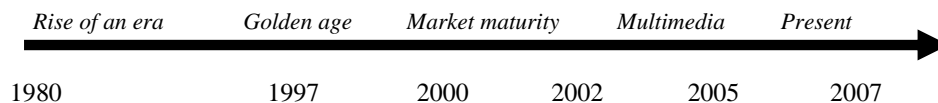


Figure 6-1: The periods of the historical evolution of the mobile handset industry.

6.1.1 The rise of an era (1980 – 1996)

The deregulation of telephone services started in the USA during the 1980s and the spread across the globe. The deregulation led to increased competitive intensity, where customers could benefit from improved service, price reductions, and network expansion¹⁵⁶. New players entered local markets which previously only had been dominated by one player. Rising from the transition, of nearly monopoly to competition were hence Nokia, Motorola and Ericsson, thanks to their in-house technology development. As 2G was developed, these companies concurrently pushed the frontiers of mobile performance. Mobile handsets evolved from suitcase-sized devices, as enormous amounts were invested to improve performance and reduce the size. Still the initial growth of GSM was held back in Europe by the lack of attractive and competitive handsets.^{157, 158}

Between some of these vendors competitive standard wars took place, especially between the GSM standard and the American standards; Qualcomm's CDMA and Ericsson's TDMA.¹⁵⁹ With

¹⁵⁶ Li F. et al (2002) *Deconstruction of the telecommunications industry*. Telecommunications Policy 26. p 451-472.

¹⁵⁷ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

¹⁵⁸ Kornby, M. Director Special Projects. EMP. 2007-02-28

¹⁵⁹ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

the shift from 1G to 2G, the Japanese players previously present on the global market withdrew to the Japanese market, since they lacked GSM technology. After pressure from the Japanese operator DoCoMo, they had merely developed the 2G technology pacific digital cellular.¹⁶⁰

Mobile handsets had initially been expensive devices that appealed to a small part of the population, such as enterprise users or so called yuppies, young successful career-focused individuals.¹⁶¹

Standards are important both for mobile handset vendors and operators. According to Lars Ramqvist, former CEO Ericsson, *playing the standards game* is of great importance. A mobile handset vendor wants to steer the development on the basis of its R&D. The driving forces behind the choice of standard are except from political: cooperation, persuasion and foremost innovations and discoveries. The use of standards enables reach of more consumers and thus reducing price.¹⁶²

6.1.2 The golden age (1997 – 1999)

During the golden age the mobile handset shifted from being a rarely used high-tech device to a commodity product. In the late 1990s the demand for mobile handsets and wireless communication exploded, initially in Western Europe and then across much of the Western world (See Figure 6-2). Consumers were attracted to the convenience of access to mobile networks, since they could make calls when and where they wanted. As the popularity of digital mobile handset increased, worldwide shipments increased by 50 percent between 1997 and 1998. In 1998, digital mobile handsets surpassed analog and accounted for 84.6 percent of total sales. Due to the transition to digital, Nokia moved past Motorola in global sales. Motorola had a troubled position as it did not see the shift to digital and therefore kept losing market share between 1998 and 2001. Motorola also experienced difficulties penetrating the mass market because of its high pricing on mobile handsets.^{163,164} Motorola maintained its number one position in the analog segment.

Nokia's success, was according to Peter Richardson, principal analyst for Dataquest Mobile Communication, based on its product strategy with few product platforms all adapted to digital standards, contributing to its ability to produce high volumes to low cost. Furthermore the company's product designs were created from consumer desire and not simply engineering ability.¹⁶⁵ An example of design ability was the built-in antenna, which quickly became a success and later, other mobile handset vendors were forced to follow¹⁶⁶.

¹⁶⁰ Kornby, M. Director Special Projects. EMP. 2007-02-28

¹⁶¹ Mobilen 50 år, p 28-30, 2007-03-29

¹⁶² NäringslivsHistoria, www.naringslivshistoria.se/templates/Page.aspx?id=1501&epslanguage=SV, 2007-04-16

¹⁶³ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

¹⁶⁴ Strategy Analytics (2002) Global Handset Market: 1Q 2002 Market Share Update

¹⁶⁵ Gartner, www.gartner.com/5_about/press_room/pr19990208a.html, 2007-03-07

¹⁶⁶ Jönsson, M. Senior Manager Product Management, EMP. 2007-02-20

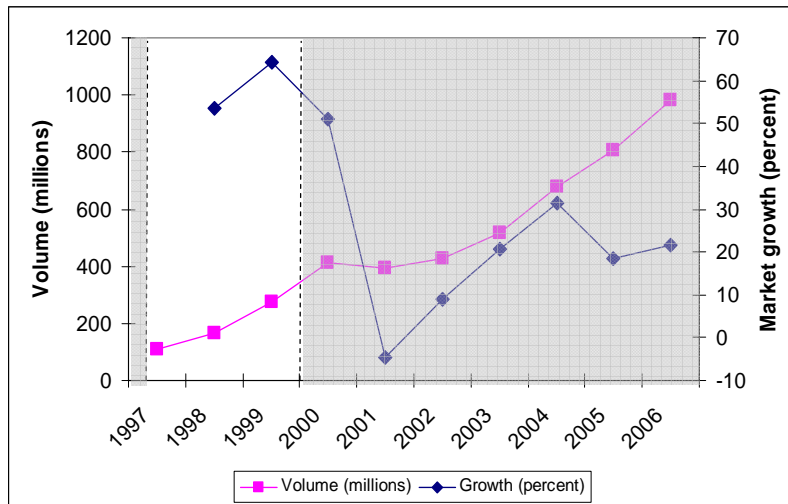


Figure 6-2: Volumes and market growth, 1997-1999.

To meet market demands, mobile handset manufacturers continued to push the performance of their products, as consumers were willing to pay for enhanced functionality, usability and reliability. An upcoming trend at this time was the growth of pre-paid subscriptions, with less affluent consumers entering the market. The mobile handset industry attracted interest from several companies originating in the consumer electronics industry. Examples of companies that made attempts to enter are Samsung, LG, Bosch, Sony and Panasonic.¹⁶⁷

6.1.3 Market maturity (2000 – 2001)

As the new millennium approached, the rapid penetration of wireless communication that had characterized the market, started to decline (See Figure 6-3). Functionality of mobile handsets had reached the mainstream customer demand, thus consumers were less willing to pay premium prices. As the mobile handset industry became consumer-oriented, companies could no longer survive on technological advantages.¹⁶⁸

A number of critical factors impacted the mobile handset industry during 2000. Component shortages impacted several vendors, were Siemens was hit the hardest. The mobile handset industry also disappointed its customers, the network operators, as the launch of 2.5G mobile handsets was postponed. The handset replacement cycle that had supported the year 2000 shipment target thus proved to be overstated.¹⁶⁹

In the beginning of the new millennium most mobile handset vendors struggled due to falling demand as the business cycle in general was decreasing. The operators had made large investments putting themselves in dept, making them unwilling to make new investments.

¹⁶⁷ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

¹⁶⁸ *ibid*

¹⁶⁹ Strategy Analytics (2001) *Worldwide Cellular Shipment Forecast (2001-2006)*

Furthermore, the operators that were not in debt reduced their investments budgets and investment banks lacked interest in the telecom industry.¹⁷⁰

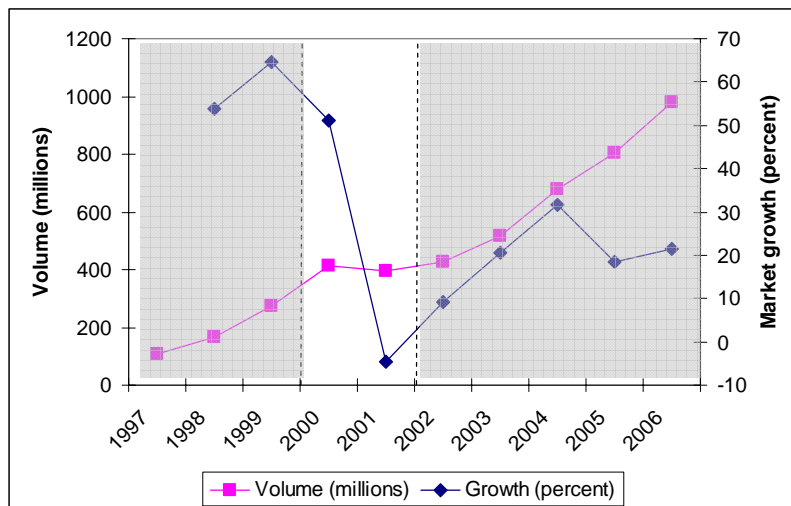


Figure 6-3: Volumes and market growth, 2000-2001.

Nokia launched new products, emphasizing design and building a consumer brand. It invested in lean manufacturing and was ahead of competitors in establishing production in low-cost countries.^{171, 172} Ericsson, unlike Nokia had been slow in the transition and not made the changes required. An example was Ericsson’s resistance to have a built-in antenna, since engineers meant this would affect reception.^{173,174} Ericsson was hit hard and in 2001, teamed up with Sony, creating Sony Ericsson Mobile Communications (SEMC). The joint venture could benefit from Ericsson’s technology knowledge and Sony’s consumer knowledge.¹⁷⁵ Samsung became the third largest player and Siemens the fourth¹⁷⁶. Motorola also experienced trouble and chose to sacrifice volumes in favor of margins and focus on mid-level and high-end handsets¹⁷⁷.

6.1.4 Multimedia (2002 – 2005)

The industry had since 2001 invested heavily in 3G infrastructure and licenses. Even so, the development of 3G mobile handsets was slow, since they competed against 2G mobile handsets in terms of size, price and power consumption. Furthermore the role of operators changed from voice service provider to supplier of a variety of services to increase average revenue per user.¹⁷⁸ Technological advances during this period include camera, color display and mp3 player in the

¹⁷⁰ Göteborgs Universitet, <https://gupea.ub.gu.se/dspace/bitstream/2077/1489/1/05-06-8.pdf>, 2007-04-17

¹⁷¹ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

¹⁷² ibid

¹⁷³ Kornby, M. Director Special Projects. EMP. 2007-02-28

¹⁷⁴ Rudenschöld, P. Product Manager. EMP, 2007-05-04

¹⁷⁵ Affärsvärlden 25 april 2001 nr 17. *Kan Sony vända trenden?*

¹⁷⁶ Strategy Analytics (2002) *Global Handset Market: 1Q 2002 Market Share Update*

¹⁷⁷ Strategy Analytics (2001) *Worldwide Cellular Shipment Forecast (2001-2006)*

¹⁷⁸ Kornby, M (2005) *The EMP story*. Ericsson Review No 1

The Mobile Handset Evolving

mobile handset¹⁷⁹. Furthermore, companies launched mobile handsets with a special theme, targeting a certain consumer niche; examples include the female- and pure music or camera handsets¹⁸⁰.

During this period the developing countries opened as new markets, increasing market volume but also challenged the mobile handset vendors (See Figure 6-4). Instead of as before focusing on one market mobile handset vendors now had to focus and try to be present on both emerging and replacement markets, requiring a portfolio of ranging product offerings.^{181,182} Due to price pressure in especially the GSM markets, some mobile handset vendors experienced a declining operating margin¹⁸³.

Nokia continued to extend its leadership, while maintaining higher margins than the nearest rivals. The company attempted to battle brand fatigue with innovation and launched 16 new products during 2002, twice as many as Motorola.^{184, 185} Nokia's CDMA shipments also grew, closing the gap to CDMA market leader Samsung and number two LG¹⁸⁶.

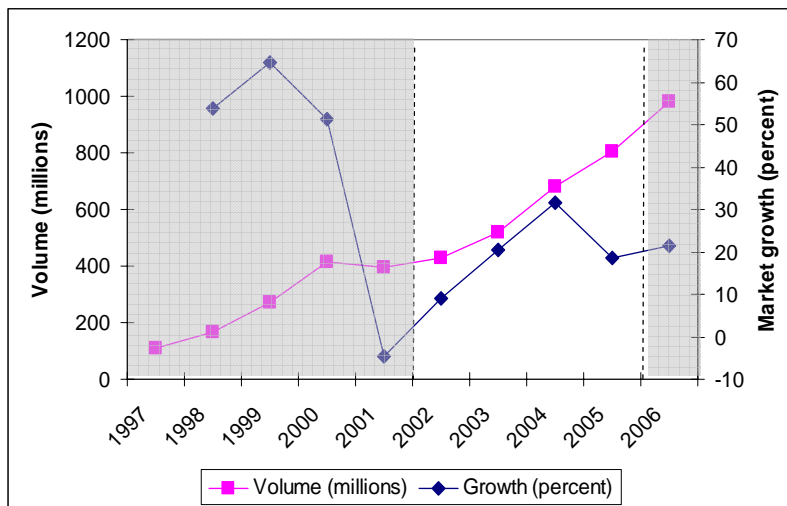


Figure 6-4: Volumes and market growth, 2002-2005.

Motorola experienced problems during this period. In 2002 they saw fruits of its 2.5G line, launched eight new products, but struggled to balance across technologies.¹⁸⁷ Motorola also moved into the low-end market, but failed with translating volumes into profits. Thanks to later

¹⁷⁹ Ekelund, B. Vice President Product Management and Strategic Technology, EMP. 2007-03-02

¹⁸⁰ Nawroth, M. Business Intelligence Manager, EMP. 2007-03-20

¹⁸¹ PocketPc, www.pocketpcmag.com/_archives/Apr06/emerging.aspx, 2007-04-10

¹⁸² It News, www.itnews.com.au/newsstory.aspx?CIaNID=46827, 2007-04-10

¹⁸³ Strategy Analytics (2005) Global Handset Market: 4Q 2004 Update

¹⁸⁴ Strategy Analytics (2002) Global Handset Market: 1Q 2002 Market Share Update

¹⁸⁵ Strategy Analytics (2003) Global Handset Market: Q1 2003 Update

¹⁸⁶ Strategy Analytics (2005) Global Handset Market: 4Q 2004 Update

¹⁸⁷ Strategy Analytics (2002) Global Handset Market: 1Q 2002 Market Share Update

supply chain improvements and volume gains, Motorola doubled their operating margin. It also launched an aggressive global brand campaign to target young users. Those improvements together with the launch of the successful Razr, increased Motorola's market shares in 2005.¹⁸⁸

Samsung kept growing market share in CDMA even though its main focus was on driving growth by GSM shipments¹⁸⁹. The gap to Motorola widened as Samsung suffered from inventory build-up. Still, the company did not address emerging markets as aggressively as Motorola and Nokia.^{190,191}

SEMC struggled with profitability during the first years and lack of new products in the entry level segments caused a declining market share¹⁹². Thanks to the success of Walkman and Cybershot handsets, SEMC started to recover with gains in Western Europe as well as Central and Latin America by the end of the period¹⁹³.

6.1.5 Present (2006 – April 2007)

2006 ended with 990 million mobile handsets sold. Vendors outside the top six continued to lose market share and accounted for only 14 percent of worldwide sales, a five percent decrease from 2005¹⁹⁴. Predictions show that there will be three billion mobile handset users during 2007. Furthermore Nokia expects that replacements will represent more than 65 percent of the total industry volume in 2007, thus increasing five percentages from 2006 and with the growing market of replacements, the drivers will be pricier and more advanced mobile handsets.^{195,196}

Nokia continued to grow market share (see Figure 6-5) despite criticism for lack of slim products and a weak mid-range offering. Nokia combined low-cost product offerings in the emerging markets and feature-rich products in the mature markets.¹⁹⁷ In February 2007, they announced a partnering which allows Nokia's consumers to view YouTube content on their handsets via broadband links.¹⁹⁸ Nokia is already a partner with Yahoo¹⁹⁹.

2006 started well for Motorola as it benefited from the success of Razr in most markets during 2005, but slowed in the second half of the year. Motorola's sales to end-users reached in 2006, 209 million units, achieving a 21.1 percent market share.²⁰⁰ During the first quarter of 2007,

¹⁸⁸ Strategy Analytics (2005) Global Handset Market: 4Q 2004 Update

¹⁸⁹ Strategy Analytics (2002) Global Handset Market: 1Q 2002 Market Share Update

¹⁹⁰ Gartner, www.gartner.com/it/page.jsp?id=492223, 2007-03-08

¹⁹¹ Strategy Analytics (2005) Global Handset Market: 4Q 2004 Update

¹⁹² Strategy Analytics (2002) Global Handset Market: 1Q 2002 Market Share Update

¹⁹³ Strategy Analytics (2005) Global Handset Market: 4Q 2004 Update

¹⁹⁴ Gartner, www.gartner.com/it/page.jsp?id=501734, 2007-03-26

¹⁹⁵ Reuters, http://today.reuters.com/news/articlenews.aspx?type=technologyNews&storyid=2007-03-12T181736Z_01_L12486771_RTRUKOC_0_US-NOKIA-MARKETS.xml&src=rss, 2007-04-17

¹⁹⁶ Ekonominyheterna, ekonominyheterna.se/nyheter/2006/11/29/fyra-miljarder-mobilanvandare-2/, 2007-03-13

¹⁹⁷ Gartner, www.gartner.com/it/page.jsp?id=501734, 2007-03-26

¹⁹⁸ EETimes, www.eetimes.com/news/latest/showArticle.jhtml?articleID=197005140, 2007-03-26

¹⁹⁹ E24, www.e24.se/dynamiskt/it_telekom/did_11493615.asp, 2007-03-26

²⁰⁰ Gartner, www.gartner.com/it/page.jsp?id=498690, 2007-03-08

Motorola announced a profit warning. Reasons to this are threefold. Firstly sales of mobile handsets which part for more than half of the company's turn-over are terribly low. Motorola has not managed the incredible price press on low end handsets sold in emerging markets. Secondly Motorola is left behind in 3G technology and the company has experienced great trouble after the successful Razr. Finally, prices on the Razr are now being cut, making it hard to sell the expensive follow-ups. The company is now leaving its previous commitment to increase market share and regain the number one position. Instead the company will focus on design, production and logistics.²⁰¹

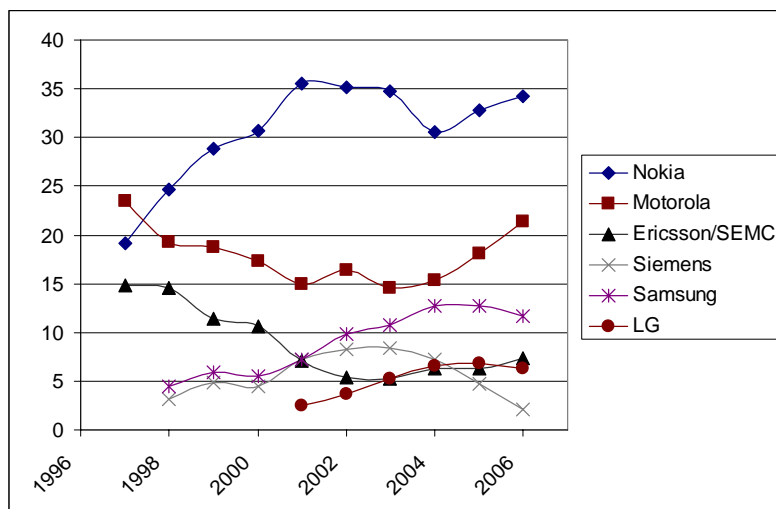


Figure 6-5: Market share in the mobile handset industry.²⁰²

Samsung continued to struggle with a falling market share, caused by its weak low-tier portfolio, a limited range of smartphones and a fading influence in CDMA²⁰³. While Samsung's focus remained on the high-end of the market, the company added more mid-tier and low-end products to its portfolio to tackle emerging markets. In 2007, Gartner expects operators' rollouts of technologies such as HSDPA and WiMax will help Samsung play a key role around the world.²⁰⁴

SEMC's overall sales for 2006 reached 73.6 million units and a market share grew of 7.4 percent. SEMC was able to count on a rich portfolio of devices with music and imaging features.²⁰⁵ However, smartphones remain a weak spot for SEMC²⁰⁶.

The gap between LG and SEMC widened further in 2006 as LG lost market share. LG's is thought to be too reliant on a single product, the LG Chocolate²⁰⁷. LG has partnered with Prada in

²⁰¹ E24, www.e24.se/dynamiskt/it_telekom/did_14878738.asp, 2007-04-10

²⁰² Various references.

²⁰³ Strategy Analytics (2007) Vendor Share: Global Handset Market: Q4 2006

²⁰⁴ Gartner, www.gartner.com/it/page.jsp?id=498690, 2007-03-08

²⁰⁵ ibid

²⁰⁶ Strategy Analytics (2007) Vendor Share: Global Handset Market: Q4 2006

²⁰⁷ E24, www.e24.se/dynamiskt/it_telekom/did_14123670.asp, 2007-04-10

order to develop a new design handset, the Prada phone, which reached selected stores from February 2007 and onward²⁰⁸. In March 2007, LG and Google signed a deal, where LG handsets will be marketed as LG-Google handsets. These handsets will feature a number of Google applications and the deal will involve handsets in Asia, Europe and North America.²⁰⁹

In January 2007 Apple announced a launch of a mobile handset, the iPhone. Apple's entrance in the mobile handset industry is not a coincidence as mobile handsets to a greater extent are used for sending and receiving emails, instant messaging and synchronizing with PC.^{210,211}

6.2 Mobile Handset Industry Evolution Analysis

Each period of the mobile handset industry; the rise of an era, the golden age, market maturity, multimedia and present, can be related to the phases; *foundation*, *growth*, *stability* and *cultural lock-in* which are described in creative destruction. Figure 6-6 shows the position of each period.

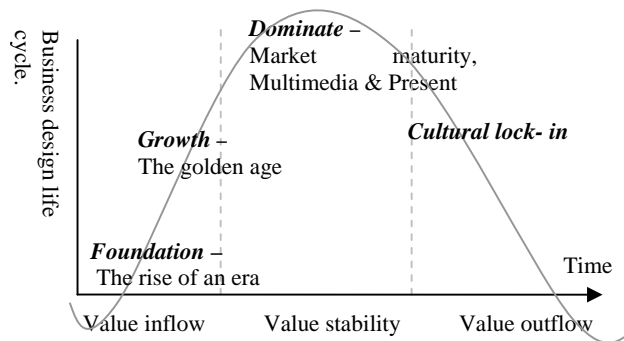
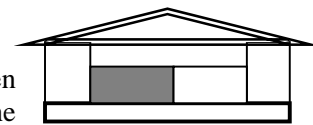


Figure 6-6: Periods in phases of creative destruction and value migration.

6.2.1 The rise of an era (1980 – 1996)

6.2.1.1 Characteristics

As defined in the theoretical framework, a new-market disruptive innovation occurs when existing products limit the number of potential consumers or force consumption to take place in inconvenient settings. The analog mobile handset had limitations since it was expensive and networks were national, which limited the number of users. As a result of the 2G standards, networks were no longer geographically constrained and mobile handset vendors could sell the same products to geographically dispersed consumers. Therefore, the digital mobile handset can be seen as a new-market disruptive innovation in its foundation phase, since it enabled new consumers to make phone calls in new environments and contexts.

²⁰⁸ LG Mobile, http://joy.uk.lgmobile.com/general/notice_view.jsp?seq=50, 2007-03-26

²⁰⁹ ZD Net, http://news.zdnet.com/2100-1035_22-6171292.html, 2007-04-17

²¹⁰ Engadget, www.engadget.com/2007/01/09/live-from-macworld-2007-steve-jobs-keynote, 2007-04-18

²¹¹ Innopath, innopath.com/pdf/imdm_business_requirements.pdf, 2007-04-18

Furthermore, a new-market disruptive innovation also creates new growth by making it easier for people to do something that historically required deep expertise or wealth. The mobile handset was during the beginning of the time period constrained to enterprise and wealthy users, but as it became digital it gradually developed to become smaller and more convenient to use by the average consumer. For example, the mobile handset evolved from a suitcase-sized box, to a pocket-sized device much more like the mobile handsets today.

6.2.1.2 Drivers of change

The *deregulation* of the telephone services during this period changed the environment and thus also the business chess game. Previous national monopoly and the relationship of one-operator, one-supplier had been a convenient way of doing business for both parties. The historical lack of competition had not made companies optimized to adapt to the new more competitive market situation. Companies that struggled did not have processes and values adjustable to the new environment. Ericsson, Nokia and Motorola adapted fast and managed the increased competition, since they pushed their technology to become standards. An example of players, that were not successful in adapting to the new, competitive and global environment were the Japanese, as they had focused on a standard which remained national. To win global market shares, it was of importance for the mobile handset vendors to take part and win standards war. In order to win this standards war, *technology development*, such as innovations and inventions, was an important driver.

6.2.2 The golden age (1997-1999)

6.2.2.1 Characteristics

As the digital mobile handsets surpassed the analog and moved up-market, to become sustaining, it started to meet the demands of the mainstream market. The mobile handset left the foundation phase and volumes increased significantly as it entered growth and value inflow, a phase characterized by high profitability and limited competition. Thus the industry attracted new entrants and several consumer electronics companies entered at the end of the period, increasing competition. Since the mobile handset facilitated consumers' everyday use and increased their productivity, the mainstream market adopted fast.

Motorola was slow in adapting to the transition to digital mobile handsets which could have been caused by Motorola's fear of cannibalizing its analog line in which the company was market leading as mentioned in creative destruction. As Motorola was late in the transition, Nokia became market leader. Nokia was successful with its focus on product design in high volumes to low cost.

6.2.2.2 Drivers of change

Since consumers were willing to pay for *improved functionality, usability and reliability* Nokia, Motorola and Ericsson pushed product performance along a sustaining trajectory. The mobile handset became more of a *commodity*, available for a broader, high volume, consumer base. Competitors such as Samsung and Sony identified the rising similarities between the mobile handset industry and the consumer electronics industry, for example high technology products used for entertainment. The consumer electronic companies' knowledge in consumer demand

turned out to be an important asset as the mobile handset industry became *consumer-oriented*. However lack of knowledge in core cellular technology constituted an obstacle for some.

During this period, *pre-paid subscriptions* were introduced, enabling a new group of consumers to enter the market. These consumers were mainly less prosperous and thus had other demands on the mobile handset than previous users. Pre-paid subscriptions can be seen as a new-market disruptive innovation since a new consumer group could benefit from the mobility offered by the mobile handset. This new consumer group generated new sales volumes to mobile handset vendors. Volumes Nokia captured, with low cost handsets.

6.2.3 Market maturity (2000-2001)

6.2.3.1 Characteristics

During this period consumer demand stagnated. Other factors influencing consumer demand was the business cycle, which was decreasing in general, and operators reducing their investments budgets. Incumbents were close to a cultural lock-in, where Nokia saw the new way of doing business, and adapted, while as Ericsson for example did not. The new way of doing business included being consumer-oriented instead of technology-oriented and finding ways to address the new consumers entering the market. The incumbents which were large technology-focused companies had a hard time realizing a change was needed, as they in past had been able to rely on their engineering skills and technological development. Ericsson made the mistake of not realizing the shift from power of technology to power of design, which is why they for example did not see the trend of built-in antenna.

At the same time, Samsung and other consumer electronic companies took Ericsson's market shares as they entered into their growth phase, with an advantage in making consumer-oriented products. The mobile handset reached market overshoot, as the foundation of technology and functions were saturated leaving consumers unwilling to pay for more. Because of the lack of new disruptive innovations, the mobile handset moved closer to an overshoot. Ericsson and Sony formed a joint venture in order to combine their technology and consumer skills. Motorola was still struggling, due to its late move into digital handsets and a wrong estimation of volumes when entering the low-end segment.

6.2.3.2 Drivers of change

The period was characterized by a decreasing consumer demand due to drivers as *maturity in market* and a *falling business cycle*. The 2G mobile handsets, functions and applications had reached a point of stagnation. 3G development was still in the future, 2.5G mobile handsets were postponed and operators were unwilling to invest, leaving few new models to attract additional consumers.

A company that identified the change was Nokia, which was also one of the few companies during this time to excel and achieve a market share maximum, 35 percent compared to 15 percent for Motorola as number two. The most successful companies were those that managed to adapt to *design, brand and low-cost manufacturing* which also evolved as the primary drivers of this period. The more consumer-oriented industry, and Ericsson's falling market shares, gave

Samsung a window of opportunity to excel as it entered its growth phase. In 2001, after only four years in the industry, Samsung surpassed Ericsson and became the third largest player, a position it has kept ever since.

6.2.4 Multimedia (2002-2005)

6.2.4.1 Characteristics

The period was characterized by hypercompetition, which the mobile handset vendors chose to deal with through disruptive innovations, agreeing with D'Aveni theories. In diversity to the period Market maturity, the mobile handset vendors now succeeded with creating small disruptive innovations, such as mp3 player, camera and slim handsets. New innovations combined with a falling ASP attracted consumers to replace their mobile handset with a new slim and/or multimedia mobile handset.

Consumers were now users with more extended needs than before. They were familiar with the use of mobile handsets and thereby harder to please. The market had reached a level of maturity and entered the stability phase. This phase is according to Slywotsky's value migration complicated, as incumbents start relaxing, believing they have a reliable consumer base and thereby change from external to internal focus. When letting go of the external focus they open for new entrants. During this period Nokia had a down period, granting players such as Samsung and LG, increased market shares.

To retain market share mobile handset vendors had to offer a broad product portfolio, to attract different consumers as personalized mobile handsets had come to be more attractive. Common was that the mobile handset vendors focused on creating theme mobile handsets.

The mobile handset's popularity and the way it facilitated people's everyday life also attracted people in the developing countries. Mobile handset vendors could now reach a larger amount of people and increase their volumes. The global market had also become divided in two, replacement and emerging, which required different product offerings and demanded even broader product portfolios.

6.2.4.2 Drivers of change

To better reach the consumers and their special needs, mobile handset vendors *segmented* the market to present more customized offers. At the same time as the consumer demanded more *personalized* mobile handsets they were less willing to pay for them. For the handset vendor to retain market share, prices had to be competitive which led to *price pressure*. The price pressure resulted in a falling ASP and mobile handset vendors needed to improve supply chain in order to keep up the margins.

The industry was characterized by hypercompetition which was dealt with by small but numerous sustaining and disruptive innovations, the *product life cycle (PLC)* also became shorter. The disruptive innovations shortened time spend in each life cycle, making the consumer demand new innovations, such as a slim handset, an integrated camera or mp3-player. The need for a *broad product portfolio*, driven by hypercompetition, also contributed in shortening the product life

cycle. The purpose of a broad product portfolio is to attract a wide number of consumers, but in order to stay attractive, the portfolio constantly has to be updated with new products, thus shortening the product life cycle.

The emerging markets gave the mobile handset vendors an opportunity to increase their sales volumes but it also added complexity. The mobile handset vendors had to be present on two different markets, the low-cost emerging and the more advanced replacement, challenging their portfolio.

6.2.5 Present (2006 – April 2007)

6.2.5.1 Characteristics

The mobile handset industry has grown enormous with almost one billion mobile handsets sold in 2006. The large players are growing even larger and the top six together, account for 86 percent of worldwide sales. The majority of sales is made up of replacement handsets and will most likely continue to be, as there are over three billion mobile handset users worldwide.

After years of increased multimedia functionality in the mobile handset, the convergence between the mobile handset industry and IT-industry has started to show. Some of the fruits of the convergence have already become this period's disruptive innovations. As the mobile handset becomes more PC-like it is to a larger extent than before, possible to work while on the move.

6.2.5.2 Drivers of change

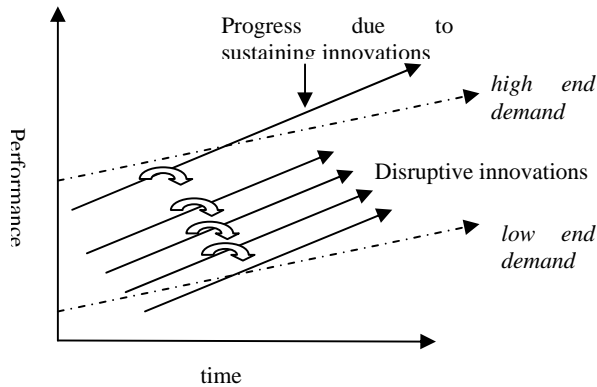
Like the mobile handset industry during the golden age had many similarities with consumer electronics, it now has become similar to the IT-industry, in regards of *demand for services and applications* such as instant messaging (IM) and email in the mobile handset. To capture the similarities and to extend the total market, *alliances* are formed between mobile handset vendors and IT-players. Examples of these alliances are Nokia partnering up with YouTube and LG together with Google launching a LG-Google handset. Not all IT-players are partnering to reach the mobile handset industry, Apple for example, with the launch of its iPhone, try to enter the industry on its own.

A risk for companies in the stability phase is becoming too self-focused and thereby experiencing cultural lock-in. Motorola's profit warning in 2007 can be an example of cultural lock-in due to not paying enough attention on what is actually happening in the industry and where the value is heading.

6.2.6 Summary mobile handset industry

The mobile handset industry has developed successfully thanks to continuously introduced disruptive innovations. Depending on company and period the effects of introduced disruptive innovation have varied. Some companies have not seen the disruption coming and thereby fallen behind. In some periods, the industry has been more creative and less in others. The industry development has influenced and increased consumer demand due to the innovating products.

The Mobile Handset Evolving



Common for the industry as an entity and all periods are that they are characterized by disruptive innovations. A disruptive innovation starts moving up the sustaining trajectory, as showed in Figure 6-7. The industry never reaches overshoot; instead it meets mainstream market demand again and again.

Figure 6-7 Disruptive innovations during the mobile handset industry evolution

The disruptive innovations that have influenced the market the most are pre-paid subscriptions and multimedia functions. These innovations, for example cameras and mp3-players are fast becoming sustaining as vendors try to outperform each other by increasing mega pixel or storage capacity. The key drivers of change of each period is summarized and shown in figure 6-8.

<i>Rise of an era</i>	<i>Golden age</i>	<i>Market maturity</i>	<i>Multimedia</i>	<i>Present</i>
1980	1997	2000	2002	2006
Deregulation Technology	Functionality Commodity Consumer-oriented	Business cycle Market maturity Design, brand Low-cost manufacturing Pre-paid subscriptions	Segments Personalized Price pressure PLC shorter Product portfolio	Alliances Services Applications

Figure 6-8: The key drivers of change of the mobile handset industry.

6.3 Case study: Mobile Handset Vendors

Success and failure factors will be identified by case studies of mobile handset vendors. The Nokia case, which will provide success factors needed to maintain a position as market leader in the mobile handset industry. The second case is Samsung will present information about what success factors were needed to succeed as a new player in the mobile handset industry. The final case is Siemens, an incumbent that failed to maintain its position. Its failure will provide information about failure factors, by showing what it lacked and managed wrongly. To visualize the identified success and failure factors each case's factors are cursive.

6.3.1 Nokia

6.3.1.1 The Nokia success

Nokia has a history of diverse activities, and the move from making rubber boots to become market leader in the mobile handset industry does not always seem obvious. Even though it can appear far-fetched, rubber boots, lavatory paper and televisions are all consumer-oriented products, like the mobile handset. The history of being *consumer-oriented* might have been an advantage for Nokia in the mobile handset industry.

In contrast to competitors, Nokia early adapted to the digital 2G and launched several successful models during 1998. Nokia has ever since attained the position as number one and remained there steadily with a market share of more than 30 percent since the year 2000.^{212, 213}

A contributing factor to Nokia's fast adaptation was its product strategy, based on using platforms all adapted to digital standards. Nokia also built its success on *design*, created from consumer desire and not simply based on engineering ability, which helped Nokia overtake Motorola and Ericsson.²¹⁴ Already in 1992, Nokia bet on *branding* and consumer-friendly design. Nokia first decreased the size and then the design with rounded edges, now a Nokia hallmark.²¹⁵ The design and simplicity of Nokia's mobile handsets along with its user interface has helped to maintain brand loyalty.²¹⁶ Nokia has a high brand value, ranked as number six in the world by Business Week and Interbrand²¹⁷.

Even though Nokia always has had a design and consumer focus, it is not known to be first with new fads, but instead a so called *fast follower*. Nokia is *fast adapting* what other companies launch successfully.²¹⁸ The adaptability is an advantage for Nokia and is much due to its *efficient supply chain*.

Company snapshot

Nokia started out as a paper mill company in 1865 but merged with the Finnish Rubber Works and Finnish Cable in 1967 to create Nokia Corporation. The large conglomerate made everything from rubber boots to lavatory paper and TVs. Nokia and the Finnish economy had to pass through a crisis before the conglomerate sold off several divisions. Along with Finnish television maker Salora, it formed the radio telephone company Mobira Oy as a joint venture. In 1984, the company launched their first portable phone. In 1992, the company decided to focus on its telecommunication business and launched its first GSM phone. By 1998 Nokia was the world leader in mobile handsets.

(Nokia, www.nokia.com, 2007-03-07, The Economist. London Oct 14, 2000. *Nokia: A Finnish fable*)

²¹² Nokia, www.nokia.com, 2007-03-07

²¹³ Affärsvärlden 13 januari 1999. nr 1-2. *Bättre vinst redan i år*.

²¹⁴ Gartner, www.gartner.com/5_about/press_room/pr19990208a.html, 2007-03-07

²¹⁵ Fortune. May 1, 2000. *Nokia's Secret Code*.

²¹⁶ Mad.co.uk, www.mad.co.uk/Main/Comments/Articles/d13c7fe88d33467087255143_5f885613/Nokia's-rivals-getting-too-close-for-comfort.html, 2007-03-08

²¹⁷ Finfacts, www.finfacts.com/brands.htm, 2007-03-08

²¹⁸ Nordén, M. Senior Product Manager. EMP. 2007-03-08

The first years of the millennium were great for Nokia, its leadership extended and the company earned margins several times those of competitors. Despite its lasting success, it also experienced difficulties. During 2004 Nokia's operating margins fell due to price cuts throughout its portfolio. A simultaneous dip in market share was explained by the company's failure to recognize the clamshell popularity and competitors' more aggressive marketing. The lesson learned was expensive for Nokia that had to overlook its models and change strategy. The strategy changes resulted in Nokia focusing on formed four segments; phone, multimedia, enterprise and network.²¹⁹ Following a raft of 56 new phone releases during 2005, including the N-series and award-winning campaigns, Nokia regained its market share.^{220,221}

Despite lack of a slim line and weak mid-tier offering, Nokia still gains market share. Targeting first-time users and teens, a combination of *low-cost offerings in emerging markets* and *feature-rich products in mature markets*, has proved to work.²²² Its focus on low-end market segments with *low-cost products* have contributed in making *production and supply chain management* issues of great importance²²³.

Nokia is also one of the few companies in the mobile handset industry who has not fully followed the trend to outsource. It has continued on its own, but is de-coupling when necessary to remain competitive. Nokia outsources manufacturing for volume production only at the end of a product lifecycle.²²⁴ Nokia has relied on *cost-leadership, volumes, an efficient supply chain*, attracting consumers with *design and brand awareness* rather than innovation.

6.3.2 Samsung Mobile

6.3.2.1 Late enter becomes first-mover

Samsung first entered the mobile handset market 1996, thus had to compete against large incumbents such as Nokia and Ericsson²²⁵. According to Yun, CEO Samsung group, this was not an obstacle: "In the analog era, it was difficult for a latecomer to catch up, but in the digital era, if you are two months late, you are dead. Speed and intelligence are what matter, and the winners have not yet been determined."²²⁶ Samsung had an advantage in originating from the consumer industry, namely *knowledge about making consumer-oriented products*.

Company snapshot

Samsung Electronics Co., established in 1969, is headquartered in South Korea and operates in the electronics industry worldwide. The company's products are divided into five categories: digital media, telecommunication network, digital appliance, semiconductor, and liquid crystal display (LCD). The telecommunication division was established in 1996.

(www.samsung.com, 2007-02-28)

(www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28)

²¹⁹ Jönsson, M. Senior Manager Product Management, EMP. 2007-03-30

²²⁰ Mad.co.uk, www.mad.co.uk/Main/Comments/Articles/d13c7fe88d334670872551435f885613/Nokia's-rivals-getting-too-close-for-comfort.html, 2007-03-08

²²¹ Nokia, http://press.nokia.com/PR/200512/1023902_5.html, 2007-03-08

²²² Gartner, www.gartner.com/5_about/press_room/pr19990208a.html, 2007-03-07

²²³ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

²²⁴ *ibid.*

²²⁵ *ibid.*

²²⁶ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

A priority for Samsung mobile was to straighten out the US market and an achievement came when the US nationwide operator Sprint began selling Samsung handsets. Sprint's service was based on CDMA and Samsung had an early *lead in the standard* due to an alliance in Korea with Qualcomm. Samsung's clamshell-shaped SCH-3500 was an instant hit and Samsung was soon world leader in CDMA phones.²²⁷ Between 1998 and 2000 Samsung's share of the European market climbed from nothing to 2.5 percent²²⁸. By 2002 Samsung surpassed Ericsson and became the third largest player on the global market with a market share of ten percent²²⁹.

A factor contributing to the success of Samsung's entrance in the mobile handset industry was *speed*. Thanks to a flat, non bureaucratic organization one could fast win approval for new products, budgets and marketing plans giving Samsung ability to seize opportunities. Samsung is also *rapid in the process of product concept to rollout*. Jin, executive vice president for mobile communications, estimates its turnaround time to be half of what Japanese rivals would require.^{230, 231}

According to Tord Wingren, former CEO, Samsung Electronics Europe, Samsung's key to success is based on that the company develops a *large number of mobile handset models* based on platforms from three to four different platform suppliers. Regarding the largest mobile handset vendors in the industry, all but Samsung has a platform supplier tied to them; Nokia makes its in-house, Motorola has Freescale and SEMC has EMP. Samsung takes advantage of its position as an attractive customer in the eyes of the platform suppliers and thus can keep *R&D costs and development time low*.^{232, 233}

Samsung also has the advantage of an advanced domestic market. The eagerness of younger South Koreans to adopt new technologies, in addition to that 20 percent of the population buys a new cell phone every seven months, gives the company a ready-made *test market* for its new mobile handsets. By launching in South Korea first, local feedback is received. Any problems are restricted and attended to before launching worldwide.^{234, 235}

Samsung has kept the hardware *manufacturing in-house*. It is industry contradictory, because Samsung outsources software and instead keeps hardware manufacturing. Yun justifies the choice by "Samsung needs it all. Everyone can get the same technology now, but that does not mean it can make an advanced product. Stay at the forefront of core technologies and master the manufacturing."²³⁶ Wingren also points out that it is important to manage and adapt the production according to the fluctuations in the market and have *ability to quickly change one's production*. Samsung's manufacturing is concentrated to a single site where 80 – 90 percent of the

²²⁷ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²²⁸ Business Week, www.businessweek.com/2000/00_38/b3699301.htm, 2007-02-28

²²⁹ EMS Now, www.emsnow.com/newsarchives/archivedetails.cfm?ID=437, 2007-03-19

²³⁰ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²³¹ Herald Tribune, www.iht.com/articles/2005/07/08/business/wbspot09.php, 2007-02-28

²³² Wingren, T. Former CEO, Samsung Electronics Europe. 2007-04-25

²³³ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²³⁴ Wingren, T. Former CEO, Samsung Electronics Europe. 2007-04-25

²³⁵ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²³⁶ *ibid*

handsets are made.²³⁷ This enables manufacturing *flexibility and control* of materials and components²³⁸.

Samsung is a large, diversified conglomerate, producing chips and displays that go into its digital products, which gives it an edge in handsets and an advantage of in-house *technology knowledge*. To get the best solution Samsung also forces its own units to compete with outsiders. For example in the LCD business, Samsung sources half of its color filters externally and the other half internally.²³⁹

Samsung has aimed at being an *innovator* and *first-mover* regarding new products and technologies and was the first to launch the watch phone, double displays, camera phone, CDMA2000 telephone and a MP3 handset. In recent years Samsung has often been first to market with an extra mega pixel in a camera phone or making the slimmest handset available in the market²⁴⁰. Samsung has also put an effort in the *form factor*, and is associated with the slide concept. The company is winning *design* awards and increasing *brand* awareness.^{241, 242, 243}

6.3.3 Siemens Mobile

6.3.3.1 A turbulent history

Siemens Mobile, a former part of Siemens AG, was molded in a time of monopoly in the German market. The *hierarchic* company was for a long time the only supplier to the national German operator Deutsche Telekom. As an only supplier, it did not need to either cost-optimize, be fast or efficient and *delays in product development were common*. When competition rose due to deregulations, Siemens Mobile had a hard time to keep up.²⁴⁴

Siemens Mobile had in 1999 a 10 percent global market share of the GSM market, but *lacked presence outside the GSM market*. The same year, the company bought Bosch Mobile and by acquiring a 15 percent stake in the CDMA handset newcomer Neopoint, Siemens tried to challenge industry incumbents by entering the US market.²⁴⁵

Company snapshot

Siemens AG, the German national symbol, was founded in 1846. Siemens AG is active in 190 countries in healthcare, manufacturing industries, service industries, process and basics industries, telecommunication, transport, logistic and infrastructure.

(<http://w4.siemens.de/archiv/en/geschichte.html>,

<http://w4.siemens.de/archiv/en/laender.html>, www.siemens.com, 2007-03-06)

²³⁷ Wingren, T. Former CEO, Samsung Electronics Europe. 2007-04-25

²³⁸ Andersson J. et al (2006) *Standards War*.

²³⁹ Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²⁴⁰ Seminar. EMP. 2007-03-02

²⁴¹ Anderson J., Jönsson, M. (2006) *The Mobile Handset Industry in Transition*.

²⁴² Business Week, www.businessweek.com/magazine/content/03_24/b3837001_mz001.htm, 2007-02-28

²⁴³ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

²⁴⁴ Ekelund, B. Vice President Product Management and Strategic Technology, EMP. 2007-03-02

²⁴⁵ Strategy Analytics (2000) *European Cellular handset market*.

From being one of the top five players in the mobile handset industry, Siemens Mobile faced increasing losses and between 2004 and 2005 Siemens Mobile's operating margins fell. Siemens Mobile had entered a vicious circle in 2003 as its devices' reputation worsened, due to its *primitiveness*. After downsizing, the remaining resources could not manage to support existing handsets at the same time as developing software for new ones. The outcome was *poor software*, adding to the already *bad reputation*.²⁴⁶ The situation became untenable for Siemens Mobile, who sought a merger partner. In 2005, the Asian company BenQ agreed to take over Siemens. Siemens Mobile paid BenQ 250 million Euros and bought shares in BenQ worth 50 million Euros, in order for BenQ to take over its debts.²⁴⁷ Siemens Mobile's main assets, an extensive worldwide GSM distribution channel and carrier relationships, did not help the new company.²⁴⁸ Due to low market shares, poor sales, massive losses and poor management the young company filed for bankruptcy in 2006.²⁴⁹ Today BenQ manufactures mobile handsets in its own brand, mainly to the Asian market.²⁵⁰

Siemens Mobile had prerequisites to become successful in the mobile handset industry; it had a *well-known global brand*, *deep knowledge in technology* and functioning *distribution channels*. Despite this, it was *unable to manage competition* and the *shifts in the industry*. The company tried to penetrate the *low-end segment*, but did not outsource, instead it kept its *manufacturing in Europe*, making it hard for Siemens to compete in low cost. In pure desperation to win volume, Siemens Mobile sold its mobile handsets to an *even lower price*, but by doing so *brand equity decreased*.^{251, 252} Siemens' hierarchical structure also made *time-to-market unnecessary long*, giving *problem in adjusting and adapting* to the fast changing mobile handset industry.

6.4 Key success factors in the mobile handset industry

The mobile handset industry's key success factors are defined below. The drivers of change in the mobile handset industry, together with the success- and failure factors of the mobile handset vendors make out the foundation. Although the KSF in this chapter are seen as decisive, the complete generated list of success factors, failure factors and drivers of change is found in appendix II.

Design relates to consumer visible aspects and can be divided into hardware, the physical product appearance and software, the user interface and user friendliness.

Flexibility/Adaptability/Time-to-market concerns the company's ability to capture and respond to changing consumer needs. Companies with high adaptability are fast followers as they rapidly pick up a successful trend and incorporate it in their products. Due to short product life cycles, time-to-market is important and requires efficient supply chain management.

²⁴⁶ Mobile review, www.mobile-review.com/articles/2006/benq-siemens-end-en.shtml, 2007-03-06

²⁴⁷ Mobile review, www.mobile-review.com/articles/2006/benq-siemens-end-en.shtml, 2007-03-07

²⁴⁸ Strategy Analytics (2000) *European Cellular handset market*.

²⁴⁹ Sydsvenskan, <http://sydsvenskan.se/ekonomi/article186595.ece>, 2007-03-06

²⁵⁰ BenQ, www.benq.com/products/mobile/, 2007-03-23

²⁵¹ Nawroth, M. Business Intelligence Manager. EMP. 2007-03-01

²⁵² Ekelund, B. Vice President Product Management and Strategic Technology, EMP. 2007-03-02

Brand regards brand awareness, brand value and positioning of the brand. A company can have a well-known brand, but it also needs to be well positioned. Consumers must feel inclined to buy a mobile handset with the brand.

Technology is divided into two sub-categories; cellular technologies and standard. Launching mobile handsets with satisfactory cellular technology is important. Interoperability testing (IOT) is included, since it is a form of quality proof towards operators. Being foremost in different standard technologies and to build an accepted standard are also taken into consideration.

Broad product portfolio involves four areas regarding hardware. Those are price segment ranging from low-end to high-end, technology concerning the ability to act on different networks, form factor thus offering mobile handsets in all forms; slim, clamshell, slide, etc, and multimedia functions including camera, mp3, etc. It is important for the company to choose proper segments and then successfully position itself within each.

Volumes are necessary in order to benefit from economies of scale, which lower costs. Low-cost manufacturing and cost-control are also aspects of hardware volumes.

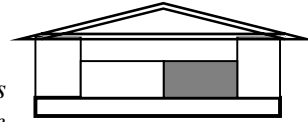
Organizational structure regards the company's organizational ability to handle a broad product portfolio, different markets and demands. This is important since different segments require diverse organizational capabilities, for example while as low-cost manufacturing and cost control is important in low-end segments, technological ability is more important in higher-end segments. It regards having autonomous divisions at the same time as making use of synergies between these divisions.

Consumer-orientation is the ability to detect and create new trends, as well as being an innovator or first-mover. It also contains a company's ability to renew itself and keep up demand.

Sales channels concern the relationships to operators and retailers, which determine a company's ability to enter the operator's product portfolio and thus reach the market. After sales management is also included, since this first-handed passes via the operator or retailer and therefore is affected by this relationship.

7 Mobile Handset Value Chain

This chapter aims to explain why the mobile handset industry has changed the way it has and what effect this has had on mobile handset vendors. Firstly, it will describe the mobile handset industry structure evolution, in regards of different levels of vertical integration. Thereafter, the mobile handset value chain will be presented which will be the foundation when determining where possibilities exist in the mobile handset industry for new players.



7.1 Mobile handset industry structure evolution

The mobile handset industry was in the late 1980s and into the 1990s dominated by a few, large players. It was characterized by vertical integration where the companies controlled everything from design and manufacturing to the entire mobile communications infrastructure (see figure 7-1).

In the late 1990s, the vertical structure changed as mobile handsets reached the consumer demand in functionality. Areas such as low-cost manufacturing, industrial design and building a consumer brand became central. Supply chain management and building several mobile handsets based on the same platform further helped reduce costs and increase economies of scale.²⁵³

HW & SW components	E R I C S S O N	N O K I A
SW application and system		
End-use device specification		
Design and integration		
Assembly		
Sales and services		

Figure 7-1: Vertical integration in the early 1990s.²⁵⁴

Companies in the mobile handset industry started outsourcing software, operating systems, components and sub-systems, thus deconstructing the value chain. By 2005, Nokia was the only manufacturer that did not rely on third-party platforms. Qualcomm and Siemens were some of the first to split up their integrated vertical structure. In 2001, Ericsson created the platform provider EMP and formed the joint venture Sony Ericsson for mobile handset vending. In 2004, Motorola followed with a splitting and founded Freescale as a platform provider. Manufacturing was outsourced to original device manufacturers (ODM) and the number of companies specialized in components grew.²⁵⁵ In 2006, 35 percent of all mobile handset production was outsourced.²⁵⁶

²⁵³ Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁵⁴ *ibid*

²⁵⁵ *ibid*

²⁵⁶ Electronics.ca Publications, www.electronics.ca/reports/electronics_manufacturing/outsourcing.html, 2007-03-20

As the mobile handset industry has become more specialized, the speed of specialization has differed depending on product tier. Integrated solutions dominate low-end segment while as in other segments, modular architecture is emerging.²⁵⁷

In low-end handsets, Nokia is the dominating player with more than a 50 percent market share. There are currently few interfaces that are industry standard in low-end handsets. In order to cost-optimize, Nokia has integrated software and hardware components in proprietary product architectures. Efficient supply chain management along with volumes giving economy of scale is important in this segment.²⁵⁸ The situation in the high-end segment is quite different, exhibiting modular product architectures. The high-end segment is characterized by advanced functions and handsets featuring open OS. The high level of complexity along with the fast evolution of software, LCDs and cameras has made in-house development too complex and expensive for incumbents.²⁵⁹

PC industry evolution

In the 1970s and early 1980s, the three largest companies in the PC industry were characterized by vertical integration, providing most of the components themselves. Their products did not have any standard interface and were not compatible with other products. Then, IBM outsourced the processor to Intel and the operating system to Microsoft. The industry structure evolved to vertical specialization with modules based upon industry standards. Cost pressures, shortened time to market and gains from specializations drove the transition. The vertically specialized structure opened for *layer-players*, companies focused in a few selected technological areas, thus achieving superior knowledge compared to vertically integrated companies.

(Anderson, J, Jönsson, M. (2006) *The Mobile handset industry in transition*. Fine, H. C. (1998). *Clockspeed*.)

7.2 Mobile handset value chain

The value chain of today's mobile handset industry is shown in figure 7-2. The first part of the value chain is *technology foundation* and consists of network communication, hardware and software components. The second part is *mobile handset provisioning*, where the mobile handset gets its shape, design, size, OS and functions such as camera and mp3. The third part includes *services and applications*, a portfolio of choices offered by among others operators and software companies, offering for example SMS, ring tones, instant messaging (IM), browsing and blogging.

²⁵⁷ Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁵⁸ *ibid*

²⁵⁹ Figueras, J. (2003) *Symbian and the smartphone market*.

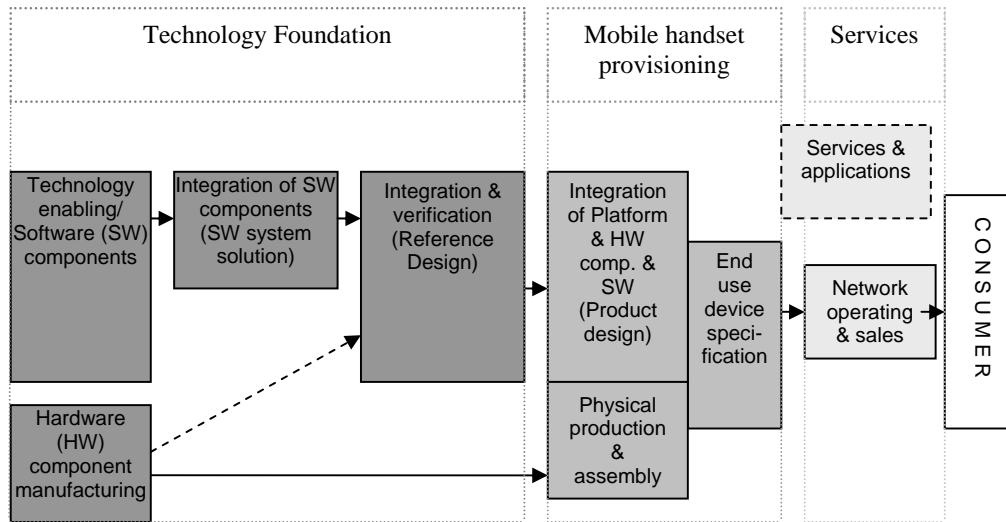


Figure 7-2: Mobile handset value chain.²⁶⁰

7.2.1 Technology foundation

The *hardware components* included in technology foundation are related to the core technology; examples are microprocessors, integrated circuits and transceivers. Originally, companies both designed and manufactured the hardware components. Because of manufacturing technique advancements, the microelectronic devices became more standardized, which allowed for a split in design and manufacturing. The high costs of a factory also added to the split, enabling the designer to contract manufacturing and thus optimized manufacturing utilization could be secured for the manufacturer.

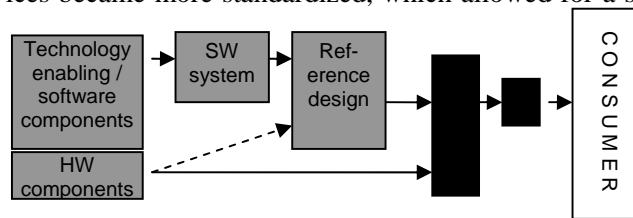


Figure 7-3: Technology Foundation

Technology enabling provides codecs, protocols, network signaling stack and application environment engines (see figure 7-3) It consists of different software component building blocks, for example music, camera and network signaling, which are integrated in the *software system solution*. The *reference design* is the proof of concept, namely the integration test and verification of the software system solution on hardware. Interoperability testing (IOT) is a key ingredient, ensuring the functionality of radio access to different networks. Approved type testing is also important, ensuring that the mobile handset is not dangerous for the user. Solid IOT decreases the need for the mobile handset vendor to make tests themselves, thus decreasing time-to-market. *Platform providers* engage in the activities technology enabling, software system and reference design. Examples of such companies are Qualcomm and EMP.^{261, 262, 263}

²⁶⁰ Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁶¹ Henriksson, A. Product Manager Radio Access and IOT Strategies. EMP. 2007-03-09

²⁶² Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁶³ Nawroth, M. Business Intelligence. EMP. 2007-02-06

7.2.2 Mobile handset provisioning

Within *mobile handset provisioning*, the mobile handset receives its form, size and design as well as bundled functions such as Mp3, camera and operating system^{264,265}. It includes end-user device specification, design, integration of software applications, platform, hardware components and the physical assembly (see figure 7-4).

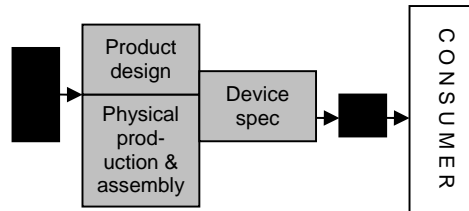


Figure 7-4: Mobile handset provisioning

The different players called OEM, ODM or EMS perform the activities to varying extents as the boundaries between them blur.

Original equipment manufacturers (OEM), also called the mobile handset vendors, refers to those that design, manufacture, distribute and sell mobile handsets branded in their name. Typically, the OEM is the first stage vendor of the distribution channel. Some OEMs subcontract the design or manufacturing of especially low-cost handsets.²⁶⁶ Major OEMs include Nokia, Motorola, Samsung, Sony Ericsson and LG²⁶⁷.

The term *original device manufacturer* (ODM) was originally used when describing companies that design, develop and manufacture a product under contract. Today, ODMs to some extent manufacture handsets branded in their own name, typically low-end devices sold on the domestic market. ODMs mostly rely on contracts and produce devices that are branded by the mobile handset vendor, operator or contract partner, not necessarily acknowledging the ODM. Examples of mobile handset ODMs include BenQ, Arima and HTC.²⁶⁸ ODMs have a high industry concentration and build their design capabilities in a specific industry segment. Subsequently, it is easy for an entrant to engage an ODM to design and manufacture their device.²⁶⁹

Electronic manufacturing service (EMS) denotes companies that design, test and manufacture electronic components and assemblies for OEMs. In the late 1990s, EMS players acquired manufacturing assets in high-cost locations and mainly focused on printed circuit board fabrication, leaving the system assembly to OEMs. In recent years, EMS players have shifted production to low-cost countries and have also acquired value-adding capabilities such as design, system assembly, test, warranty and repair.²⁷⁰ By sharing capacity with diversified clients in various industries including computing, communication and consumer electronics, EMSs are less exposed to single client/industry risk. However, its services create low profit margins and

²⁶⁴ Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁶⁵ MIT, www.media.mit.edu/events/2003-04-15-ec/fine.pdf, 2007-04-19

²⁶⁶ Gartner (2006) *Mobile Communications Worldwide*.

²⁶⁷ EMS now, www.emsnow.com/npps/story.cfm?ID=25175, 2007-03-20

²⁶⁸ Gartner (2006) *Mobile Communications Worldwide*.

²⁶⁹ Forward Concepts. Horney, C. (2005) *Global Cellular Handset and Chip Markets*.

²⁷⁰ Accenture. Delattre A., Hess T., Chieh K. (2003) *Strategic outsourcing*

therefore strive for economies of scale, operation efficiency and a global logistics network.²⁷¹ EMS players include Flextronics, Foxconn, and Jabil circuit²⁷².

7.2.3 Services

Services and applications in mobile handsets are SMS, games, movies, ring tones, IM, browsing and blogging.²⁷³ Services also include sales and after-sales (see Figure 7-5)²⁷⁴.

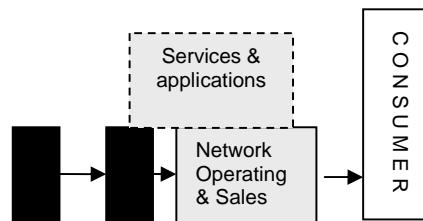


Figure 7-5: Services

The *Mobile Network Operator* (MNO) owns and operates one or more mobile networks²⁷⁵. To become a MNO within a country, a radio spectrum license must be obtained from the government.

Another category of operators is the *Mobile Network Operator* (MVNO), which as far as the subscriber is concerned, seems identical to the MNO. The difference is that they do not own the network but lease from a MNO. Large MNOs are China Mobile, Vodafone, Telefónica and Orange. Examples of MVNOs in Sweden are Halebob and Vattenfall.²⁷⁶ MNOs represent the sales channel for millions of mobile handsets and therefore have significant bargaining power²⁷⁷. The MNOs choose how much to subsidize a mobile handset, in return of a certain subscription time, which means that the final price tag is set by the MNO. It gives them an important role and it is thus important for the mobile handset vendor to establish good relations.²⁷⁸ As new technology and new players have entered the market, operators are facing the threat of becoming bit pipe providers and losing their strong position²⁷⁹. There also seems to be a shift away from handsets sold through operators²⁸⁰. In order to increase revenue, operators are also looking to partner with Gameys to find new ways to entertain their consumers.

Lately, *Gameys* have entered the mobile handset industry and shape user experience in the mobile handset. The term GAMEY refers to Google, AOL, MSN, Ebay and Yahoo. Gameys focus on the online advertisement market, in which they also try to convert social sites such as Myspace and Facebook into revenue sources. Gameys provide an IM client which it tries to position as the preferred one across all devices. IM includes among other things chat, photo sharing and inter-network communication.²⁸¹ The popularity of Gameys gives an indication of the demand for the services, internet portals and communities they offer.

²⁷¹ Forward Concepts. Horney, C. (2005) *Global Cellular Handset and Chip Markets*.

²⁷² EMS now, www.emsnow.com/npps/story.cfm?id=24636&pg=story, 2007-03-21

²⁷³ IEFT, www3.ietf.org/proceedings/01aug/slides/more-1/sld007.htm, 2007-03-23

²⁷⁴ MIT, www.media.mit.edu/events/2003-04-15-ec/fine.pdf, 2007-04-19

²⁷⁵ Gartner (2006) *Mobile Communications Worldwide*.

²⁷⁶ Nawroth, M. Business Intelligence Manager, EMP. 2007-02-06

²⁷⁷ Anderson, J., Jönsson, M. (2006) *The Mobile handset industry in transition*.

²⁷⁸ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

²⁷⁹ Arvinus F., Halvarsson D. (2006) *Managing Positions in a Dynamic Environment*

²⁸⁰ Telecoms.com. *Is Dell plotting a mobile move?* 2007-02-28

²⁸¹ Phillips, P. (2006) *GAMEY Overview*. Presentation material.EMP.

The industry has during 2006 and 2007 seen partnering between mobile handset vendors and Gameys.^{282 283} In Table 7-1, mobile handset vendors partnering with Google and/or Yahoo are showed. The dates show the valid start date of the deal²⁸⁴.

	<i>Google</i>	<i>Yahoo</i>
<i>Nokia</i>		2005-04 extended 2007-01
<i>Motorola</i>	2006-06	2005-07 extended 2007-01
<i>Samsung</i>	2007-01	2007-01
<i>SEMC</i>	2006-02	
<i>LG</i>	2007-03	2007-02

Table 7-1: Partnerships between mobile handset vendors and Google and/or Yahoo.²⁸⁵

7.3 Value chain evolution analysis and the waterfall analogy

As the mobile handset industry has developed, value has flowed between different parts of the value chain. This is illustrated in figure 7-6, which shows where the value was located during each time period.

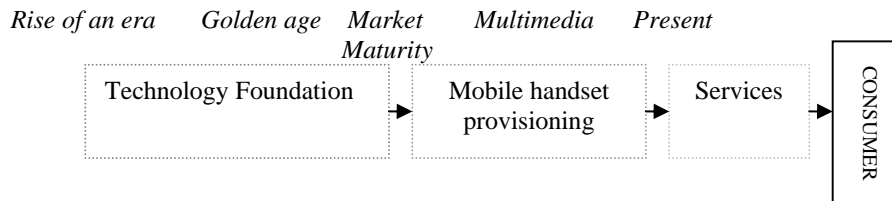


Figure 7-6: The mobile handset industry and value evolution.

The waterfall analogy consists of three levels or buckets, where each represents a part of the value chain, see figure 7-6 and figure 7-7. To this waterfall, the inflow symbolizes consumer demand and technology, since the industry is characterized by *technology push*, meaning technology development driven by development organizations.

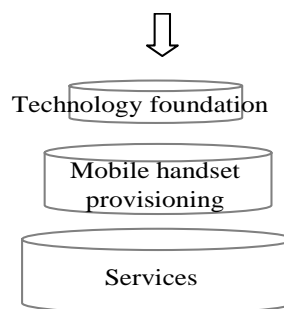


Figure 7-7: The waterfall buckets in combination with the value chain.

²⁸² Jesty. R et al (2006) *Discovering Mobile Services – A new perspective*.

²⁸³ Tekrati, www.tekrati.com/research/News.asp?id=8514, 2007-03-23

²⁸⁴ Search engine land, <http://searchengineland.com/070328-091125.php>, 2007-04-17

²⁸⁵ Search engine land, <http://searchengineland.com/070328-091125.php>, 2007-04-17

During the *rise of an era* and *the golden age*, technology development was an important factor as mobile handset vendors that excelled at this were successful. Since consumers were willing to pay for increased functionality, their demand drove product performance. During these periods the technology foundation bucket began to fill (see figure 7-8). Christensen states that integrated firms earn the most of an industry's profit when a product's functionality and reliability is not good enough to meet mainstream customer needs, which was the case of the mobile handset industry in the early 1990s.

As technology advanced, the mobile handset market grew and met mainstream consumer demand. During *market maturity* mainstream consumers were no longer willing to pay for enhanced functionality. Instead, design, brand and user-friendliness became important. In the waterfall analogy, the technology foundation bucket was full and therefore water flowed to the underlying bucket, thus the activities of mobile handset provisioning (see figure 7-9).

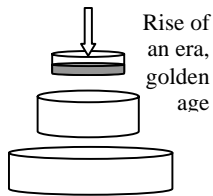


Figure 7-8: *The technology foundation bucket fills up.*

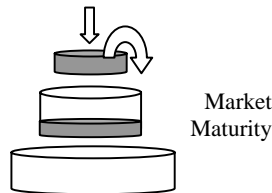


Figure 7-9: *The mobile handset provisioning bucket fills up*

Consumer electronics companies with knowledge in consumer behavior, attempted to enter. Still, in addition to consumer knowledge, technology foundation knowledge was a prerequisite to successfully enter the mobile handset industry.

As the mobile handset market attracted attention from consumer electronic companies, competition increased. According to Christensen, competition then becomes more based on speed, flexibility or convenience and the benefits from being integrated no longer exist. In order to stay competitive mobile handset vendors split their integrated structure and outsourced components, thus deconstructing the value chain. Product architecture was pressed into becoming more modular as the industry exhibited high dimensional complexity (see figure 7-10). Fine defines this state horizontal but in this thesis it is referred to as vertical specialization. As the mobile handset provisioning bucket started to fill up, companies were pushed to disintegrate and change their business design in order to stay competitive.

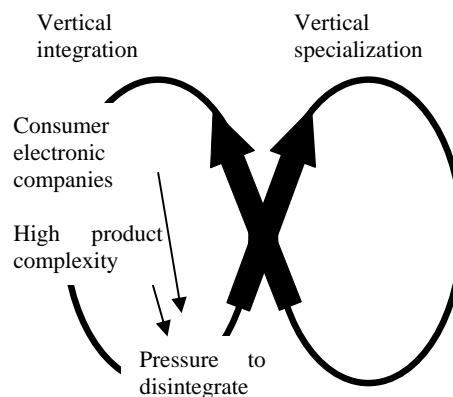


Figure 7-10: *Mobile handset industry in transition.*

The demand of extended services has lately grown, thus the water is flowing to the next bucket, (see figure 7-11). The migrating value attracts new players to enter the mobile handset industry. Many mobile handset vendors are creating alliances with Gameys, which could indicate that the value in the future will be associated with services or application providers. Operators, in fear of becoming merely bit pipe providers are also partnering with Gameys in order to find new revenue channels. As water flows to the service bucket, mobile handset vendors might have to change their business design once again to stay competitive.

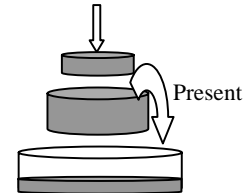


Figure 7-11: *The water is flowing into the services bucket.*

7.4 Value chain discussion

The mobile handset industry structure has not reached full vertical specialization, since some product tiers exhibit a vertical integration. If the industry does reach vertical specialization, according to Fine's theory, a sub system will gain market power and then expand vertically. In the PC-industry for example Microsoft's OS and Intel's processor gained enough power in order for these companies to vertically integrate. However one can discuss whether the industry as an entity will reach vertical specialization in the near future. As ODMs and EMS are vertically integrating, the industry could already be headed towards vertical integration again. Furthermore, short product life cycles, Nokia's dominance in the low-end tier, high level of technology complexity (mp3 player, display, cameras, software) and consumers' demand of different form factors may constitute large obstacles to drive the industry into complete specialization or integration. Instead, the industry might move in the double helix as in figure 7-12, and not touch the fully integrated or specialized structures.

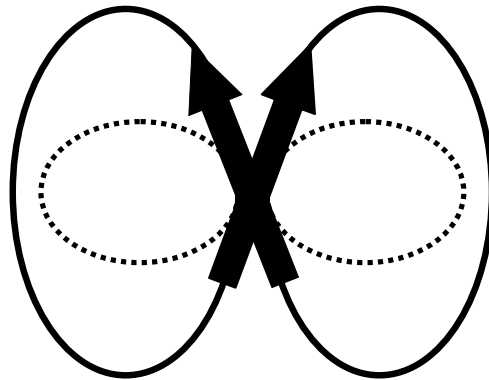
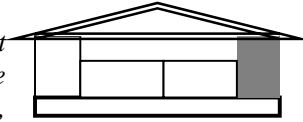


Figure 7-12: *Mobile handset industry moving in the double helix?*

ODMs lower entry barriers to the mobile handset industry, since newcomers can outsource both design and manufacturing to them. Subsequently newcomers can then brand the mobile handset in their own name, similar to what operators have done. ODMs have lately mainly been granted contracts from major manufacturers to produce low-end mobile handset, whereby ODMs look to forward integrate, in order to obtain higher margins. ODM branded handsets are mainly sold on the domestic market but there are attempts to penetrate globally.

8 Case study: IT-Players

This chapter consists of case studies that aim to describe different players originating from the IT-industry. Firstly, the chapter will handle the companies Apple and Dell, which are PC manufacturers. Thereafter, the service provider Google and the open OS player Microsoft will be described. Subsequently strengths and weaknesses of IT-players will be analyzed, which will be used to determine if they possess the KSF needed in the mobile handset industry. The KSF of each company will be presented in a matrix.



8.1 Apple

8.1.1 Historical background

In 1978, Apple launched Apple II, a simple machine that could be used directly as taken out of the box. It set in motion the personal computer revolution and made Apple the industry leader. Apple's position changed as IBM launched its first PC, which became an immediate success. It was not as colorful or graphically enhanced as the Apple II, but instead of relying on proprietary design, it had the advantage of a relatively open system that producers could clone.^{286,287}

Apple launched the Macintosh in 1984 and even though it was a breakthrough in ease of use and design, it lacked compatible software, which limited its sales. Apple was, due to a fall of 17 percent in net income, left in crisis.

Apple moved into desktop publishing and education, and managed to rise from its down period. By 1990 Apple's hardware and software was the only significant alternative to IBM. It was to a greater extent vertically integrated than any other PC company, except IBM. Manufacturing and assembling of most of its products were done in-house. It also developed a proprietary OS and application software. Apple could offer consumers a complete desktop solution, allowing them to plug and play.²⁸⁸

During the 1990s, several companies entered the personal computer market, launching computers compatible with Windows. When Microsoft launched Windows 95, Apple was hit hard, as it had made an incorrect market prediction in making cheap computers with low capacity. In 1997, Microsoft bought stocks in Apple and the two companies made an alliance where Microsoft reaffirmed to develop its core products such as Microsoft Office, for the Mac.^{289, 290}

Company snapshot

Apple Computer Inc was founded in 1976 by Steven Wozniak and Steven Jobs. Since, then it has gone through a turbulent history: the stock in 1997 traded \$7 a share, while in early 2006, it reached an all-time high of \$86 a share. Among Apple's products are iMac and the iPod, connected to the iTunes ecosystem.

(Yoffie, D. Slind, M (2006) *Apple Computer 2006*. Harvard Business School., Apple History, www.apple-history.com, 2007-03-27)

²⁸⁶ Apple History, www.apple-history.com, 2007-03-27

²⁸⁷ Yoffie, D. Slind, M (2006) *Apple Computer 2006*. Harvard Business School

²⁸⁸ Apple History, www.apple-history.com, 2007-03-27

²⁸⁹ *ibid*

²⁹⁰ MacWorld 1997, <http://video.google.com/videoplay?docid=4436710013736446644>, 2007-04-20

In 1998, the iMac was introduced. It had design and features that attracted the market and sold close to 800 000 units during its first five months, boosting the company's revenue and profitability. 1998 became the first profitable year since 1993. Today the iMac is considered an industrial design icon of the late 1990s. During 2001, Apple released a new operating system, Mac OS X, and opened Apple retail stores at major U.S. consumer locations.

During this period Apple started its transformation, also becoming a MP3 provider as the first iPod was launched in 2001. iPod sales were modest during its first years but started to increase rapidly during 2004²⁹¹. Nearly 100 million units have been sold up until today.²⁹² At the launch of the iPod, Steve Jobs said that Apple had identified a large target group, without a market leader²⁹³. Soon after the launch, Apple's iTunes Store was introduced and quickly became market leader in online music services. By January 2007, it had over 2 billion downloads. iTunes has met criticism as the music bought from iTunes only works on iPods. Since April 2007, Apple is forced to make music on iTunes compatible with other music devices than the iPod²⁹⁴. An ecosystem with over 2000 additional items has been built around iPod, enabling consumers to personalize the iPod.^{295,296} In 2006 Apple had a global market share in the PC-industry of 2.3 percent (see appendix II for full market share development) and iPod had a global market share of 77 percent in the MP3 industry (not including mobile handsets with MP3 player) accounting for nearly 40 percent of Apple's total sales.²⁹⁷ When including mobile handsets with MP3 player Apple has a 14 percent market share.²⁹⁸

8.1.2 The Apple world

Apple has put effort into building an image around its brand. Apple's *think differently* campaign featured icons such as Einstein and John Lennon by which Apple promoted itself as a hip alternative to other computer brands. For Jobs, founder and CEO, Apple is not just a technology company; it is a cultural force.²⁹⁹ Thanks to devoted users, Apple and especially the Macintosh have established a form of religion or cult. In the book, *The Cult of Mac*, author Leander Kahney exposes all the sides of Mac fanaticism. He resembles them with fans of a football team or rock group, completely dedicated to Apple's computers.³⁰⁰ Furthermore there are several communities that link Mac users, for example MacWorld and numerous forums and blogs on the internet³⁰¹. Not all Apple consumers are dedicated supporters of Apple. Instead some appeal to the hype and status around the brand as it is seen as a premium brand. Several of Apple's products, for example the iPod, are overpriced giving Apple the possibility of higher margins.³⁰²

²⁹¹ CNN, http://money.cnn.com/2006/05/31/magazines/fortune/razr_greatteams_fortune/index.htm, 2007-04-25

²⁹² BBC, <http://news.bbc.co.uk/2/hi/business/4625262.stm>, 2007-03-09

²⁹³ Macworld 2001, iPod launch, www.youtube.com/watch?v=kN0SVBCJqLs, 2007-04-24

²⁹⁴ IDG, www.idg.se/2.1085/1.102030, 2007-04-20

²⁹⁵ Time, www.time.com/time/magazine/article/0,9171,1576854,00.html, 2007-03-05

²⁹⁶ Apple, www.apple.com/pr/library/2007/01/09itunes.html, 2007-03-10

²⁹⁷ CNN Money, http://money.cnn.com/2006/03/29/technology/apple_anniversary/?cnn=yes, 2007-04-20

²⁹⁸ Wireless watch, Demise of a daling: iPod market share crashes, 2007-04-20

²⁹⁹ Yoffie, D. Slind, M (2006) *Apple Computer 2006*. Harvard Business School

³⁰⁰ O'Reilly, www.oreilly.com/catalog/1886411832/#top, 2007-04-19

³⁰¹ MacWorld, www.macworld.com, 2007-05-07

³⁰² Blackberry, www.blackberrytoday.com/articles/2007/1/2007-1-18-Apple-Taps-High.html, 2007-05-07

8.1.3 The iPhone

In January 2007, Apple confirmed that it once again had listened to the Alan Kay, professor of computer science, saying: "People who are really serious about software should make their own hardware"³⁰³. The rumors of the iPhone turned out to be true and it will be launched June 2007 in the USA and priced SEK 3500 and 4300 respectively depending on memory capacity³⁰⁴. The iPod is a radically different device, which is intended to be easy-to-use. With the iPhone, Apple has addressed the consumers on the terms of consumers. Broadcom and Infineon will supply the 2.5G platforms. The iPhone's lack of 3G, probably due to problems in finding suppliers, is compensated by being equipped with WiFi.³⁰⁵

Initially, the handset will be launched with only one operator, Cingular, in the USA, which could give indication of IOT problems³⁰⁶. The iPhone will not be subsidized by either Apple or Cingular and the mandatory subscription time is two years³⁰⁷. The iPhone lacks a QWERTY keypad, but the main purpose of the device is not messaging, but media consumption. Thereby Apple has with iPhone taken shifted focus from features to four main services; ipod, web, e-mail and phone, which are of equal importance and level. The OS is proprietary, thus closed for third party applications, which might limit the plea for consumer developers.³⁰⁸

Apple has put a volume target of one percent market share in 2008. The pricing without subsidization, in combination with the long subscription time, might limit iPhone's penetration into the wider mobile handset market. This, together with the exclusivity with Cingular in the US market will according to analysts make it hard for Apple to reach its target.³⁰⁹

8.2 Dell

8.2.1 Never be the 21st horse

Dell, the second largest player in the PC-industry in 2007 with 14 percent market share³¹⁰, is built around build-to-order manufacturing, mass customization, just-in-time (JIT) components deliveries, partnerships and information sharing. Dell aims to achieve virtual integration, which is real-time connection with its suppliers and consumers.³¹¹

Company Snapshot

Dell Computer Corporation was founded in 1984 by Michael Dell. By selling directly to consumers, the company could achieve a great knowledge of consumer needs and preferences. By only producing to order, time-to-market and costs were low, enabling Dell to offer the computer systems at very competitive prices. (Dell, www.dell.com, 2007-03-08)

³⁰³ Macworld 2007, iPhone lauch, www.youtube.com/watch?v=hfYQ-KpUioA, 2007-04-26

³⁰⁴ Ny teknik, www.nyteknik.se/art/48578, 2007-03-27

³⁰⁵ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

³⁰⁶ Henriksson, A. Product Manager Radio access and IOT strategies. EMP. 2007-03-09

³⁰⁷ Macnn, www.macnn.com/articles/07/01/30/digging.into.the.iphone/, 2007-04-03

³⁰⁸ Strategy Analytics (2007) iPHONE: Rising Tide Lifts Converged Media Device Emphasis.

³⁰⁹ ibid

³¹⁰ Gartner, www.gartner.com/it/page.jsp?id=503816, 2007-04-20

³¹¹ McGraw-Hill, www.mhhe.com/business/management/thompson/11e/case/dell5.html, 2007-02-19

Dell's direct-sell gives it first-hand information about consumer preferences and needs, as well as immediate feedback on its products. This enables Dell to detect shifts in trends and receive complaints. Dell uses its knowledge to add value to its consumers, to improve product quality and increase speed. The knowledge received from the first-time information in consumer needs and trends is passed on to suppliers so they can plan their component production accordingly.³¹²

Dell's philosophy regarding make-or-buy decision was rather to partner with reputable suppliers than to integrate and manufacture components it selves. Michael Dell puts it:³¹³
“If you've got a race with 20 players all vying to make the fastest graphics chip in the world, do you want to be the 21st horse, or do you want to evaluate the field of 20 and pick the best one?”

Dell's strategy is to partner with as few suppliers as possible and stay with them for as long as they maintain its leadership in technology, performance and quality. Dell thereby reinforce its supplier relations resulting in dedicated supplier engineers which gives assurance of getting volumes even in temporary scarcities. It makes up the basis for JIT delivery to Dell's assembly plants, on hourly or daily basis. The JIT structure is upheld by Dell's sharing of daily production schedules, sales forecasts and new-model introduction plans.³¹⁴

Dell's low inventory is advantageous, since it enables low cost. New developments and advances in the PC-industry come so quickly that a component is obsolete in less than a month. The development also rapidly decreases the component prices.³¹⁵ Because Dell is not constrained by stock, they can easily change as the technology or market change.³¹⁶

Dell entered the market for low-end servers in 1996, using the same business structure and strategy as for computers. Dell's build-to-order and direct sell strategy gave them an advantage over competitors, which had 15-20 percent higher costs due to reseller networks.³¹⁷

8.2.2 A mobile move?

In February 2007, former Motorola CEO Garriques was acquired to run Dell's consumer group. Sources tell that Dell has plans to launch a *wireless* personal digital assistant (PDA) based on cellular technology. Recently, speculations suggest Dell will buy the smartphone vendor Palm Inc, especially since Dell terminated its own *non-wireless* PDA line. An advantage to come out of such acquisition is that Dell has a long history of selling to enterprises and could thus integrate the Palm with the enterprise applications. Making a Windows Mobile based handset together with an ODM should not be difficult for Dell.^{318, 319, 320}

³¹² McGraw-Hill, www.mhhe.com/business/management/thompson/11e/case/dell5.html, 2007-02-19

³¹³ *ibid*

³¹⁴ *ibid*

³¹⁵ *ibid*

³¹⁶ Dell, www.dell.com, 2007-03-08

³¹⁷ McGraw-Hill, www.mhhe.com/business/management/thompson/11e/case/dell5.html, 2007-02-19

³¹⁸ Telecoms.com. *Is Dell plotting a mobile move?* 2007-02-28

³¹⁹ DigiTimes Telecom. *Dell plans to venture into PDA handset segment, say sources.* 2007-03-03

³²⁰ Seekingalpha, <http://ce.seekingalpha.com/article/28907>, 2007-05-08

8.3 Google Inc

8.3.1 A fun way to success

In 2000, two years after Google's foundation, the company went global with the introduction of ten language versions. Google also introduced a key-word targeted advertising program, Google Toolbar and made its search engine available to mobile handset users. As opposed to many other internet companies at the time, Google was profitable. Google continued to find new partners and by doing so expanded geographically. The company opened new international sales offices and made it possible to search sites written in 18 additional languages. Although the primary market is web content, Google has started experimenting with other markets, such as print publications and radio, with acquisitions of companies such as YouTube and Writely.³²¹

Google is well-known for its relaxed corporate culture based on philosophies such as *you can be serious without a suit and work should be challenging and challenge should be fun*³²². All Google engineers are encouraged to spend 20 percent of their time on projects that interest them, which has generated some of Google's services such as Gmail and Google News³²³. Another philosophy is that *technology to serve users comes first and business comes second*. This means that Google first establishes the technology and once users appreciate it; business models to monetize the user-traffic appears.³²⁴

Google's products are divided into advertising, applications and enterprise solutions. Most of the company's revenue is derived from online advertising programs. Google is most known for its web search engine, which has been a major factor in the company's success. Other services include Gmail, Google maps and Froogle, a price comparison site. In 2007, Google launched a software suite for businesses offering email, instant messaging, calendar and word processing.³²⁵ The product competes directly with Microsoft Office, at a price of \$50 per user and year compared to \$500 for Microsoft³²⁶.

Company Snapshot

Google was founded by Larry Page and Sergey Brin in September 1998. The company specializes in Internet search and online advertising. Google has grown rapidly as their reputation has spread through word-of-mouth and is today the world's largest search engine. The 2007 edition of Oxford English Dictionary will contain the verb *to google*. Google's initial public offering took place in 2004, raising \$1.67 billion and giving Google a market capitalization of \$23 billion. Due to strong sales and earnings, the stock has soared.

(GoogleInc.,
www.google.se/corporate/history.html,
www.ipogoogle.org/, 2007-03-21, Sieber,
S., Valor, J. (2007) Google: Organizing
Information on the Web.)

Despite Google's success, in 2007 having 74 percent market share globally (excluding Canada and US, where its market share is slightly smaller)³²⁷, some people have concerns regarding its

³²¹ Google Inc., www.google.se/corporate/history.html, 2007-03-21

³²² Google Inc., www.google.se/corporate/tenthings.html, 2007-03-21

³²³ Google Inc., www.google.com/support/jobs/bin/static.py?page=about.html, 2007-03-21

³²⁴ Sieber, S., Valor, J. (2007) *Google: Organizing Information on the Web*.

³²⁵ Google Inc., www.google.se/corporate/history.html, 2007-03-21

³²⁶ USA Today, www.usatoday.com/tech/products/2007-02-22-google-apps_x.htm?csp=15, 2007-03-21

³²⁷ Traffick, www.traffick.com/2007/04/global-search-market-shares-aol.asp, 2007-04-20

long-term future, since Google has failed to develop revenues from other than advertising. Ray Ozzie, Microsoft's Chief Software Architect, says, though, that a new business model has emerged in the form of advertising-supported services and software. The business model has the potential to impact how Google and other developers build, deliver and monetize innovations. As Google has grown, some of its services have led to several controversies, with among others the Authors Guild for Google Book Search and several governments concerning Google Earth^{328, 329}.

8.3.2 Google in the mobile handset industry

As the usage of data services in the mobile handset will increase, Google has moved into the mobile handset industry, with acquisitions of start-up companies and introduction of related services. The mobile offering, called Google Mobile, features services such as web and image search, similar to those for PC-users but customized for mobile devices. Google Mobile is free to use; subscribers only pay data traffic to operators. Analysts at Visiongain believe that the company will target the mobile handset industry for future revenue growth and that Google's main opportunity in the mobile space is based on advertising revenue. Furthermore Google has partnerships with mobile handset vendors and operators, examples include T-Mobile, Motorola and Sony Ericsson.³³⁰ Selected LG handsets will be marketed as LG-Google, which will add awareness to both their brands³³¹.

Various reports have indicated that Google will release a Google Phone. Google Iberia's CEO Isabela Aguilera confirmed the project and a job-ad recently posted on the company further increased the reliability of the rumor. The Google phone will not, as some initially speculated be competitive to Apple's iPhone. The Google phone will instead be targeted to emerging markets with limited number of personal computers. Speculations also include collaboration with Orange, Cingular and HTC.^{332, 333} If Google tries to enter the mobile handset industry in both software and hardware, it becomes a threat to its mobile handset vendor partners. It is a risky strategy, thus should it choose one of the sides.³³⁴

8.4 Microsoft

8.4.1 The highway to success

The initial driver behind Microsoft's success is the disc operating system (DOS). Microsoft received the contract to provide IBM with an operating system to be used in IBM's new personal computer.^{335, 336} As IBM-PC clones flooded the market, IBM fought for keeping its consumers by

³²⁸ New York Times, www.nytimes.com/2005/12/20/technology/20image.html?ex=1292734800&en=91529f7772801391&ei=5088&emc=rss, 2007-03-21

³²⁹ Author's Guild, www.authorsguild.org/news/sues_google_citing.htm, 2007-03-21

³³⁰ Visiongain (2006) Google in Mobile and Wireless. p 36-37, 74-75

³³¹ ZD Net, http://news.zdnet.com/2100-1035_22-6171292.html, 2007-04-17

³³² Mobile Gazette, www.mobilegazette.com/google-phone-07x03x20.htm, 2007-03-21

³³³ Info World, www.infoworld.com/article/07/03/08/HNgooglemobilephone_1.html, 2007-03-21

³³⁴ Wingren, T. Former CEO Samsung Electronics Europe. 2007-04-25

³³⁵ Computermuseum, www.computermuseum.li/Testpage/MSDOS-PCDOS.htm, 2007-03-12

³³⁶ Smartcomputing, www.smartcomputing.com/editorial/article.asp?article=articles/1994/june94/pcn0608/pcn0608.asp&articleid=5103&guid=, 2007-03-12

aggressively marketing its computers with DOS by Microsoft, making Microsoft one of the major software vendors in the personal computer industry.^{337,338} Today Microsoft's operating system Windows is the de facto standard for PCs, with a 94 percent market share³³⁹. Furthermore Microsoft Office, released in the early 1990s is the most popular business suite³⁴⁰.

Company snapshot

Microsoft Corporation was founded by Bill Gates and Paul Allen in 1975. The company's global revenue in fiscal year 05/06 was \$44.28 billion. Its best-selling products are Microsoft Windows operating systems and Microsoft Office. Microsoft's original goal "A computer on every desk and in every home, running Microsoft software" is practically fulfilled as they have ubiquity on the desktop computer market. Microsoft also owns MSN Internet portal, the OS Windows Mobile and home entertainment products such as the Xbox and Zune.

(Microsoft, www.microsoft.com/msft/earnings/FY06/earn_rel_q4_06.msp, www.microsoft.com/msft/ar05/downloads/MS_2005_AR.doc, 2007-03-12, Seattlepi, <http://blog.seattlepi.nwsource.com/microsoft/archives/003469.html>, 2007-03-12)

Microsoft has not only continuously released new versions of its operating system, the latest being Windows Vista, launched in 2007. It has also constantly targeted new areas and markets for growth. The company has thus expanded into markets such as video game consoles, interactive television and Internet access³⁴¹. With the release of the Internet Explorer, Windows took over the browser market from the competitor Netscape³⁴². Microsoft also has released MSN for Microsoft online services and Xbox, thus entering the game console market previously dominated by Sony and Nintendo^{343, 344}.

At the end of the 1990s, Microsoft launched an OS for PDA, which was designed to run on low-memory, low-performance machines. In 2003 Microsoft announced Windows mobile, branded software for mobile devices such as pocket PCs and smartphones. It has the same user interface as Windows for computers and pocket versions of applications such as Pocket Word, Excel, PowerPoint and Internet Explorer. Microsoft has experienced problems in penetrating the mobile handset industry with Windows Mobile, mainly because it overpriced the OS.^{345, 346, 347}

³³⁷ Techworld, www.techworld.com/applications/features/index.cfm?featureid=1603&Page=1&pagePos=5, 2007-03-12

³³⁸ Os2bbs, www.os2bbs.com/os2news/OS2History.html, 2007-03-12

³³⁹ Market share, <http://marketshare.hitslink.com/report.aspx?qprid=2>, 2007-04-20

³⁴⁰ Microsoft, www.microsoft.com/about/companyinformation/visitorcenter/student.msp, 2007-03-12

³⁴¹ Hpcfactor, www.hpcfactor.com/support/windowsce/, 2007-03-12

³⁴² US Department of Justice, www.usdoj.gov/atr/cases/ms_index.htm, 2007-03-12

³⁴³ History of Computing Project, www.thocp.net/companies/microsoft/microsoft_company_part2.htm, 2007-03-12

³⁴⁴ Microsoft, www.microsoft.com/about/companyinformation/visitorcenter/student.msp, 2007-03-12

³⁴⁵ Smartcomputing, www.smartcomputing.com/editorial/article.asp?guid=&article=articles/hardware/2004/h0707/handheldterms.asp, 2007-03-21

³⁴⁶ Microsoft, www.microsoft.com/about/companyinformation/visitorcenter/student.msp, 2007-03-12

³⁴⁷ Winberg, T. Former CEO, Samsung Electronics, Europe, 2007-04-26

Microsoft has an important strength in its size, being a dominate player with deep pockets and capacity to introduce coming standards. Thereby it is threatening and criticized not only by its competitors. For example, in 2004, the European Union believed Microsoft took advantage of and misused its dominant position and forced the making of a new version of Windows XP, not including Windows Media Player.^{348,349}

Due to its great power, Microsoft has been exposed for numerous battles and has reached settlements to end antitrust investigations and lawsuits, including agreeing to uniformly license its OS and allowing manufacturers to include competing software with Windows. Furthermore critics say that Microsoft has brought inferior, inelegant products to markets, behind time schedule. Some also believe that Microsoft's success has not been based on solely the company's superior technological ability but also on Bill Gates' business intelligence, which combines perseverance, strategic marketing, powerful alliances and highly aggressive competitive tactics.³⁵⁰

8.5 Brand value IT-players

To verify how strong the previously discussed IT – players' brands are, Interbrand's list of the 100 most valued brands has been used (see Table 8-1). To relate the IT-player's to the mobile handset vendors, see appendix III To qualify to the list the brand must derive approximately a third of its earnings outside its home country, be recognizable outside of its customer base and have publicly available marketing and financial data. Parent companies are not ranked. When valuing a brand, many different parameters are included. Depending on which parameters are considered crucial, the results are shifting. Other analysts' brand value list might of that reason have another ranking. Lists, where Google are placed as number one can for example be found. Interbrand's list is chosen because it evaluates brands similar to the way analysts value other assets, namely based on how much they are likely to earn in the future. Projected profits are then recalculated to present value, taking into account the possibility of whether projected earnings will actually be correct.³⁵¹

<i>Rank</i>	<i>Name</i>	<i>Brand value (Million \$)</i>
2	Microsoft	57 000
24	Google	12 380
25	Dell	12 260
39	Apple	9 130

Table 8-1: *Interbrand's brand value list.*³⁵²

³⁴⁸ US Department of Justice, www.usdoj.gov/atr/cases/ms_index.htm, 2007-03-12

³⁴⁹ Cnn, www.cnn.com/2004/BUSINESS/03/24/microsoft.eu/, 2007-03-12

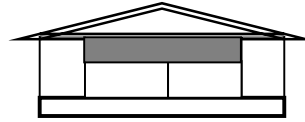
³⁵⁰ Answers.com, http://www.answers.com/microsoft#after_ad1, 2007-04-24

³⁵¹ Business Week, <http://bwnt.businessweek.com/brand/2006/>, 2007-04-19

³⁵² *ibid*

8.6 Analysis IT-players

8.6.1 Apple



8.6.1.1 Strengths

Apple has become popular not only because of its brand and design, but also due to factors as user friendliness, user interfaces and plug & play. The hype and religion Apple has created around its brand and products attracts both dedicated users and the trendy public. Apple is a niche player in the PC-industry and market leader in the MP3-industry and manages, due to its design, brand and loyal consumers, to have premium pricing in both industries. Apple only has approximately two percent market share in the PC-industry, while in the MP3- industry, Apple has gained a large market share and retains premium pricing.

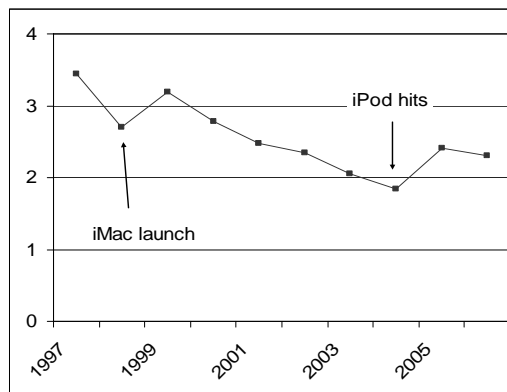


Figure 8-1: Apple's market share in the PC-industry.

Historically, Apple has had several crises but still managed to recover, mainly due to its launches of disruptive innovations. An example is the launch of iMac. Apple was losing market share and with the iMac, market share increased and Apple became profitable for the first time in five years. As the hype around iMac declined, it was time for Apple to obtain new attention from the market. The iPod had a similar effect, increasing Apple's market share in the PC-industry. Naturally, other factors that we have not taken into consideration might have had impact on Apple's market share as well. It took a while until consumers accepted the product, but when they did, the popularity of Apple as a brand and as a computer manufacturer rose again. The phenomena are shown in figure 8-1 above. The increased market share could be rooted in these product launches which brings attention to the brand and increases sales in other areas as well. Apple has, since 1993, launched three disruptive innovations: the iMac, iPod and shortly, the iPhone.

With the launch of the iPod, Apple entered, to it a new industry, the MP3-industry. The new consumer group was not used to Apple as a MP3-brand, which might have affected the late adoption of the product. Furthermore, the disruptive innovation moved into a position below low-end market demand (See arrow A in figure 8-2). Therefore, it took several years before the iPod prevailed, leaving Apple in the foundation phase longer than wanted. By creating a hype around the iPhone, Apple could be trying to shorten the time to meet mainstream market demand, and by doing so reach the growth phase at an earlier stage (See arrow B in figure 8-2).

The Mobile Handset Evolving

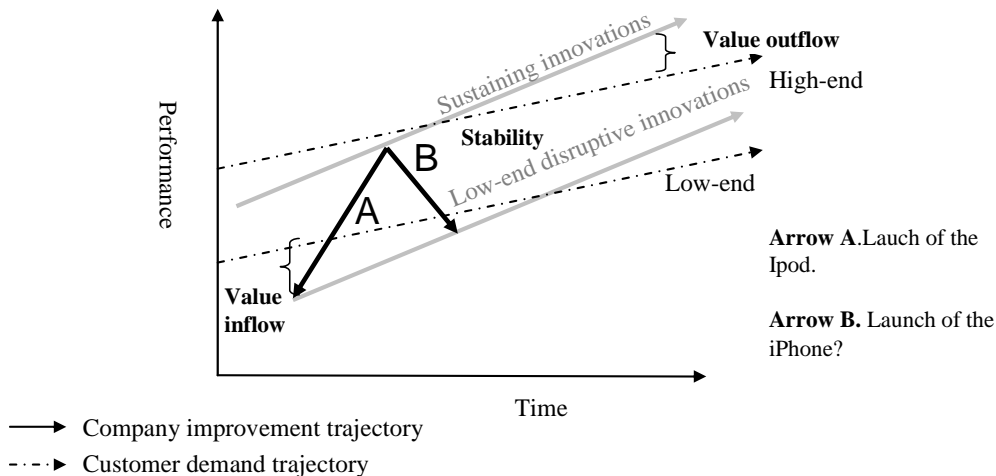


Figure 8-2: *Apple's disruptive strategies.*

In order for the iPhone to reach its target of one percent market share by the end of 2008, the iPhone must reach a phase of growth almost immediately. The settings in the mobile handset industry differ from those in the MP3-industry. Apple had identified a possibility to enter the MP3-industry, as the industry had a large target group, without any differential market leader. In the mobile handset industry, on the other hand, competition is fierce and the five largest players dominate the market. The iPhone is a challenger in the way it changes focus from the mobile handset being voice centric to become a multimedia device. The iPhone has taken the focus away from features and instead focusing on four main services, ipod, web, e-mail and phone and putting them on the same level. This is revolutionary for the industry as phone always has been most prioritized. Apple has with the iPhone developed what can come to be three detached businesses all integrated in the iPhone; *the operating system, the hardware and services*. These are businesses which Apple can develop one at the time to sell to other players in the mobile handset industry to further extend its brand and revenue. By its operating system it can for example compete with Microsoft which has troubled in entering the mobile handset industry.

A reason for Apple launching a disruptive innovation and entering the mobile handset industry, could be the increased number of MP3 mobile handsets sold, which pose a threat to the one-functional MP3 device. The move into the mobile handset industry is a form of creative destruction, killing the old business of one-functional iPod and replacing it with the multifunctional iPhone. Apple is taking advantage of its former iPod users, who are used to its user interface and might see the iPhone as an extended version of iPod since it also is a mobile handset.

8.6.1.2 Weaknesses

The hype of the Apple brand not only revolves around Apple, but many of the devoted consumers also idolize the visionary leader Steve Jobs. As in many companies, the founder and/or front figure is important for its existence. If and when Steve Jobs leaves the company, will Apple's image change and will it be able to continue its disruptive path?

One of the reasons the iPod became a success for Apple, was the ecosystem which Apple created around it, iTunes being distinguished. Due to regulations introduced in April 2007, iTunes now has to be compatible with other MP3-players as well

Apple’s market share objective with the iPhone could be overstated, since the company relies on one model. The iPhone also comes with a number of other limitations. Firstly, Apple is reliant on one operator in its domestic market, limiting the number of consumers, although it can be risk minimizing. Secondly, the iPhone is not subsidized, but is still tied to the operator for two years. It is a rather expensive and inflexible deal for the consumer. A further limitation is the network choice, since the iPhone will initially only work with 2.5G, which is slower than 3G. The reason for launching a handset using 2.5G might be that it is the most used network in the USA but rumor says Apple could not find a 3G supplier. Still, the usage of 2.5G instead of 3G restrains the functions of the mobile handset. It can lead to consumer dissatisfaction, thus decreasing the number of consumers replacing their old iPhone with a newer iPhone model.

The mobile handset industry is characterized by hypercompetition and short product life cycles. Furthermore, all major competitors offer a broad product portfolio to attract different consumer segments. In order for Apple to make a lasting impression in the industry, the company will most likely have to offer a broader variety of products and be a fast inventor. Otherwise, Apple will probably just remain a niche player.

8.6.1.3 Key success factor analysis – Apple

Apple’s KSF are mapped in a matrix, Table 8-3, where the left column contains the KSF, the middle the rating of the KSF and the third column gives the cause of the rating. Table 8-2 is the rating instruction, which also is found in appendix IV, together with the full matrix of IT-players.

-	The company lacks the KSF.
0	The company possesses some of the KSF.
+	The company possesses the KSF.
?	Fulfillment of KSF is questionable.

Table 8-2: KSF rating.

Apple	Rating	Cause
Design Hardware	+	Consumers are willing to pay a premium price for Apple's design.
Design Software	+	Apple's UI is well known for its user friendliness.
Flexibility/ Adaptability/ Time-to-market	0	Apple has rather successfully adapted consumer trends and also launches new products in new markets.
Brand	+	The Apple brand is well known among consumers and stands for premium products.
Technology Standard	0	Apple has not surrendered in the standard war against Microsoft, using its own standard.
Technology Cellular	-	iPhone is a 2G phone, indicating Apple lacks knowledge of cellular technology.
Broad product portfolio	-	Apple launches one model of the iPhone and initially only a niche player.
Volumes	0	Even though iPhone will be a niche product. Apple has handled volumes before, both in computers and with iPods.
Organizational structure	0	The organizational structure is flexible and adapt to needed changes, but sometimes too late.
Consumer-orientation	+	Apple is popular among consumers, supplying well-designed products which satisfy consumers demand.
Sales channels	0	Apple's hype makes operators want it in their portfolio, but launching the iPhone to only one operator is seen by many as a limitation.

Table 8-3: Apple's KSF rating.

From studied cases, Apple could in some years' time become a large player in the mobile handset industry. In order for this to happen, the launch of the iPhone would have to become a success with low return rates and follow-ups which attracts a large public in different segments. The iPhone have the potential to become a hype like the iPod, and every operator wanting it in their portfolio. Apple's success and impact in the mobile handset industry depends on if they manage to keep the hype around the iPhone and make consumers desire also coming versions and new improved models.

8.6.2 Dell

8.6.2.1 Strengths

Dell's direct-sell strategy of PCs was a disruptive innovation since it brought an entirely new business design to the PC-industry. The company managed to manufacture, distribute and sell PCs in a unique way. Regarding D'Aveni's 7S, the Dell's direct-sell is an example of the first group, vision for disruption. It contains among other things serving existing consumers better. Dell customized its products by letting the consumers choose which performance and composition they wanted, resulting in consumers did not have to pay for unwanted but included performance. Because of the customization of PCs and consumers being able to choose their PCs before manufacturing, Dell avoids making inaccurate predictions.

Dell also uses the D'Aveni strategy of speed, as time-to-market is kept short. The speed further gives Dell strength in flexibility. The built-to-order manufacturing and low stock-keeping minimizes obsolete components and maximize flexibility. By direct-sell, Dell opened a sales channel direct to the consumer reducing the middleman. The first-hand information received from consumers gives Dell an advantage, as it easily can detect changes in consumer demand and adapt accordingly.

Dell managed to take advantage of the modular product architecture of the products and vertical specialization of the industry. Instead of fighting against the industry structure and competition, Dell took advantage of it, by picking the best supplier and creating a close partnership with it, Dell could create the best combined solution for its consumers. This shows Dell's ability to capture the migrating value. Instead of being in a state of cultural lock-in as other PC makers of the time, Dell adapted its business design so that it could capture the new value flow.

Dell has managed to use its business design in other product areas as well, such as servers. An interesting question is whether the business design is possible to apply on the mobile handset. Since Motorola's former CEO recently started working for Dell's consumer group, this could give an indication to where the Dell is moving next. If the mobile handset industry becomes fully vertically specialized, with modular product architecture, Dell has the strategy for exploiting it to the fullest.

8.6.2.2 Weaknesses

The applicability of Dell's strategy to the mobile handset can be questioned. The mobile handset has not yet reached a state of modularity which Dell advantage of in the PC-industry and the question is whether it possibly can reach it. In the mobile handset industry, design is an important factor, which would add complexity to making it modularized. For example, since consumers want to choose between form factors such as clamshell or slide, this could become an obstacle in Dell's direct-sell, since it would be difficult to keep time-to-market short.

Selling handsets using Dell's direct-sell strategy would also raise supply chain issues in the operator/retailer channel. For Dell to enter the mobile handset industry by using its direct-sell, the power of operators has to diminish. Interoperability testing between networks could also become

a problem since Dell does not have earlier experience from the mobile handset industry and its cellular technologies.

Dell's PCs do not have a reputation of design, and the Dell brand, even though it is ranked at approximately 30th place in Interbrand's brand value; is not associated with well-designed products. It is therefore interesting to see if Dell will be able to offer consumer design-focused mobile handsets. Therefore if Dell enters the mobile handset industry, it will most likely enter as an enterprise supplier, supplying a total package of computers and mobile handsets. The mobile handset will be an additional device enabling work on the move.

Dell has its business model that revolutionized the PC industry, including its adaptability and knowledge of handling large volumes to rely on. Can Dell's business model be as successful in the mobile handset industry as it has been in the IT-industry or will it have to be redesigned? If that will be the case will Dell manage it or has the company entered the phase of cultural lock-in? Is Dell too focused on what has been successful before and thereby not able to change its way of thinking and its processes and values?

Dell advantages from its supply chain and effective handling of volumes regarding JIT, production and assembly, but it is applicable on a device that is not fully modular? Dell's success is determined by the operators and their role in the future. Dell will, if the operators become bit pipes, have an advantage of its business model. If the operators' role is the same as today, Dell would with existing business model have a hard time entering and establish itself in the mobile handset industry.

8.6.2.3 Key success factor analysis – Dell

Dell	Rating ³⁵³	Cause
Design Hardware	0	Dell has manufactured PDAs but in PCs Dell's products are not known to be well-designed.
Design Software	-	Dell does not supply software.
Flexibility/ Adaptability and time to market	+	Dell's efficient supply chain increases its flexibility and adaptability.
Brand	0	Its brand is well known but not trendy and attractive for a mobile handset.
Technology Standard	-	Dell has not managed to create any standards.

³⁵³ The rating instruction is found in appendix IV.

Technology Cellular	■	Dell has no stated knowledge of cellular technology.
Broad product portfolio	■	Dell will at least as a newcomer not be able to have a broad product portfolio.
Volumes	0	Dell is used to handle volumes in the PC-industry, which are relative small compared to volumes in the Mobile handset industry. Will Dell manage to handle these volumes?
Organizational structure	+	Dell has an efficient organizational structure but is it applicable in the mobile handset industry?
Consumer-orientation	0	Dell is specialized in customized products but is not an innovator as it assembly components of others.
Sales channels	?	Dell advantage in the PC-industry because it is its own sales channel. Sales channels in the mobile handset industry are more complex due to the role of operators. Therefore for Dell's advantage might not be applicable in the mobile handset industry.

Table 8-4: Dell's KSF rating.

8.6.3 Google

8.6.3.1 Strengths

In few years, Google has become one of the world's most valued brands. Furthermore the verb *to google* included in dictionaries gives indications of the company's superior position in the web search engine industry. Google's strength mainly derives from its relaxed corporate culture which it has worked hard to maintain. The work philosophies are examples of this. The culture has enabled the company to remain in corporate architecture phases of foundation and growth, described in creative destruction. The corporate architecture constitutes a fundament in the company's ability to create disruptive innovations.

Google's search engine, which uses a more efficient way to search the Internet, became the world's most used search engine. It can be seen as a disruptive innovation as its technology had not been used in search engines and it improved the consumers search results. The company still continues to invent both disruptive and sustaining innovations by offering new services such as Gmail and Google Mobile. These innovations are sustaining as it is products already existing on the market, not providing anything special for the consumer more than an enhanced and branded service. Both Google's sustaining and disruptive innovations add services to a *Google world*, a place where the consumer can find necessary information such as to find a location, to search for competitive prices and check his or hers email. Furthermore Google does not seem frightened by large competitors such as Microsoft, as they launched a low price business suite competing with Office.

Google's corporate culture is emboldened to handle both disruptive and sustainable innovations (see figure 8-3). By encouraging employees to spend 20 percent of their time on projects that interest them, numerous innovative services have been created, thus handling arrow A. The remaining time, employees spend on regular work, thus following arrow B. This could enable the company to achieve the only sustainable competitive advantage that D'Aveni speaks of, namely continuously developing new advantages, not waiting for competitors to undermine the old.

The company has not only released numerous new applications and made acquisitions to broaden its portfolio. Google has also made several alliances and by doing so entered new businesses. It has entered the mobile handset industry on its own, with the launch of its web-based services, and by partnering with mobile handset vendors and operators and co-branding with LG. Further, there are speculations about an ongoing Google phone circulating on the Internet. Analysts believe that Google's growth and revenue will be driven by advertising, further supporting its only revenue channel. Google's business model fits the present mobile handset industry, where value seems to be flowing to service-related activities.

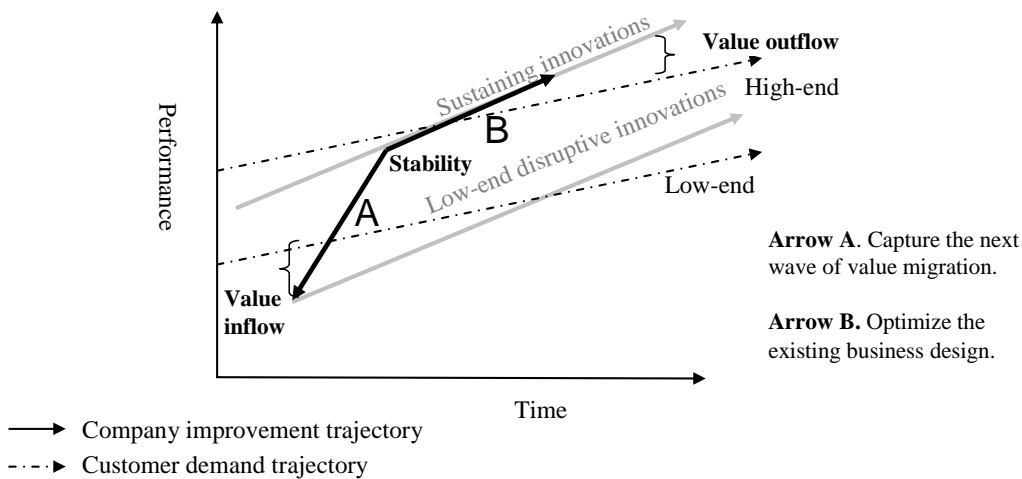


Figure 8-3: Google manages both strategies of arrow A and B.

8.6.3.2 Weaknesses

One of Google's key weaknesses is that its revenue is almost solely based on advertising. Although Google offers a number of services, it has not been able to successfully monetize these. One could argue that this is aligned with its philosophy, technology first, business later, but one can wonder if this is a long-term profitable strategy. Moreover Google's actual value is hard to pinpoint as it originates from its brand value. Its value is more dependent on the number of users due to the network effect than from direct revenues tied to a product. The more users Google have the more attractive it will be to its customers, the ad owners as they reach a larger group of people. It is therefore significant to ask if Google's expansion and its rapidly soaring stock can be resembled with IT-companies before the dot-com bubble.

As the company continues to expand and develop it is interesting whether it can hold onto its corporate architecture. Considering Google becoming a mobile handset vendor, Google most

likely have to reconstruct its corporate culture as shifting from being an innovating software company to become a producing company, as it has not before had a physical product.

Google may have grown and expanded too fast for its own good. Its growth has been through acquisitions and not organic. In a very short time, the company has expanded into several new businesses and does not seem to see any limitations, which could make it loose focus and make the wrong decisions. The company may have become over-diversified and in down-times, it could be heavy to carry the load of all non-profit making divisions.

8.6.3.3 Key success factor analysis – Google

Google	Rating ³⁵⁴	Cause
Design Hardware	?	It is not yet clear if Google will make a mobile handset.
Design Software	+	Google’s software is well-designed.
Flexibility/ Adaptability/ time to market	+	Google has the ability to catch changes in demands and trends.
Brand	+	Google is one of the most valued brands in the world.
Technology Standard	0	Google has been able to make its search engine a form of standard.
Technology Cellular	-	Google does not have any cellular technology development.
Broad product portfolio	-	Google does not have a broad portfolio.
Volumes	?	Google does not have any hardware products, therefore unknown whether it could handle large physical volumes. Its services are boosted of increased volume.
Organizational structure	0	Google has a large organization, but still manages to handle diversification.
Consumer-orientation	+	Google has an ability to renew itself and keep demand up.
Sales channels	0	Google is partnering with mobile handset vendors and operators.

Table 8-5: Google’s KSF rating.

³⁵⁴ The rating instruction is found in appendix IV.

Google is an interesting player as it might be trying to penetrate the industry with two different strategies, alliances contributing with services and an actual handset. To become successful, it has to focus on one strategy, as being both partner and competitor is a difficult situation. Other interesting aspects with Google are if its corporate culture will enable it to become a producing company, as well as with what kind of business model it will enter the industry as it profits from advertising. For Google, the mobile handset is not only seen as multibillion dollar industry, but also a way to extend its product offering. If value migrates from mobile handset provisioning to services, Google will definitely profit from it.

8.6.4 Microsoft

8.6.4.1 Strengths

As the PC-industry emerged, the, at the time, small company Microsoft was able to capture value as it flowed from larger companies, such as IBM. Ever since, Microsoft's Windows is the de facto standard in OS for the PC-industry and Microsoft has thereby been able also to keep the value. Microsoft has further captured value by moving into new businesses with new products. Today the company has experience from different markets, due to its diversified and broad product portfolio containing among others MSN, Internet explorer, Xbox, Windows, Office and Windows Mobile.

The company can also due to its financial strength, size and strong brand, be a *fast follower* just as Nokia, letting time pass before new products prevail. It has further used its business design and products to connect more of its products and used the synergies between them. Examples of these synergies are its ability to connect Office, Internet Explorer to Windows. As Windows is the standard in operating systems other Microsoft products connected to Windows easily become standards, something Microsoft has taken advantage of.

Microsoft is not a company which profits on disruptive innovations. Instead, the company has the ability to see disruptive innovations and then use its power and deep pockets to buy or exploit ideas which other companies have already created. An example is the internet browser Internet Explorer, Netscape was market leading but Microsoft penetrated the market and took over the leading position. Thus the company has captured value from a disruptive innovation. Microsoft also develops products along the sustaining innovation trajectory, i.e. the Windows OS where Microsoft releases new versions with only slight differences.

Regarding Microsoft's position in the mobile handset industry, it can benefit from Windows and its similarities with Windows Mobile since users are familiar with the user interface and can synchronize the mobile handset with their PC. Furthermore Windows Mobile is more favorable for the ODMs as it is a more complete system than Symbian and Linux, thus demanding less integration. The ODM can also use Microsoft's strong brand when selling the mobile handset. Increased use of open OS in the mobile handset industry speaks for Microsoft.

Since Microsoft is incredibly powerful the *rules of the game* are not valid to it and therefore it is difficult to apply theories used in this thesis. Contradictory to what D'Aveni says about deep pockets, brand awareness and stronghold not being a way to gain competitive advantage any more, Microsoft still benefits from this. Despite a somewhat poor quality, launching products not

fully developed, later than stated release date, Microsoft has been a trendsetting player no matter what business it has been in.

8.6.4.2 Weaknesses

Microsoft has for a number of years tried to penetrate the mobile handset industry, without major success. This is partly due to Microsoft's dominant position in the PC-industry, its attitude and charging the mobile handset vendors high prices for its OS. The vendors attempt to stop and/or weaken Microsoft's entrance by joining forces, such as the creation of Symbian. This is done as a reaction to Microsoft's highly priced products and to prevent Microsoft to gain power in the mobile handset industry. Microsoft's aggressive tactics from the PC-industry have thereby become an obstacle in the mobile handset industry. Windows being a standard in the PC-industry has not made Microsoft used to competition in the OS business. How will Microsoft handle or beat OS competitors in the mobile handset industry? In order to prevail in the mobile handset industry, Microsoft might need to bring superior products at a reasonable price.

Windows Mobile has so far been associated mainly with enterprise users, and been incorporated in smartphones. For Microsoft to become an incumbent in the industry, Windows Mobile would need to be incorporated in a broader device range. Nevertheless current pricing is an obstacle, since it is cheaper and more flexible for the large mobile handset vendors to use Symbian or Linux.

Although Microsoft's reliance on Gates does not seem as great as Apple's on Jobs, Gates' business intelligence characterizes the company and one can wonder how it would manage without him.

8.6.4.3 Key success factor analysis – Microsoft

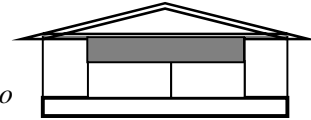
Microsoft will continue to grow in the open OS segment. It will benefit from the other IT-players' entrance and probably attract enterprise consumers by its common interface in the mobile handsets as the PC. All incumbents in the mobile handset industry will therefore probably also be pushed into making mobile handsets with Windows Mobile, except Nokia, which is the only player large enough to resist.

Microsoft	Rating ³⁵⁵	Cause
Design Hardware	-	Microsoft does not sell hardware products in the mobile handset industry.
Design Software	+	Microsoft's user interface is well-known and user friendly.
Flexibility/ Adaptability and time to market	0	Microsoft is a typical fast follower, for example efficiently introducing Internet Explorer to follow Netscape.
Brand	+	Microsoft's brand is well-known and well positioned within high tech products.
Technology Standard	+	The de facto standard of Windows is Microsoft's most important strength.
Technology Cellular	-	Microsoft as an open OS supplier in the mobile handset industry does not need to apply the cellular technology development.
Broad product portfolio	-	Microsoft has only a few versions of its OS, mostly focused on enterprise users.
Volumes	+	Microsoft manages high volumes of its OS, thus a full rating in this factor.
Organizational structure	+	Microsoft is a diversified, global company and has managed its organizational structure successfully thereafter.
Consumer- orientation	0	Microsoft has not been the foremost innovator, but keeps up the demand for its products.
Sales channels	0	Microsoft partner with ODMs in the, but is viewed as a threat to some in the industry.

Table 8-6: Microsoft's KSF rating.

³⁵⁵ The rating instruction is found in appendix IV.

9 Comprehensive Analysis



The chapter aims to conduct a comprehensive analysis and answer to whether the IT-players can affect the mobile handset industry to a level where the industry KSF and settings are changed. The IT-players' KSF will be analyzed from a general point of view. Thereafter, present drivers of change will be discussed. Finally, the IT-players' position in the value chain and effects of the mobile handset industry value chain structure due to their presence will be analyzed.

9.1 Analysis of IT-players' general KSF

Regarding the IT-players on a general level, thus the majority, some KSF are similarly fulfilled. Two of them, software design and brand, are strong KSF, while cellular technology, broad product portfolio and sales channels are weak KSF for the IT-players (see Table 9-1). The rating instruction is found in appendix IV. The importance of this analysis is not only to evaluate IT-players' fulfillment of the KSF needed in present in the mobile handset industry, but also to examine whether IT-players possibly can affect the mobile handset industry, and thus the KSF needed. The weaker KSF might not be an issue, if IT-players are able to either source what they lack or if they change KSF needed in the mobile handset industry.

KSF		Apple	Dell	Microsoft	Google
Design	Software	+	-	+	+
Brand		+	0	+	+
Technology	Cellular	-	-	-	-
Broad Product Portfolio		-	-	-	-
Sales channel		0	?	0	0

Table 9-1: KSF for IT-players³⁵⁶.

9.1.1 Design

As Table 9-1 shows, the IT-players are strong in software design. Since the PC hardware is not a differentiating factor, software programs have been in focus. The mobile handset has the opposite focus, where the hardware design is the differentiating factor in the mobile handset industry. However this could change, as the mobile handset becomes more PC-like and consumers would start to value software performance more than previously.

As the consumer electronic companies entered the mobile handset industry, their strength was the hardware design and ability to manufacture what the consumers wanted. Their weakness was thus the software. The case of the IT-players is the opposite. They have the strength in software, but

³⁵⁶ The instruction for rating coloring is found in appendix IV.

might not be aware of the complexity in making of the mobile handset, thus it could become a weak point. Assembling a mobile handset is not as easy as assembling a PC, since the mobile handset need network connectivity.

9.1.2 Brand

The IT-players have high brand value and awareness, which is advantageous in the mobile handset industry. IT-players' brands are in average better ranked than the top five mobile handset vendors'. Brand as a KSF could be seen as a prerequisite in the mobile handset industry, but not largely differentiating when it reach a certain point. It is, though, important that the brand attracts and represent the right things in the eyes of the consumer.

9.1.3 Cellular technology

A possible barrier for IT-players when entering and establishing themselves in the mobile handset industry is cellular technology. Most of the players in the mobile handset industry have many years of experience in developing cellular technology, hence also most of the patents. Being at the forefront of cellular technology will therefore be difficult for the IT-players to achieve, which means that they will not be able to offer consumers the latest cellular technology. The well-tried technologies, such as 2G, have been on the market for some time and are more easily applied for a newcomer, but this means choosing a position one step behind the incumbents.

Incumbents in the mobile handset industry seem to believe that consumers might be disappointed when buying a mobile handset from an IT-player, since it will not have the technology to support the usage of the latest services. It can be compared to buying a Porsche, not being able to enjoy it fully because it contains a lousy engine. However, selling products without the latest generation technology might not be an issue, since it is aligned with Christensen's disruptive innovations. The products of IT-players will be underperforming the existing ones, but could provide aspects consumers value more. The IT-players are thus in the foundation phase, while as incumbents find themselves in a state of cultural lock-in, since they believe that having the foremost technology is a way to survive in the business (see figure 9-1). Focusing too much on technology has in the past proven to be risky.

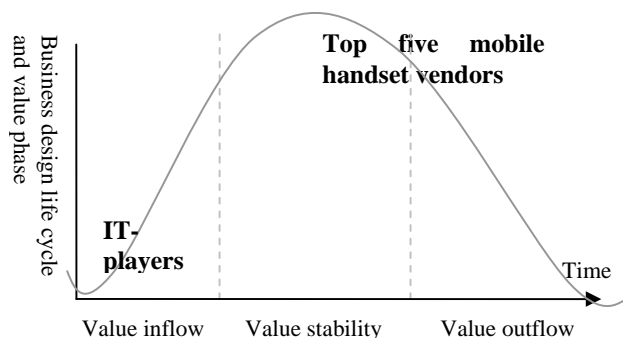


Figure 9-1: IT-players in foundation and mobile handset vendors in cultural lock-in.

If IT-players make a mobile handset in which the 2G technology is complemented with a mobile internet technology, for example WiMax, it might still not be fully satisfying according to the consumer. The question is where and when consumption of the new services takes place and what the consumer value most, for example what is most important, coverage or maximum mobility? The choice of the consumer will determine which technology that will be satisfying enough to last in the long run.

9.1.4 Broad product portfolio

The top five players in the mobile handset industry offer a product portfolio in order to attract a broad base of consumers. The segmentation of the market is a consequence of hypercompetition, as mobile handset vendors have pushed performance of the mobile handset in attempts to achieve temporary advantages. As for the IT-players, they will enter the mobile handset industry as niche players and launch one model targeting a certain segment. They will most likely be able to make a *one hit wonder* and maybe even a *one hit wonder-portfolio*. The issue is to maintain the success and launch portfolio after portfolio with attractive mobile handsets in all segments, at volumes that have not been reached in either PCs or MP3s. Will the IT-players manage to produce mobile handsets with quality and performance, to a sufficient degree that is also enough to sell the follow-up models? The short PLC of a mobile handset also adds complexity for the IT-players, since PCs have significantly longer PLC. The mobile handset industry requires an ability to deal with hypercompetition, demanding a never-ending flow of disruptive innovations at a pace that IT-players might have problems in keeping up with.

The broad product portfolios of mobile handset vendors contribute to the great number of mobile handsets available on the market. At the same time, it is a complex mass of offerings, which might only confuse the consumer. The simpler choice for the consumer would then be to choose a branded product from a portfolio with fewer choices, than to choose one mobile handset out of many in a broad product portfolio.

9.1.5 Sales channels

The sales channels in the IT- industry are resellers such as wholesales and the Internet. In the mobile handset industry, the operators play an important role in the relation between the mobile handset vendor and the consumer. The operator has the power to decide whether to accept a product in its portfolio, if not, the product will not reach the consumer. The operator is also the one to set the retail price to consumers since it decides to what degree the product will be subsidized. In addition, interoperability testing demands relations with the operators. These conditions are new to the IT-players, since they differ from how PCs are sold. Relations are not something that can be bought by a company, and takes time to build, which could pro-long IT-players penetration on the market.

9.2 Present drivers

One present driver in the mobile handset industry is the increased services and features earlier only available in the PC, such as email, browsing and IM. These all contribute to the increased data traffic and also push hardware design changes, with a QWERTY keypad and larger display.

Another driver is alliances. Seen in our study, IT-players lack KSF such as sales channels and product portfolio, which will take time to build. Therefore, a successful alliance is a prerequisite for IT-players to penetrate the industry. Apple is for example reliant on an ODM partner for the iPhone. Microsoft has for a long time attempted to penetrate the industry but failed, as it has not been able to form contracts with major mobile handset vendors and thus not reached significant volumes. Once an IT-player has managed to gain power in its subsystem it can, according to Fine, expand vertically, thus threat mobile handset vendors. ODMs possess the knowledge in provisioning of mobile handsets, which could strengthen the advantage for IT-players to build alliances with them.

As a way to capture the migrating value, mobile handset vendors have created alliances with service providing IT-players. As long as the IT-players are present in the mobile handset industry only on terms of alliances, the alliances are a way for the mobile handset vendors to create competitive advantage. It is not until the new entrants start expanding from service providing to hardware and the provisioning of the mobile handset that they become a direct threat to mobile handset vendors.

9.3 Value chain positions

The IT-players studied perform different value adding activities and respectively have different strengths and weaknesses in their business designs. They will therefore attempt to penetrate the industry or are already doing so, by performing the corresponding activities in the mobile handset industry value chain. Figure 9-2 shows what activities the companies engage or as in Dell's case most probably will engage in.

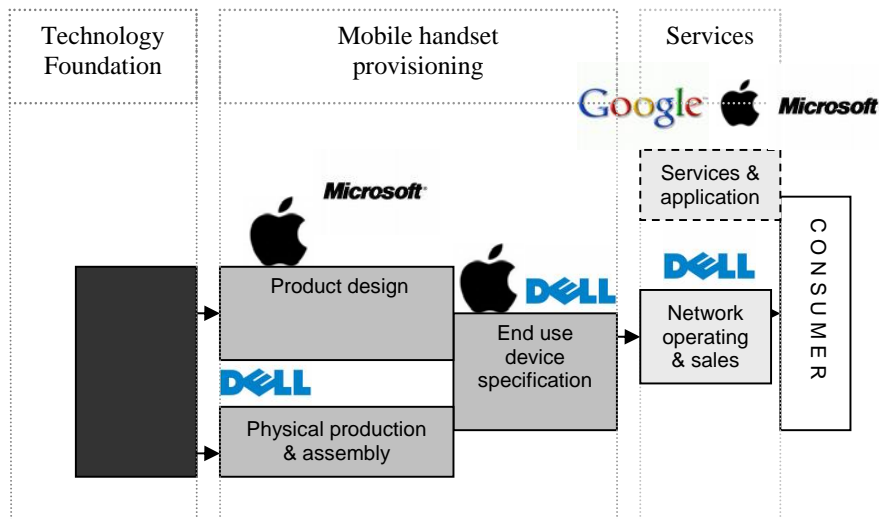


Figure 9-2: The IT-players positions in the mobile handset industry value chain.

The IT-players studied in this thesis do not possess the technological competence or interest to enter into the technology foundation activities nor are they interested in becoming network operators. Therefore the IT-players will increase competition within the mobile handset provisioning activities as well as services. As seen in figure 9-3, value in the mobile handset industry is presently flowing into the service bucket. Therefore, in order for mobile handset vendors to derive value in the future, they must engage in these activities. Conclusively, end-use design specification and services will be the most threatened activities in the future. OEMs will therefore need to find a business design that can handle both activities, without value flowing to adjacent activities.

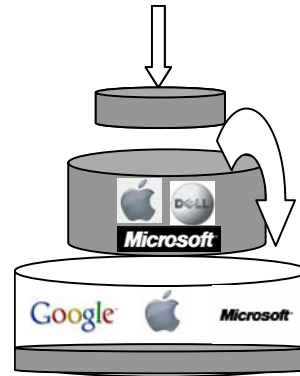


Figure 9-3: The value is flowing into the service bucket.

Service providers have the greatest possibility to enter the mobile handset industry since services have become the new way to attract consumers and an entrance can be enabled by alliances. Entering the mobile handset industry in the mobile handset provisioning bucket is a safer but less profitable strategy as the value will migrate.

Apple is entering the mobile handset industry value chain in multiple ways. Firstly the company has engaged in the activity *end-user design specification*. It is also partly connected to the integration of hardware and software, as it has designed an operating system. Apple will also use its experience from iTunes and create similar services around the iPhone. If Apple manages to successfully launch the iPhone and build an eco-system around its products, Apple will become a threat to both mobile handset vendors as well as service providers. Apple's businesses position in both the mobile handset provisioning and the services bucket gives it two ways of establishing itself in the mobile handset industry.

Dell's strength is the JIT, produce-to-order and direct-sell strategy and therefore the company would want to engage in production and assembly activities, end-use device specification and sales. Thus, Dell engages in mobile handset provisioning, and would probably want to engage in sales as well. Dell-branded mobile handsets will probably target business users and run Windows Mobile. Dell's capability to enter the mobile handset industry is seen as moderate for the time being. More standardized component interfaces and operators losing power and becoming bit pipes are seen as prerequisites for the company to succeed. Should this occur, Dell would be a threat to mobile handset vendors.

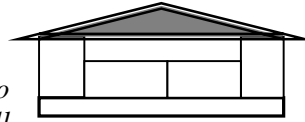
Google's entrance in the mobile handset industry is currently seen as an opportunity for mobile handset vendors, as they can extend and add value to their products by forming an alliance with Google. Even though rumors exist regarding a Google-phone, it should not be seen as a possible threat to mobile handset vendors as Google's further entrance will most likely also target services and applications. However Google could, despite its alliance with OEMs, gain value from mobile handset vendors in the future. The OEM could become merely a hardware provider while as the Google brand would be associated value. As IBM marketed its products as containing Windows and Intel, it could not see the direction that the value headed. The same could occur in the mobile

handset industry, if OEMs brand their products containing IT-players' services or brands. According to our analysis in chapter 7, value in the mobile handset industry will most likely in the future be associated with services, which further speaks in favor of Google.

Microsoft will not make a physical product in the mobile handset industry but continue to provide OEMs and ODMs with Windows Mobile. Up until today, all major OEMs but SEMC and Nokia have made a Windows Mobile handset. As open OS grows more common, Microsoft will be provided with opportunities to prevail. With Windows Mobile and MSN, Microsoft is present in both the mobile handset provisioning and services bucket, which gives it two ways to penetrate the mobile handset industry. Should Windows Mobile and/or MSN become a standard in the mobile handset industry; a situation similar to the one in the PC-industry will derive. Mobile handset vendors will then lose parts of their value, since the Microsoft brand will derive value from the brand of the mobile handset.

Historically, value in the mobile handset industry has migrated in the direction of the consumer. Presently, value is migrating from mobile handset provisioning to services which is the last bucket before reaching the consumer. This raises two interesting questions. Where will value migrate as the bucket of service becomes full? Who will capture the migrated value?

10 Conclusions



This chapter will describe the conclusions of the thesis and also reflect on our work process. We will first discuss the overall comprehensive empirical conclusions. Thereafter the theoretical and practical contributions of the thesis, followed by a discussion regarding the theoretical framework and the methodological approach are presented. Finally, proposals of further research areas are presented.

10.1 Comprehensive empirical conclusions

By applying the KSF for the mobile handset industry on chosen IT-players, our intention has been to determine if the IT-players possess the KSF and thereby can be successful in the mobile handset industry. Similar to how the consumer electronic companies' entrance reshaped the mobile handset industry and changed the factors needed to succeed; the IT-players entrance will change the KSF or the importance of a certain KSF. The identified KSF are therefore only valid in the mobile handset industry in present.

In general, the IT-players are strong in the KSF software design and brand. As mobile handsets become more PC-like, software design will become of greater importance and could even be decisive for the choice of mobile handset. This brings another dimension to the mobile handset industry, demanding more from players currently in the industry. A well-known brand is important and can be seen as a prerequisite to succeed in the mobile handset industry. The five top mobile handset vendors and the IT-players studied in this thesis possess strong brands. As for the IT-players, their brands are today used in order to create alliances with incumbents.

The IT-players could experience difficulty in establishing themselves in the mobile handset industry, since they lack cellular technology knowledge. They will therefore initially have to settle with older technologies and have trouble matching their mobile handsets' performance with those of the incumbents. However when relating to Christensen's disruptive innovation, the lack of the latest technology might not become a problem as customers could value other parameters.

As IT-players enter the mobile handset industry, they initially lack a broad product portfolio, which means that their existence on the market will first be limited to niches. Although a broad product portfolio is a KSF today, it might not continue to be. Sales channels as the operators are also seen as an obstacle. If the mobile handset is not in the operators' portfolios, the product will not reach the customer. Building a relationship with operators is time demanding, but if operators lose their strong position and power and new sales channels emerge, this importance will reduce.

The IT-players are in general weak in fulfilling the KSF for the mobile handset industry such as cellular technology, broad product portfolio and sales channels. Mobile handset vendors see these weaknesses as entry barriers to the mobile handset industry. However our research shows that these KSF will be subject to change, in a way advantageous for IT-players.

Finally, we have identified that value is flowing from the mobile handset provisioning related activities to those related to service. Seeing that Microsoft and Apple are both located where the value is to be found now and where the value is heading in the future, we believe that they have

greater possibilities to penetration and establishment in the mobile handset industry than Google and Dell. Also seeing that both companies have experience from hardware and software design further enhances their abilities.

10.2 Contribution

10.2.1 Theoretical

Our theoretical contribution is presented in chapter 4, theoretical discussion. The theories regarding dynamic environments presented in the theoretical framework lack structured analysis tools and mostly coin terms. Therefore our theoretical contribution has been to identify the similarities and correlations between these theories and terms. The theoretical discussion shows that these theories describe the same phenomena, where the disruptive innovation theory covers the other discussed theories.

10.2.2 Practical

This thesis' practical contribution is threefold. First, we have through an extensive research identified the key success factors in the mobile handset industry. These determine what presently is needed to be a successful player in the industry.

Secondly, we have described the mobile handset industry value chain, both in detail and simplified. The value chain structure was thereafter discussed and brought to the waterfall analogy, which amplified the reasoning of the migrating value throughout the mobile handset industry evolution.

Thirdly, we have applied the theoretical framework along with the key success factors on IT-players entering the industry. By doing so, we determine how these will affect the mobile handset industry structure. Individual and general IT-player players' potential, as well as industry implications are presented in chapters 8 and 9 and represent our further practical contribution.

10.3 Theoretical framework

In chapter 3 our theoretical framework was presented, which aimed to help us describe and understand the mobile handset industry dynamics. We have been able to recognize different players' behavior and the mobile handset industry as described in the theoretical framework, hence the theories have been adequate and applicable in a satisfying way.

In traditional strategy theory, there are numerous analysis tools which can be used for different purposes, for example Porter's Five Forces and PESTEL. The theories in our framework and other studied theories lack a systematic tool like that. Perhaps dynamic industries are too complex to be described in this manner?

The authors of dynamic theories all generate a wide variety of terms, which confuses the reader. Different words are used to describe similar things and accepted terms within dynamic industries are few. This could be due to the fact that theories regarding dynamic and high-technology industries exist in abundance and are relatively new. As the literature that introduces these terms

and theories is extensive whereas the message with each can be put into few words, the theories sometimes much resembles management fiction in their presentation.

Furthermore the theories' individual contribution can be questioned, since they all individually lack some aspects. To a certain extent, these theories complement each other. Therefore, to create order from chaos one needs to unite all these theories and their terms in order to create an understanding for the environment, which has been our aim with the theoretical discussion. Once united, these theories are still only practical to a certain limit, but to a greater extent than before.

10.4 Methodological approach

As this study to some extent speaks of the future, a scenario method could have been used, however this was neglected since generating scenarios gives most input to those actively involved in the process. Instead our study aimed to give benefit to a broader audience. We do speak of the near future, since the knowledge that has derived from this thesis gives indications of how it could appear.

Furthermore our work has been moving in iterative cycles, making it difficult to determine a sequential method. Our work has proceeded with monthly seminars of our work in progress, which we held for the product management group at EMP. This has led to valuable input and feedback as well as encouraged an iterative process. The analysis is therefore not only a result of discussions among us and our tutors but also of people with substantial industry insight.

10.5 Further research areas

The conclusions drawn are based on the situation as is in April 2007. Since the industry changes rapidly, information becomes obsolete and as IT-players continue to establish themselves it would be interesting to perform a follow-up study. For example, will Apple succeed in its attempt to penetrate the industry? This can further be related to the KSF identified in this thesis. Will certain KSF be of greater or lesser importance than supposed and how will the new players actually affect the KSF in the mobile handset industry?

An interesting theoretical area for further research is to explore analysis tools applicable for dynamic industries. The foundation for such a research could take place in this thesis' theoretical discussion, and further be developed by creating a tool for analyzing dynamic industries or companies existing in or entering in such.

Further areas of interest are how the software design in the mobile handset will change as players from the IT-industry enter, as well as how usage of open OS in mobile handsets develops. Will the usage spread to all segments? What will be the future standard? Also, the role of the operators is an interesting area for further research. What power will they have and will they become bit pipes?

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Appendix I: Definitions

The definitions of terms used in this master thesis are structured in alphabetical order.

Application	Employs the capabilities of a device, for example a computer or mobile handset, directly to a task the user wishes to perform. Examples of applications are Word, Excel and software in the mobile handset.
Bit pipe	Providing access to network thus the simplest form of data and voice traffic for a fixed rate instead of services.
Cellular technology	A technology where the layout of time, frequency or code reuse is cellular. ³⁵⁷
Convergence	Is when previously separate industries begin to overlap in terms of activities, technologies, products and consumers. ³⁵⁸
Data centric device	The primary function of a data centric device is data transmission but it can also be equipped with voice transmission technology. The device has an operating system, allowing for third party applications. The device can be synchronized with PCs. Examples include the original form of PDAs which were none wireless.
Feature phone	A mid-range mobile handset that includes features such as color screens, cameras, text and photo messaging, digital music, video streaming, and games. ³⁵⁹
Function	Performs a specific task, and is relatively independent. For example camera or music.
Horizontal integration	Several companies conduct specific activities.
Industry	A group of companies producing the same principal product. ³⁶⁰
IT	Information technology is an umbrella term including any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware as well as software, satellite systems, various services and applications. ³⁶¹

³⁵⁷ www.ericsson.com/ericsson/corpinfo/publications/ericsson_business_review/pdf/107/dont_be_afraid.pdf, 2007-05-10

³⁵⁸ Johnson, G et al. (2005) *Exploring corporate strategy*. Prentice Hall. Seventh edition. Mateu Cromo

³⁵⁹ Windows for devices, www.windowsfordevices.com/news/NS3328868025.html, 2007-02-22

³⁶⁰ Johnson, G et al. (2005) *Exploring corporate strategy*. Prentice Hall. Seventh edition. Mateu Cromo

³⁶¹ Bitpipe, www.bitpipe.com/rlist/term/IT-Industry.html, 2007-02-22

The Mobile Handset Evolving

IT industry	Consists of all computer, communications, and electronics-related organizations, including hardware, software, and services. ³⁶²
IT-Players	Companies related to provisioning or usage of a personal computer.
Key success factor	Those factors within the company's market environment that determine its ability to survive and prosper. ³⁶³
Key driver of change	Drivers likely to affect the structure of an industry, sector or market. ³⁶⁴
Market	Where the companies make their profits.
Mobile handset	A wireless device which communicates with cellular technology.
Mobile handset industry	Companies that design and manufacture mobile handsets.
Open OS	An operating system which enables third-party applications.
Operating system (OS)	Runs the software and coordinates the resources to achieve optimum system performance ³⁶⁵ . The operating system in a mobile handset determines its features, performance and security, providing <i>application programming interface</i> (API) for additional applications ³⁶⁶ .
PDA	Personal Digital Assistant, PDA is a handheld computer primarily designed for use with both hands. These devices use an open OS. PDAs offer synchronization of files with the PC. The primary function is data transmission. ³⁶⁷
Proprietary OS	An operating system which is owned and developed in-house by the mobile handset vendors.
Service	Services are a portfolio of choices offered by service providers to a user. The services are entities and can be charged for separately, for example iTunes.
Smartphone	An enterprise consumer focused device with an open OS offering business capabilities such as e-mail, personal information manager (PIM) synchronization, security features, and at least 64MB of storage. One-handed use should be possible. However, enhanced or QWERTY keyboards may be included to support data input and messaging. Other

³⁶² Information Technology Association of America, www.ita.a.org/, 2007-02-22

³⁶³ Grant, R. (2005) *Contemporary strategy analysis*. Blackwell publishing. Fifth edition. Cornwall

³⁶⁴ Johnson, G et al. (2005) *Exploring corporate strategy*.

³⁶⁵ Randell, B. *Operating systems: The problem of performance and reliability*

³⁶⁶ Malykhina, E. (2007) *Phone Smarts*. Information Week. p 32

³⁶⁷ Gartner (2006) *Mobile Communications Worldwide*

	optional features include a mini USB connector and extensive third-party application support. Examples include the Sony Ericsson P910 and P990, and the Nokia E60 and E70. ³⁶⁸
Technology push	Technology development is driven by ideas or capabilities created by the development organization in the absence of any specific need that customers may have ³⁶⁹ .
Telecom industry	An industry consisting of organizations which provide telecommunications and services related to the same activity. The telecommunications sub sector is primarily engaged in operating, maintaining, and/or providing access to facilities for the transmission of voice, data, text, sound, and video. ³⁷⁰
Telecommunication	The extension of communication over distance, based on cellular technology. Telecom covers many technologies such as radio, television, telephony, data communication and computer networking.
Value chain	The set of inter-organizational links and relationships that are necessary to create a product or service.
Vertical integration	One company conduct most value adding activities itself. Backward or forward integration into adjacent activities in the value chain. ³⁷¹
Vertical specialization	See horizontal integration.
Voice centric device	The voice centric device relies on cellular communication technology, where voice transmission is the primary function, data the secondary. Examples include feature- and smartphones.
WiFi	Wireless fidelity. WiFi enables devices such as laptops and mobile handsets to connect wirelessly to the internet, at a limited geographical area, called <i>hotspot</i> . ³⁷²
WiMax	Worldwide interoperability for Microwave access. The mobile WiMax standard is a wireless technology which provides high throughput broadband connections over long distances. ³⁷³

³⁶⁸ Gartner (2006) Mobile Communications Worldwide

³⁶⁹ www.usabilityfirst.com/glossary/term_569.txt, 2007-04-18

³⁷⁰ Bitpipe, www.bitpipe.com/tlist/Telecommunications-Industry.html, 2007-02-22

³⁷¹ Johnson, G et al. (2005) *Exploring corporate strategy*. Prentice Hall. Seventh edition. Mateu Cromo

³⁷² Al-Alawi, I. A. (2006) *WiFi Technology*. Journal of Computer Science 2. pp 13-18

³⁷³ WiMax Forum (2006) *Mobile WiMax*. p 2-5

Appendix II: Success and failure factors

List of mobile handset vendors' success and failure factors in the mobile handset industry:

Nokia

Success factors

- *Consumer-orientation*
- *Design*
- *Brand*
- *Fast follower*
- *Adaptability*
- *Efficient supply chain*
- *Low-cost offerings in emerging markets, feature-rich products in mature markets*
- *Low-cost products*
- *Production and supply chain management*
- *Outsource manufacturing for volume production at the end of a PLC*

Samsung

Success factors

- *Knowledge about making consumer-oriented products*
- *Lead in the standard*
- *Few layers of bureaucracy*
- *Rapid in the process of product concept to rollout*
- *Large number of mobile handset models*
- *R&D costs and development time low*
- *Test market*
- *Manufacturing in-house*
- *Ability to quickly change one's production*
- *Flexibility and control*
- *Technology knowledge*
- *Innovator and first-mover*
- *Form factor, design*
- *Brand*

Siemens

Success factors

- *Well-known global brand*
- *Knowledge in technology*
- *Distribution channels*

Failure factors

- *Hierarchic*
- *Delays in product development were common*
- *Lacked presence outside the GSM market*

- *Primitiveness*
- *Poor software*
- *Bad reputation*
- *Unable to manage competition and shifts in the industry*
- *Low-end segment with manufacturing in Europe*
- *No balance between margins and volumes*
- *Brand equity decreased*
- *Time-to-market unnecessary long*
- *Problem in adjusting and adapting*

List of success factors in the mobile handset industry^{374,375,376}:

- *Design; product and user interface*
- *Flexibility/adaptability/TTM/Fast-follower*
- *Brand*
- *Technology/IOT/standards*
- *Broad product portfolio*
- *Alliances*
- *Low cost manufacturing*
- *Organization structure to manage a broad product portfolio*
- *Knowledge in consumer products/ consumer-orientation*
- *Distribution channels; operators and retailers*
- *Cost control*
- *After sales management/ Customer service*
- *Requirement list*
- *Economies of scale/size*
- *Balancing volumes/margins*
- *Local differences*
- *Price strategy*
- *Choice of segment*
- *Handling volumes*
- *Segment profiling*
- *User-friendliness*

³⁷⁴ Gustafson, M. Product Manager Marketing Material. EMP. 2007-04-24

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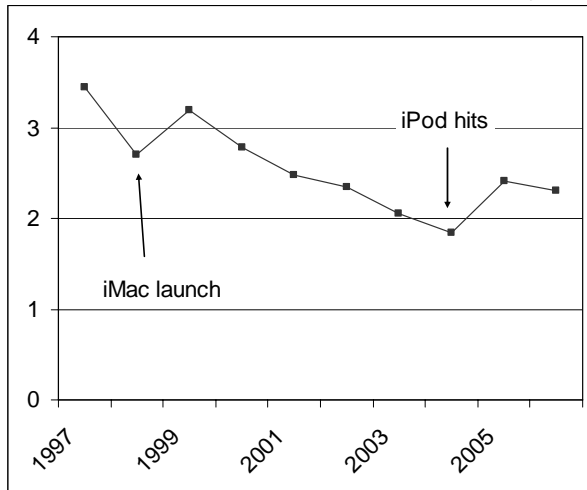
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³⁷⁵ Accenture. Delattre A., Hess T., Chieh K. (2003) Strategic outsourcing: Electronics Manufacturing Transformation in Changing Business Climates.

³⁷⁶ ABI Research (2007) *Nokia: a strategic review*.

Appendix III: Figures and tables

Apple's market share in the PC-industry³⁷⁷



³⁷⁷ Pegasus, www.pegasus3d.com/total_share.html, 2007-04-23

Brand value mobile handset vendors³⁷⁸

Interbrand's list of the 100 most valued brands. To qualify to the list the brand must derive approximately a third of its earnings outside its home country, be recognizable outside of its customer base and have publicly available marketing and financial data. Neither parent companies nor airline companies are ranked. Interbrand's list is chosen because it evaluates brands similar to the way analysts value other assets, namely based on how much they are likely to earn in the future. Projected profits are then recalculated to present value, taking into account the possibility of whether projected earnings will actually be correct.³⁷⁹

First, a percentage of a company's revenues credited to its brand are figured out. Then operating costs, taxes and a charge for the capital employed is subtracted to figure out the intangible earnings. Following, intangibles such as patents and management strength are reduced to evaluate which of these earnings can be related directly to the brand. Finally, a risk profile of forecasted earnings is conducted to determine the brand's strength including its market leadership, stability, and global reach—or the ability to cross both geographic and cultural borders.³⁸⁰

Rank	Name	Brand Value (Million \$)	Change from 2005 (%)	Description
6	Nokia	30 100	+ 14	Fashionable design and low-cost models for emerging markets, enabled Nokia to regain ground from competitors
20	Samsung*	16 170	+ 8	The handset division is missing action with low-end handsets, hurting market share
26	Sony	11 700	+ 9	Sony Ericsson is not listed on the top 100, but the joint venture could benefit from from both brands?
69	Motorola	4 570	+ 18	Products like the RAZR and SLVR have been a hit, and marketing campaign behind adds luster to the brand
94	LG*	3 010	+ 14	Stylish handsets and digital TVs emulate its rival Samsung

³⁷⁸ Business Week, <http://bwnt.businessweek.com/brand/2006/>, 2007-04-19

³⁷⁹ Business Week, <http://bwnt.businessweek.com/brand/2006/>, 2007-04-19

³⁸⁰ Business Week, <http://bwnt.businessweek.com/brand/2006/>, 2007-04-19

Appendix IV: IT-players' key success factors

IT-players' KSF are individually mapped in a matrix where the left column contains the KSF, the middle the rating of the KSF and the third column gives the cause of the rating. The scale of rating is presented in the table below.

-	The company lacks the KSF.
0	The company possesses some of the KSF.
+	The company possesses the KSF.
?	Fulfillment of KSF is questionable.

In this matrix the different IT-players and their rating on identified KSF are put together to present a common view of the possibilities they have to impact the mobile handset industry.

Case KSF	Apple	Dell	Google	Microsoft
Design Hardware	+	0	?	-
Design Software	+	-	+	-
Flexibility/Adaptability and time to market	0	+	+	0
Brand	+	0	+	+
Technology Standard	0	-	0	+
Technology Cellular	-	-	-	-
Broad product portfolio	-	-	-	-
Volumes	0	0	?	+
Organizational structure	0	+	0	+
Consumer-orientation	+	0	+	0
Sales channels	0	?	0	0

