The Influence of Firm's Human Resource and Market Demand on a Firm's Innovation Strategy

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Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy

Master Thesis

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Background: In technology based industries, firms which originate from advanced economies have traditionally occupied the leading position. In order to keep that position, they relied on strong efforts devoted to research and development, striving for being at the cutting edge of technology. During the last decade, we observed that some change happened amongst the top ranking of firms within the telecommunication industry with the apparition of Huawei, which originates from China, an emerging economy, in second position.

Aim: This research is aimed to investigate the influence of firm’s human resource and market demand on firm’s innovation strategy.

Definitions: Human resource represents the employees working for a company. In our study, when we mention human resource we deal with employees working in research and development. Market demand refers to the products which are demanded on a specific market. For our research we divided it in three categories: less advanced, advanced and most advanced products. Innovation strategy deals with the way a firm organizes its research and development in order to innovate according to either, in our research, new-to-firm or new-to-world innovation strategy.

Completion and results: This study revealed that Huawei managed to adjust its innovation strategy in accordance with its human resources and market demand. Thanks to an efficient and adapted innovation strategy, Huawei now manages to perform better than its main competitor Ericsson, not only on developing or emerging markets, but also in advanced markets. We also observed the role of rules and regulations and cooperation, without which Huawei would not have been able to lead an efficient new-to-firm strategy. We created a model which is designed to give a better understanding of the situation and illustrate the interrelation between human resource, market demand, innovation strategy and performance.

Search terms: human resource, market demand, innovation strategy, telecommunication industry, huawei, ericsson.
# Table of Content

1. Introduction .................................................................................................................. 1  
   1.1 Background .............................................................................................................. 1  
   1.2 Research Problem ................................................................................................. 2  
   1.3 Research Aim and Questions ................................................................................. 3  
   1.4. Structure of the Thesis ......................................................................................... 4  

2. Methodology .................................................................................................................. 5  
   2.1. Methodology .......................................................................................................... 5  
   2.2. Method ................................................................................................................... 7  
      2.2.1. Research Strategy and Design ......................................................................... 7  
      2.2.2. Company Selection ....................................................................................... 7  
      2.2.3. Data Collection and Analysis ......................................................................... 8  
      2.2.4 Limitations ....................................................................................................... 9  

3. Theoretical Framework ................................................................................................ 9  
   3.1. Definition of Innovation ....................................................................................... 10  
   3.2. Strategy Formulation ............................................................................................ 11  
      3.2.1. Value Creation Strategy .............................................................................. 14  
      3.2.2. Internal and External Factors ....................................................................... 17  
   3.3. Innovation Strategy ............................................................................................... 20  
   3.4. Concluding Remarks to the Chapter ................................................................. 23  

4. Empirical Analysis ...................................................................................................... 23  
   4.1. Company Presentation ......................................................................................... 24  
      Huawei .................................................................................................................. 24  
      Ericsson: ............................................................................................................... 24  
   4.2. Human Resources Analysis of Huawei and Ericsson .......................................... 25  
   4.3. R&D and Innovation of Huawei and Ericsson ................................................... 27  
   4.4. Market Analysis of Huawei and Ericsson ......................................................... 33  

5. Our Model .................................................................................................................... 37  
   5.1. Explanation of Model: ......................................................................................... 38
Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy

5.1.1. Firm’s Human Resources ........................................................................................................... 39
5.1.2. Market Demand .................................................................................................................... 40
5.1.3. Innovation Strategy .............................................................................................................. 41

6. Result .............................................................................................................................................. 41

6.1. Answer of the Research Questions .......................................................................................... 41
1. How do Huawei’s and Ericsson’s human resources affect innovation strategy? .... 41
2. How does market demand affect Huawei’s and Ericsson’s innovation strategy? ........ 42
3. Which factors of human resources and market demand are important for Huawei’s and Ericsson’s innovation strategy? ......................................................................................... 44

6.2. Discussion .................................................................................................................................. 45

6.3. Suggestions for Future Research ............................................................................................... 46

7. References ..................................................................................................................................... 47


7.1. Annual Report .......................................................................................................................... 51

7.2. Website ....................................................................................................................................... 51

Appendix 1: Five-stage strategy formulation framework ................................................................. 52
Appendix 2: Asset configuration strategy model ............................................................................. 53
Appendix 3: Value Discipline Model ................................................................................................. 53
Appendix 4: Percentage of employees by profession (2011) .......................................................... 54
Appendix 5: Number of Employees and Average Wages and Salaries by Region (Ericsson)........... 55
Appendix 6: Ericsson sales by region in 2010 .................................................................................. 56
Appendix 7: Huawei’s international and local Sales (2002-2010) .................................................. 56
Appendix 8: Percentage of population covered by GSM, WCDMA and LTE ................................. 57
Appendix 9: Countries that offer 2G/3G services commercially, mid-2011 ................................. 58

Figure

Figure 1: Our Model ............................................................................................................................. 37
Table

Table 1: The Structure of the Thesis ........................................................................................................... 4

List of Abbreviations

NGN: Next Generation Network
GSM: Global System for Mobile communication
LTE: Long Term Evolution
WCDMA: Wideband Code Division Multiple Access
EU: European Union
SAE: Switch Access Evolution
UMTS: Universal Mobile Telecommunication System
TDMA: Time Domain Multiple Access
DSL: Digital Subscriber Line
3G: Third Generation
2G: Second Generation
4G: Fourth Generation
Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy
1. Introduction

1.1 Background

During a long time, firms from advanced economies like Ericsson were secured in their leading position in the industry of telecommunication relying on intense research and development. In the last decade, one can observe that this state of fact is no longer identical. Competition went stronger and stronger, technology improved and globalization made possible the appearance of new competitors from emerging economies. Firms of emerging economies persistently scale the value chain in a quest to compete on the world stage in part by imitating the products of others. They develop new products and services that are dramatically cheaper than their Western equivalents (Luo et al., 2011). By reinventing production and distribution systems and experimenting with the way they use available resources and networks, firms of emerging economies are creating entirely new business models. Thus, emerging economies firms offer a unique mix of copying and innovating that offers a major challenge to existing business (Luo et al., 2011).

Most emerging markets are highly local (Sheth, 2011), which is an advantage for the firms that belong to emerging economies. These emerging firms have better knowledge about customers. Therefore Huawei rapidly gained advantage on its domestic market (China). According to International Monetary Fund (IMF) 2008 data, it is estimated that by 2035, the gross domestic product of emerging markets will permanently surpass that of all advanced markets. High growth rate of emerging markets attracted firms of advanced economies into emerging markets. As time goes by in the markets where firms of advanced economies operate, the markets get more and more mature. When the market is mature, the efforts made by firms of advanced economy switch from innovation to cost. In order to reduce costs, firms of advanced economies relocate or outsource in emerging economies. By doing so, a transfer of resources and know-how happens between firms of advanced economy and firms of emerging economies (Luo et al., 2011). It gives to firms of emerging
Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy

economies the know-how to improve its own process and it brings new-to-firm innovation as well as new resources which the firms of emerging economy can allocate to innovate and enter in competition with firms of advanced economies.

Most firms from emerging economies are engaged in activities far from that technological edge and involved in original innovation or imitation of new product, process or business model that already exist in advanced markets (Ayyagari, 2011). On the long term, most of these move toward innovation from imitation (Luo et al, 2011) and enter in advanced markets. Firms of emerging economies orientate their efforts in order to keep low costs/ to reduce their costs and provide cheap products in emerging economies. In advanced economies, firms provide advanced and most advanced products whereas firms of emerging economy focus more on a low-cost strategy. Firms of advanced economy are in advance in R&D whereas firms from emerging economies have the advantage in terms of manpower. But, with the mechanism described above, firms from advanced economies give, on the long-term, tools to firms from emerging economies to compete with them on high tech and high quality products. Firms from emerging economies will improve their production processes as well as their products with the know-how they can capture from firms of advanced economy. Firms from emerging economies get more resources which they can use in order to produce high-tech and high-quality products and therefore eventually compete with firms of advanced economy.

1.2 Research Problem

It is established from results of different researches that market has influence on firms’ innovation strategy. However, results of different researches are contradictory. Some researchers indicate that customers' preferences are the most important factors for a firm to decide its innovation strategy while other researchers stated that a firm’s innovation strategy depends on its resources and capabilities. As Bowman and Ambrosini, (2000), Allen (1995), Day, George S. (2011) and Davenport et al (2011) put emphasize on the analysis of market demand to understand customers’ preferences of a specific market to
decide firms’ strategies. On the other hand, resource based theory (RBT) explains that firms should consider their resources and capabilities to place any strategy. Researchers like Lepak et al., (2007), Barney (1991) and Grant (2010) mentioned that firms’ resources and capabilities have most influences on deciding a firm’s strategy. Moreover, Prahalad & Hamel (1990) confer importance on building core competence from valuable resources to win over competitors. Barney (1991) claims that value of the resources in a market is determined by that market.

Due to the existence of such contradictory opinions, this research area seems interesting to investigate.

1.3 Research Aim and Questions

To identify how a firm’s internal factors or external factors or both factors are responsible to determine a firm’s innovation strategy, we decided to analyze firm human resource (internal factor) and market demand (external factor). Human resource is the only operate resource in the firms and due to these we believe human resources have great influence on firm’s other internal factors.

The study deals with two issues: the influence of market demand and the influence of human resources on a firm’s innovation strategy. In our study, we want to investigate the effect of market demand on a firms’ innovation strategy and also effect of firm’s human resources on a firm’s innovation strategy. And secondly, we want to create a model that will illustrate the interrelation between firm’s human resource and market demand and their influence on firm’s innovation strategy.

In order to fulfill the purpose of this research the following research questions will guide the investigation:

1. How do Huawei’s and Ericsson’s human resources affect innovation strategy?
2. How does market demand affect Huawei’s and Ericsson’s innovation strategy?

3. Which factors of human resources and market demand are important for Huawei’s and Ericsson’s innovation strategy?

### 1.4. Structure of the Thesis

The structure of the thesis summarized in table 1.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>The chapter presents background, research problem, aim and research questions.</td>
</tr>
<tr>
<td>Methodology and Method</td>
<td>The chapter explains methodology and methods (data collection &amp; analysis, research design and research strategy) that used in this particular research.</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>An overview of existing theories on firm’s strategy formulation and innovation strategy.</td>
</tr>
<tr>
<td>Empirical Analysis</td>
<td>The chapter deals with data of Ericsson and Huawei. In addition it also presents the analysis of empirical data and theoretical framework.</td>
</tr>
<tr>
<td>Our Model</td>
<td>The chapter presents our model that we developed from existing theories and analytical output of Ericsson and Huawei.</td>
</tr>
<tr>
<td>Result</td>
<td>The chapter contain answer of the research questions, discussion and suggestions for further research.</td>
</tr>
</tbody>
</table>
2. Methodology

This chapter explains methodology and method of the present study. Provide explanations of applied research strategy, design and methods in the study.

2.1. Methodology

Research methodology provides an outline to the researcher in order to solve the problem scientifically. Research is an investigation and inquiry for facts, a study for a problem or an issue; it is the process of seeking answers to the questions. Research tries to clarify and find the explanation to unclear phenomenon.

In order to conduct a study qualitative and quantitative research approaches can be used (Hair et al., 2007). This distinction is made based mainly on the kind of information used to study a phenomenon: quantitative studies rely on quantitative information (numbers, figures, etc.) Whereas qualitative ones are based on qualitative information (words, sentences, narrative, etc.) (Blumberg et al., 2008; Bryman and Bell, 2007). However, some researchers choose to combine quantitative and qualitative research techniques and procedures (Bryman and Bell, 2007). The differences between qualitative and quantitative research are not limited to use different categories of data. They also employ different relationship between theory and empirical data. Qualitative research is based on inductive reasoning while quantitative research is based on deductive reasoning. Deductive approach represents the most common view on the relationships between theory and research (Bryman and Bell, 2007). In inductive approach, on the contrary, generalized theory is the outcome of research observations (Bryman and Bell, 2007). In other words, researchers make practical observations and based on that develops the existing theory or creates a new theory.
Bryman and Bell (2011) pointed out three main choices while doing a research: selecting research strategy, research design and research method. The authors formulated research strategies as quantitative and qualitative. They provided five types of research designs: experimental, cross-sectional or social survey, longitudinal, case study and comparative. Classical experimental design entails establishing two groups, one is treated (experimental group) and the other one not (control group), measured variables of two groups are compared against each other. Cross-sectional or social survey design involves collecting data on more than one case using quantitative data. The longitudinal design surveys samples several times. It is time consuming and rarely used in business. It is aimed to track changes over time in business and management research. Case study design implies a detailed and intensive analysis of a single case. The case study can be of a single organization or a single location. Flick (2006) explained cases as the broad term containing persons, social communities, organizations and institutions and suggests that it is up to the researcher to define the relevant subject for the case analysis. Comparative design entails the study of several contrasting cases using similar methods. It can be realized in both a quantitative and qualitative way. Zainal (2007) argued that using case studies as research methods aid in understanding and exploring complex issues. The author goes ahead to state that by including both qualitative and quantitative data, case studies enable researchers to explain the processes and outcomes of a phenomenon through observation, reconstruction and analysis.

Moreover according to Bryman and Bell (2011), a research method is a technique for collecting data. There is a wide range of possible methods of data collection for the research purposes mentioned in literature (Hair et al., 2007; Blumberg et al., 2008). Surveys, case studies, observations, experiments and secondary data are among the main of them.
2.2. Method

2.2.1. Research Strategy and Design

According to our research questions we suppose that the most appropriate approach is mixed methods research. For the purpose of our study we collected data from different sources. Qualitative data provided us deeper understanding of the issues under research whereas quantitative data enabled us to get standard data for analysis.

For the purpose of the present study, longitudinal was selected as a research design. This design is appropriate to investigate how firms’ human resources and market demand influence firms’ innovation strategy over long period. To understand influence of human resources on firm’s innovation strategy it required to observe firm human resource in long run. Long period observation of firm’s human resources needed to understand how a particular firm manages its human resource to create new knowledge and reduce cost. On the other hand, observation of market for a long period needed to understand market development, demand and to identify firm response to demand. For this we used archival information and previously conducted case studies that implement in different angle.

To fulfill purpose of the study we used two different companies (Huawei and Ericsson) from the telecommunication industry. Currently, both companies are in leading position in the industry. However, these two firms developed differently. Analysis of difference between these two firms required to fulfill our purpose of the study.

2.2.2. Company Selection

For the purpose of our research, we chose to focus on Huawei and Ericsson. We orientated our choice in that direction because Huawei and Ericsson are two firms which originate from two different types of markets. On the one’s hand, Ericsson originates from the EU,
more precisely Sweden, which is an advanced market and, on the other hand, Huawei originates from China which is an emerging market.

Ericsson is mainly focused on fulfilling the needs of advanced markets; therefore it adapted its innovation strategy for that purpose. Huawei primarily focused only on developing and emerging markets. It also adapted its innovation strategy according to that. The fact that both firms had different innovation strategies enabled us to provide a more comprehensive answer to our research problem.

The study of these two companies appeared, for us, to be the best way in order to answer to our problem in the most comprehensive way possible.

### 2.2.3. Data Collection and Analysis

In order to have material to analyze for our empirical part, we had to collect data. The data we collected are secondary data; they proceed from annual reports from both firms, from the official websites of both firms as well as articles dealing with the two companies. We chose that type of data collection because we considered that it was the appropriate source of information we needed in order to conduct our research. As we mentioned that our research design is longitudinal, we need data for a long period to do our analysis. Therefore, interview is not a right choice. It is almost impossible to get data for a long period by interview. Secondary data like archival information is the right choice for our study. We collected data on a period between 1997 and 2011. We used systematic combining approach (Dubois & Gadde, 2002) “systematic combining is a process where theoretical framework, empirical fieldwork and case analysis evolve simultaneously, and it is particularly useful for development of new theories”.

Preliminarily we looked on more general data about both companies to identify influence of innovation strategies on development of both companies. After that we narrowed our focus only areas which are indicated by our theoretical framework to collected data. We analyzed our data based on qualitative and quantitative approaches. Quantitative approaches we used to compare
performance of two companies. On the other hand, qualitative approach facilitates our study to identify influences of human resources and market demand on firm's innovation strategy.

2.2.4 Limitations

In our research, to define innovation we used a number of definitions that given by different researchers. In emerging market, difference between definition of imitation and innovation is very thin. In our research we don’t consider imitation, especially when we collected data. We choose to focus on these two particular factors influencing innovation strategy which are human resources and market demand. As other factors also influence innovation strategy we focus on these two particular factors. As other factors can have influence on innovation strategy, we propose later as a further research to expand the field of investigation on that topic and especially to investigate the influence of rules and regulations on innovation strategy. Our choice to focus on these two factors is a limitation. We also chose to lead our research on the telecommunication industry and the empirical data come from two companies, Ericsson and Huawei. This limitation is the reason why we propose as a possibility of further research to investigate the applicability of our research to other firms still within the telecommunication industry and also to other technology-based industries.

3. Theoretical Framework

In the following part, we will deal with different theories which discuss innovation and innovation strategy. The study of these theories is designed to provide a theoretical understanding of the issue we address in our research.
3.1. Definition of Innovation

Innovation is one important necessity for the firms to attain competitive advantage. In the literature on innovation, it is defined in many different ways. Most of the widely used definitions of innovation focus on novelty and newness. Joseph Schumpeter in the 1930s defined five types of innovation. These were, (i) introduction of a new product or a qualitative change in an existing product, (ii) process innovation new to an industry, (iii) opening of a new market, (iv) development of new sources of supply for raw material and (v) other inputs and changes in the industrial organization (Goswami & Mathew, 2005). Zaltman et al. (1973) defined innovation as “any idea, practice, or material artifact perceived to be new by the relevant unit of adoption”. Innovation also can also be divided between product innovation and process innovation. Process-based innovation requires different strategies from those of more frequently-studied product-based innovation (Maine et al, 2012). According to Grant (2010), product innovations include innovations in goods and services for differentiation while process innovations can be technological and organizational for greater standardization.

Innovation can be defined based on sources of innovation: technology-push and demand-pull. In technological push innovation, firms focused more on the using of latest technology while demand-pull innovation relies on market pull (Rothwell 1994). Innovation can also be classified based on knowledge generated from the process or newness of the innovation. According to Mark Rogers (1998), innovation can involve both the creation of entirely new knowledge, as well as the diffusion of existing knowledge. Certain degree of imitation of existing knowledge in developing countries has defined as “new-to-firm” innovation by researchers while creation of entirely new knowledge has defined as “new-to-world” (Ayyagari et al, 2011). New-to-firm innovation describes the adoption for a firm of technology which is new for the firm and enables it to improve its productivity, quality etc. It has been defined by the Organization for Economic Co-Operation and Development (OECD) as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, work-place organization, or external
relations”. That strategy describes improvements which are new for the firm which adopts it, and it is an innovation strategy which fits to firms from emerging economies as it is mentioned by Ayyagari et al (2011). There are several types of imitation which have been categorized by Schnaars (1994) fall in “zone of acceptance”: counterfeits (pirate products), knock-offs (clones), design copies, creative adaptation, technological leapfrogging, and adaptation to another industry. It is often difficult to evaluate the legality of imitation (Luo et al., 2011), there is a major role played there by rules and regulations and they vary, or their application varies, from place to place. Imitation is to be taken within a “zone of acceptance” (Deephouse and Suchman, 2008). Our study does not take into account pirate firms, business pirates (Luo et al., 2011) which are counterfeiting and violate rules and regulations. We take into consideration imitation which does not imply illegal counterfeits or clones and does not involve patent infringement or pirating intellectual property (Kim, 1997).

In order to apply any of these definitions of innovation, a firm needs to look first on firm’s strategy. If the innovation fit with firm’s strategy only then the firm can implement this innovation (Gobble et al, 2012). In next part we discuss strategy formulation process of the firm and related issues.

### 3.2. Strategy Formulation

Strategy has been defined as “the match an organization makes between its internal resources and skills…and the opportunities and risks created by its external environment” (Grant 1991). For a strategy to be successful, it must be consistent with the firm’s external environment (customers, competitors and suppliers) and with its internal environment (goals and values, resources and capabilities, and structure and systems) (Grant 2010).
Fundamental to this view of strategy is the notion of strategic fit. However, it is merely impossible for a firm to achieve strategic fit for long time. Chorn (1991) stated that “a strategy is only appropriate in a particular set of competitive conditions.” Continuous changing nature of external environment makes it difficult for the firm. Therefore, the resources and capabilities of a firm are the central consideration in strategy formulation (Grant 1991). A firm could control its internal environment more conveniently than its external environment. A firm’s resources and capabilities are the source of direction and profit for the firm (Grant 1991).

Porter’s (1980) framework explains that firm’s performance determined by industry attractiveness and to some extent by the firm effect (Grant, 1991). On the contrary, Barney (1991) mentioned that firm resources and capabilities mainly responsible for a firm’s competitive advantage. Porter’s (1980) five forces framework explains how a firm performed better by entreating and operating in an attractive industry. Barney (1986) argued with this view and mentioned that it is not possible for a firm to get economic rent even in an attractive market when all firms possess same resources that are used to produce a product. If all the firms possess the same resources then a firm cannot earn any economic rent form the resources. Brahma and Charaborty (2011) state that “in RBV, greater economic value (competitive advantage) is created from the efficiency of the resources which enable the firm to produce greater perceived benefits for the same cost (efficiency in differentiation) or same perceived benefits for a lower cost (lower cost).” To create economic rent, resources should have valuable, inimitable, non-substitutable and rare attributes. Valuable and rarity of resources ensure greater value (competitive advantage) of the resources while inimitability and non-substitutability of the resources secure competitive advantage in long run (Barney 1991). Barney (1991) also mentioned that to protect firm’s resources from imitation a firm need to create casual ambiguity. Brahma and Charaborty (2011) state “causal ambiguity arises when the linkage between the firm resources and competitive advantage is not understood or imperfectly understood”.

Grant’s (1991) framework of “five-stage procedure for strategy formulation explained based on resource based view of the firm” explains how a firm should make its strategy
considering its internal resources and external environment (See Appendix-1). The five stages are: analyzing the firm’s resource base; appraising the firm’s capabilities; analyzing the profit-earning potential of firm’s resources and capabilities; selecting a strategy; and extending and upgrading the firm’s pool of resources and capabilities. This framework analyzes firm’s resources and capabilities to discover firm’s core resources and capabilities. Then a firm can easily decide a strategy which can best exploit firm’s core resources and capabilities considering external environment.

However, Five-stage strategy formulation framework (Grant 1991) does not explain which resources are the most important for the firms’ strategy. To understand the importance of resources & capabilities, it is important to know how strategy with different combination of resources & capabilities affect the firm performance. Knowledge of technology and market need is the resources those mainly responsible for firm’s value creation and capture process (Allen 1995). So, it is essential to analyze impacts of these two kinds of resources on the firm performance putting them into different combination.

Fang et al (2011) put most importance on customer assets and innovation assets to observe how the alignment of internal environment with the external environment affects firm’s performance (See Appendix 2). In their “asset configuration strategy” model they used “broad” and “depth” dimensions in order to analyze these two assets. Asset depth refers to the focus and intensity of an asset and is critical for creating value while asset breadth captures the diversity and scope of the assets (Fang et al 2011). They identify four configuration strategies which have differential effects on a firm’s performance and performance variability: deep customer-broad innovation asset-leveraging strategy; deep innovation-broad customer asset-leveraging strategy; asset concentration strategy (deep-deep); and asset diversification strategy (broad-broad). Here we want to look only first two strategies those have effect on the firm’s performance.

Deep customer assets indicate that the firm has a great understanding of customer demand and preferences, which makes the firm able to develop and deliver value in unique ways to customers. Such knowledge about customers assists firms to adapt quickly with changing conditions and to launch successful products. At the same time when firms also possess
broad innovation assets, thus increasing sales and profit margins by matching customers’ needs with new and improved technology solutions (Fang et al 2011). These combinations of assets foster demand pull innovation. More focus on market required adequate human resources on marketing and firms also need human resources for R&D. However, deep innovation assets reflect an intense knowledge and understanding of specific technologies and provide firms with rare and hard-to-duplicate insights into a specific technological area (Fang et al 2011). A Firm best leverage the benefits of deep innovation assets when it combines them with broad and diverse customer portfolio. In this way, a firm can exploit its deep knowledge of innovation assets into its broad customer portfolio. Here firms focus more on R&D but still firms’ innovations have done putting customers in center of attention. Fang et al (2011) mentioned in conclusion that knowledge about customers is more important than knowledge of innovation. It means that a firm needs to carefully observe its market. This indicates that demand pull innovation is more essential than technological push innovation for firm performance.

3.2.1. Value Creation Strategy

Which entry strategy firm will take it partly depends on its specific internal factors. A firm value creation strategy decides in which market firm should enter and how should enter. A firm can create value in many different ways. A firm value creation depends on the relative amount of value that is subjectively realized by a target user who is the focus of the value creation (Lepak et al, 2007). According to Pitelis C.N. (2009) “value creation is the willingness to pay minus opportunity costs”. According to Bowman and Ambrosini (2000) value can be classified as ‘Use value’ and ‘Exchange value’. Use value refers to the specific qualities of the product perceive by customers in relation to their needs while exchange value refers to the price. Bowman and Ambrosini (2000) stated that “customers’ perceptions of the value of a good are based on their beliefs about the good, their needs, unique experiences, wants, wishes and expectations.” The difference between use value and exchange value is defined as consumer surpluses. The consumers will purchase the product which provides more consumer surplus than other products in same price (Bowman and
Ambrosini, 2000). Exchange value is much easier to understand compared to use value, it is the amount of money paid by the buyer to the producer for the perceived use value (Bowman and Ambrosini, 2000). Consumer’s high perceptions about the product increase the use value.

Brickau et al (1994) noted that it is important for the firm to develop its resources looking on future market opportunities. A firm needs to develop its strategy in a way that enables the firm to sustain competitive advantage of internal competencies on the long run. Development of internal competencies depends on the firm’s choice of value creation.

Porter’s (1985) generic strategy model explained three different ways to create. Firm can achieve higher rate of profit (capture higher value) over a competitor in one of two ways: either it can sell same product at low cost or can sell a product or service that is different from competitors offer in such a way that consumer willing to pay a price premium that exist additional cost of the differentiation (Grant 2010). A firm can choose either cost leadership strategy or differentiation strategy to achieve competitive advantage. A firm has another option, it can choose focus strategy. Here it focuses in the specific market segments. Which strategy firms should take it depends on firm’s resources and capabilities, nature of competition and market.

In contrast, Treacy & Wiersema (2000) describe three value disciplines by which firm can deliver superior customer value line: operational excellence, customer intimacy and product leadership (See Appendix 3). A firm becomes industry leader by being champions in one of these disciplines while meeting industry standard in other two.

**Operation Excellence:** A strategy where a firm intends to lead its industry in price and convenience. For this, firms are seeking ways to minimize overhead costs, to reduce transactional and other cost and to optimize business process across functional and organizational boundary.
Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy

**Customer Intimacy:** In this strategy a firm continuously tailors and shapes product or service to fit an increasingly fine definition of the consumer. The firm is willing to build customer loyalty for the long term. Therefore, a firm offers specialized product or provide a broad range of products.

**Product Leadership:** A firm strives to produce continuous stream of state-of-art products and services. For this, a firm needs to meet three requirements. First, this firm is creative. Second, this firm is able to market its innovation quickly. And finally, product leader must relentlessly pursue new solution to its own latest product or service has just solved.

Porter’s (1985) cost leadership strategy and Treacy&Wiersema’s (2000) operation excellence strategy concern about cost. Price is the most important factor in both strategies. In contrast, Porter (1985) defined differentiation strategy where firms add value in their products or services by innovation or by customization. While Treacy&Wiersema’s (2000) customer intimacy strategy deals with customization and product leadership strategy deals with continuous innovation. It is difficult for a firm to excel in two different strategies at a time (Grant 2010). Every strategy demands unique operational model to operate and therefore firms experience difficulty to master two different strategies at a time (Treacy&Wiersema, 2000). In that situation, how a firm chose a value strategy for itself? Treacy&Wiersema (2000) state that “When a firm chooses to focus on a value discipline, it is at the same time selecting the category of customer that it will serve.” Therefore, customer is one important factor that influences firms’ decision. Another important factor is firm resources and capabilities. A firm needs to identify which value creation strategy can best exploit its resources and capabilities.
3.2.2. Internal and External Factors

Analysis of firm’s internal factors and external factors is required to determine firm’s strategy to filling the gaps.

Internal Factor

To decide which value creation strategy a firm wants to apply, the firm needs to identify its resources and capabilities. Barney (1991) mentioned in his article that “firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge that control by a firm”. Different firms enjoyed different advantage from its resources. Firm with low cost human resource can enter in a market where they can exploit its low cost advantage. On the other hand, firm with strong knowledge based resource need to enter in a market where it can exploit its advantage. However, human resource is the only operant resource which works with other operand resources towards the creation of value for the company (Grant 2010). In our study we focus only in human resources to see how it could affect firm innovation strategy as internal factor.

Human Resources

Only people are capable to perform heterogeneously across competing firms (Bowman and Ambrosini, 2000). In RBV, casual ambiguity is one important element for the firm to protect its resources from imitation. Human resources of the firms are mainly responsible to create casual ambiguity in a firm. Non-understandable skill, knowledge and behavior of
employees make difficult to understand link between firm resources and capabilities (Colbert, 2004). Human resource makes it difficult for a rival firm to understand firm source of competitive advantage. In addition, human resources in a firm create knowledge that crucial for the firm existence. However, according to knowledge based view knowledge is the principal strategic resource and it is largely tacit (Nag & Gioia, 2012). Therefore, it is difficult for the competitors to imitate (Barney 1991).

Bowman and Ambrosini, (2000) suggest three main categories of labor based on performance: generic, differential and unproductive. Generic and differential labors create value while unproductive labor destroys value (Bowman and Ambrosini, 2000). Differential labor is the source of an organizational uniqueness and enables innovation while generic labor is required when need to perform routine work that is codifiable and can be imitated (Bowman and Ambrosini, 2000). Differential labor is efficient in knowledge creation and generic labor efficient in knowledge use.

**External Factors**

Information exchange with the external environment affects organization innovation (Gumusluoglu & Ilsev, 2009). Firms acquire knowledge of potential markets and resources that they don’t possess form the external environment. In this way firms obtain more clear idea about their position in the industry. This helps them to decide their way to do business. For this a firm needs to understand nature of different economies in which market belongs and demand of products on this market.

**A. Developing Economies:**

The developing economies are not homogeneous; they refer to economies which are neither developed nor emerging. United Nations Conference on Trade and Development (UNCTAD) set the characteristics of economies referred to as “developing economies”. Developing economies are characterized by a low economic development, a strong share of
agriculture in their workforce, low income, little available capital for investments, and scarcity of human and physical resources (Brasseul, 2008). Developing economies also show a low human development index (HDI) which reflects weaknesses in education, health, standards of living in that type of countries. Because of these characteristics, technology literacy tends to be rather low, incomes are also low, which leads these markets to purchase more less advanced type of products rather than cutting edge technology products. Markets which belong in this segment demanded less advanced high-tech products. In addition, the markets are very price sensitive in this segment which fosters only incremental innovation (Kim & Lee, 2009). These natures of the developing markets make them unattractive to the most innovative firms. However, higher population growth of developing economy can be seen as an opportunity for the high-tech firms (Chamon&Kremer, 2006). In addition, inadequate transport and communication systems of the economy increase demand of telecommunication product.

B. Emerging Economies:

Emerging economies are characterized by rapid economic growth. The BIP per capita is lower than in advanced economies but growth is strong and the evolution of standard of living as well as economic structures converges toward those of advanced economies (Kateb, 2011;). These economies are characterized by fragmented markets, young population, infrastructures still improving, rapidly changing markets, growing demand (Mahajan&Banga 2005). Jagdish N. Sheth (2011) hypothesized that emerging markets experience a highly heterogeneous market demand. Due to this nature of demand and customers price sensitive behavior it is difficult for the firms to profit in this market. However, Sheth (2011) explained that in such a condition firm should approach with standardized product and need to aggressively market to perform financially better. Therefore, firm mostly need to follow demand-pull innovation for this segment. Emerging economies have a HDI which is lower than advanced economies’ but it is improving. Therefore, education, health and standard of living are also getting better on average in
Influence of Firm's Human Resource and Market Demand on Firm's Innovation Strategy

these countries. As Mahajan and Banga (2005) stated, the market in these economies is fragmented, which means that demand for less advanced, advanced and most advanced products exist in these countries in significant terms.

C. Advanced Economies:

As the UNCTAD defines them, advanced economies are characterized by a high GDP per capita, which comes along with a high purchasing power. The level of industrialization is high, as well as the widespread of infrastructure and a high standard of living. The HDI in these countries is high which means a high level of education, health and standard of living for these populations. To create value in a market under this segment a firm needs to take differentiation strategy. Therefore, a firm needs to implement technological push innovation here to create value. In advanced market demand is mostly orientated toward most advanced products. That demanded mostly ‘new to world’ innovation.

3.3. Innovation Strategy

A strategy is a plan for achieving defined goals, shaped by an organizing principle that provides a way to understand the broader patterns of change and to locate our own goals in conjunction with the broader view. Innovation is a tool of strategy—it creates the future that strategy predicts. Innovators, then, must understand the strategy and be able to see how their work fits within the larger corporate strategy. They must understand which innovations fit the strategy and which don't (Gobble et al, 2012). In this section we will focus on the strategy which a firm can decide to apply to the field of innovation.

A firm can choose supply driven innovation strategy or market driven innovation strategy or can use both simultaneously. They also can choose an innovation strategy which does not produces new knowledge or a strategy which produces new knowledge. Decision of
choice of innovation strategy depends on internal and external factors, and corporate strategy.

Technology-push innovation does not depend on market demand, it rather depends on technology. It is the supply-driven innovation strategy. Therefore, it is hard to say about profitability from this particular innovation (Nemet 2009). This kind of innovation fosters radical innovation in the industry. Using latest technology and intend to bring something new always foster radical innovation. However, Utterback (1993) state that radical change in technology is the result of high competition. Firms in the high competitive industry either need to rapidly change their product or need to reduce cost to create value. In advanced market, high competitive environment forces firms to innovate products that can change existing environment. This is similar with the notion of “Blue Ocean”. By doing radical technological advancement a firm can change rule of the game. Radical innovation can destroy existing dominant design of the industry and set a new one (Utterback 2001). For this a firm has to change its existing competence and need to add new competence that able to do radical innovation. By using ‘new to world’ innovation strategy a firm can do radical innovation. ‘New-to-world’ innovation is more likely to be the strategy followed by firms at the world frontier of technology, mainly in advanced countries (Amecoglu et al 2006). If we consider Schumpeter’s distinction made in 1947 between invention and innovation, the new-to-world strategy is about “the realization of new ideas in marketable products and processes”. That strategy aims at creating something new rather than imitating, which describes better new-to-firm strategy. It is the effort made by a firm to create a product which is the first of its kind and serves a new purpose. That innovation requires being at the frontier of world technology and therefore is most likely to be undertaken in advanced countries (Ayyagari et al 2011). On the other hand, in developing and emerging markets a firm mostly needs to find a way to reduce cost to create value due to less technological advancement of the market and customer price-sensitive behavior. Therefore, in most case firms from the emerging economy choose ‘new to firm’ innovation strategy while firms from the advanced economy bound to choose ‘new to world’ innovation strategy. Weaker rules and regulation condition of developing and emerging
Influence of Firm’s Human Resource and Market Demand on Firm’s Innovation Strategy

Economy allow ‘new to firm’ innovation to the firms that originated from that economy while advanced economy’s rules and regulation does not allow this.

On the other hand, in market-pull innovation firm need to use its existing competence to fulfill market demand. Change in the existing product is low. Firms focus only innovation that is demanded by the consumers. As technological change under this innovation is incremental, all firms under the same industry occupied almost build same resources and similar competence in long run. In such a situation a firm cannot create value by radical change. Therefore, a firm needs to focus on cost reduction. Emerging firms can use ‘new to firm’ innovation strategy to reduce cost while firms from the advanced market need to find another way to do it.

Kim and Lee (2009) noted that “the role of technology-push in technological innovation is greater than that of demand-pull in the early-stage of the technology life cycle while on the later-stage of technology life cycle, the role of technology-push rapidly decreases and the role of demand-pull becomes greater than that of technology-push”. The early exploratory stage of industry life cycle involves high uncertainty due to lack of knowledge about the market. High technological advancement incur in this stage. Every firm uses its own technology to produce product. In this stage, industry experience lack of standard of technology. That increase difference between products those produce by different firms (Utterback, 2001). Customers in the market also have very few knowledge about the technology that is used. Therefore, the industry experiences fewer sales on the market. Firms which operate that time focus more on establishing their product as dominant design. The second stage is the intermediate-development stage in which market demands are not satisfied and output grows rapidly. In a mature industry, customers are educated and have knowledge about the product and suppliers (firms) know the market needs (Drew, 1987). Earnings and sales grow slower in mature industries than previous two stages. Markets may continue to grow, but firms in the industry observe high competition. As the competition increases, customers diffuse to different companies, sales decrease which in turn leads to a decline in revenues. Therefore, product features are enhanced at this stage to differentiate the product from that of the competitors, though “significant innovations tend to be fewer and are mainly of an improvement character” (Klepper, 1997). Consumers’
price sensitive behavior increase demand-pull innovation and decrease technological-push innovation (Kim & Lee 2009).

3.4. Concluding Remarks to the Chapter

Knowledge is the most valuable resource for the innovative firm. According to resource based view, knowledge has VRIN qualities. However, “new to firm” innovation strategy is mostly based on imitation of knowledge. On the other hand, human resource is required for knowledge creation. Differentiated labors mainly create knowledge in a firm. Firms from the advanced economy normally possess more differentiated labors while advanced and developing and emerging economy possess major generic labors.

Market demand for different products is vary according to the markets. Advanced market demand more most-advanced product while developing market demand less advanced products. Firms from the different economy produce different products and their innovation strategy also unique due to their unique resources and rules & regulation of the market.

4. Empirical Analysis

In the following part, we will use secondary data to provide an analysis of the influence of market demand and human resources on the innovation strategy of Ericsson and Huawei. The analysis of the secondary data also aims at expressing how both firms perform and therefore make the link between their performance and their innovation strategy.
4.1. Company Presentation

**Huawei**

Huawei is a Chinese company which provides networks, telecommunications equipment and services and its headquarters are located in Shenzhen, China. It is currently the second largest supplier of mobile telecommunications infrastructures in the world, after Ericsson.

Huawei was founded in 1987, it is a private company owned by its employees. Therefore Huawei is not quoted on stock exchange. Today, Huawei has more than 110,000 employees in the world and operates in more than 140 countries. Amongst these 100,000 employees, approximately 50,000 of them are working for the R&D department of Huawei. Its revenue was about SEK 200 billion in 2010, and its profit was SEK 30 billion high (Huawei annual report 2010).


**Ericsson:**

Ericsson is a Swedish company, one of the largest in Sweden, and provides telecommunication and data communication systems as well as related services; it covers a wide range of technologies including mobile networks. In 2001, it created Sony-Ericsson, with the Japanese Sony Corporation.

Ericsson was founded in 1876 by Lars Magnus Ericsson as a telegraph equipment repair shop. Ericsson knew a quick growth, by the end of the 1890s, the Swedish market was saturated and Ericsson expanded into foreign markets. Britain and Russia were early
markets where Ericsson established factories. It also generated significant profits in Commonwealth countries like New-Zealand, Australia, South-Africa and in China. At the beginning of the twentieth century, Ericsson was the leader of the market for manual telephone exchanges. The headquarters of the company are located in Stockholm since 2003, and the presence of Ericsson in the city since the nineties has fostered it turning into one of Europe’s most important place of information technology (IT) research (http://www.ericsson.com/thecompany)

Ericsson has offices and operates in more than 180 countries and had more than 100,000 employees throughout the world by the end of 2011. That same year, Ericsson reached revenue of SEK 226.9 billion, a profit of SEK 12.6 billion, total assets of SEK 280.3 billion and SEK 143.1 billion of total equity. With a market share of 35%, Ericsson is currently the world’s largest mobile telecommunications equipment vendor (Ericsson annual report 2010).

Ericsson relies on experience and quality in order to ensure its leading position. It puts great emphasis on its long experience and expert know-how in total systems solutions. Ericsson relies on reliable products of high quality and low power and energy consumption. Moreover, the company also strives to have an image of truthfulness in communications, respect of its employees, respectful of regulations as well as the environment (annual report 2010).

4.2. Human Resources Analysis of Huawei and Ericsson

Research and development has always played an important role for Ericsson. From the orientation of the human resources we can deduce the importance of research and development for Ericsson. The number of employees in research and development was over 20,000 employees in 2002, and then it decreased a bit to 17,000 in 2006 and finally increased to reach 20,800 in 2010 and even 22,000 in March 2012 (Ericsson annual reports 2002, 2006, 2010 and Ericsson website). The evolution of the number of employees in
research and development is an indicator of the importance granted by Ericsson on that field as well as it is an indicator of the type of labor which Ericsson uses. In terms of percentage, the number of employees who work in research and development represent approximately 21% of the total number of employees (Ericsson annual report 2011, see appendix -4).

Moreover, we can also observe that between 2002 and 2010, the vast majority of the employees of Ericsson are located in the EU or northern America where labor costs are high in comparison to other geographical areas (Ericsson annual reports 2002 to 2010, graphical illustration in appendix 5). As we can read on the tables in the appendix, salaries are much higher in northern America and in Europe, and it is precisely where Ericsson has the biggest part of its employees. We can therefore deduce that the human resources of Ericsson represent high expenses for the firm.

What we can deduce from the data above is that human resources of Ericsson are located mainly in the EU or in northern America, geographical areas where salaries and wages are higher than other geographical areas in the world. As a consequence, we can conclude that Ericsson’s human resources are high-cost human resources; Ericsson has to spend a lot of its financial resources to support its human resources.

Human resource is one of the resources which are required by any firm to continue its process. It is a key resource for any firm. Bowman and Ambrosini (2000) explained that only human resource can create difference between two firms. We also observed that Huawei’s competitive advantage of low cost human resource played a critical role to win against its competitors. However, they also mentioned that human resource create value for the firms. Particularly differentiate labor create value for the firms. Differentiate labor means researcher who are mainly responsible for firms’ innovation. For Huawei, 48% of all employees are researchers. However, Van de Ven states that “innovation is not an individual activity- it is a collective achievement” (Andersson& Berggren, 2007). It means that firms’ generic labor is also necessary for innovation activity. Huawei has the advantage on both kinds of labor over its competitors from the advanced countries. Average working hours of European researchers is 1300 to 1,400 hours per year, while it is 2,750 hours for Huawei’s home researchers. In addition, Huawei’s average R&D personal cost is also one
fourth to one sixth of its competitors from the advanced countries (Sun, 2009). High competition and customer demand in Huawei’s home market increase the efficiency of researchers and reduce R&D costs.

In 1988, Huawei was founded with 30 employees and in 2010 it had grown to 110,000 (Sun 2009 and Annual Report 2010). It has employees from China and local overseas country. In the beginning it only hired form their domestic market, where human resource cost is very low. After some time, it started to hire from abroad. It established first overseas research center in India in 1999. Indian labor market is almost similar to Huawei’s domestic market. In this way it was able to use India’s differentiated labor and also at same time managed to keep low cost advantage of human resources. By establishing research centers in different countries it became able to build diversified human resources. In addition to that, it also has partnerships with its many competitors and other firms. By partnership, joint venture, merger it also managed to improve human resources.

From the analysis of Huawei annual reports, we know that most of the employees working for them are located in geographical areas (China, Africa for example) where wages and salaries are lower than in the EU or northern America. Therefore, we can deduce that Huawei’s human resources are not high-cost human resources; Huawei manages to have low cost human resources. If we compare Huawei’s situation with Ericsson’s situation, we can deduce that Huawei has the advantage of benefiting from human resources for which costs are lower than Ericsson’s human resources. Ericsson has a strong potential in R&D, many researchers but their human resources are at high cost, on the other hand Huawei managed to develop also a strong R&D potential, it also has numerous researchers but their geographic location makes the cost for human resources lower for Huawei than for Ericsson.

4.3. R&D and Innovation of Huawei and Ericsson
As a result of a strong activity in the domain of research and development, the number of patents held by Ericsson is quite high and kept increasing throughout the years. In 2002, Ericsson held 12,000 patents, it held 22,000 patents in 2006 and 27,000 in 2010 (30,000 in 2012). Ericsson relentlessly strived to improve its research and development area. We can observe that the growth of number of patent is higher between 2002 and 2006 (10,000 patents more) than it is between 2006 and 2010 (5,000 patents more, half of the number of patents added for the previous period).

Ericsson’s expenses for research and development activities reflect the effort made by the firm to be efficient in that field. In 2002 these expenses were SEK 29.3 billion high, representing around 20% of net sales. In 2006 these expenses were SEK 27.9 billion, representing 15.7% of net sales and in 2010 they were SEK 29.9 billion, representing 14.7% of net sales. We can observe from those numbers that the expenses remained somehow stable between 2002 and 2010. The thing which changed along time is the proportion of net sales which represent the expenses in research and development. There, we can observe that in terms of percentage of net sales, the expenses for research and development fell from 20% to 14.7%.

The high expenses of Ericsson for research and development are the necessary expression of a new-to-world innovation strategy. That strategy reveals itself costly and very demanding in terms of human resources and capitals.

As we can observe on (Appendix 6), most of Ericsson’s sales are made in western and northern Europe and in northern America. On those markets, demand is oriented toward the most advanced products which leads Ericsson to adopt its innovation strategy, that is to say to adopt new-to-world innovation strategy which is costly.

With high expenses in research and development, the vast majority of its employees working in the EU or in northern America and most of its research centers located in the same geographical areas, we can conclude that Ericsson has the adequate resources to have the differentiate knowledge which is necessary to produce the most advanced types of products, but these resources are costly.
From the beginning of its activity, Huawei understood the importance of research and development and strived to develop it in different regions. Huawei not only improved its own research and development abilities but also concluded partnerships and joint-ventures which enabled Huawei to acquire knowledge and technology with reduced costs.

In Asia Pacific region, it has established four regional headquarters, twenty representative offices, two R&D centers and six training centers in this region (Huawei’s Asia Pacific Fact Sheet). Hong Kong was the first country from where they got first international contract. In the beginning, Huawei limit its international business in South-East Asia and Central Asia (Low 2007).

Huawei entered the African market in 1997. It has established four regional headquarters, twenty representative offices, two R&D centers and six training centers across Africa (Huawei’s Africa Fact Sheet). In order to provide training programs on the latest technology to expand its training center in Egypt. For that they invest around USD 20 million (Huawei’s Africa Fact Sheet). Huawei also plays an important role in the advancement of the local economy. Through training centers it provides annually instruction to 12,000 students. Up to January 2009, Huawei has more than 4,000 employees in Africa, 60% of them are locally recruited. Not only had this it helped to create more than 10,000 jobs through collaboration with 1,000 local sub-contractors.

In the Middle East region, Huawei mainly operates its business in Bahrain, Saudi Arabia, UAE, Qatar, Jordan, Oman, Kuwait, and Lebanon (Huawei Middle East fact Sheet). Huawei’s Middle East region headquarter situated in Bahrain. It has offices in 13 countries in The Middle East region with over 2,800 and 60% are local hires.

In 1999, Huawei established its first office in South America in Brazil. The headquarters for the region are located in Mexico City, Mexico (Huawei South America Fact Sheet). It has 19 regional offices, 3 software R&D centers and 3 training centers across the region. It has more than 4,500 employees in South America. It serves more than 50 operators from in the region including the key operators like America Movil, Telmex, Telefonica, Nextell, Digitel etc.
In 2001, Huawei established its North America headquarters in Plano, Texas. It has 8 regional offices and 9 R&D Centers. It serves in the North America market through Leap Wireless, Cox Communications, Telus, Bell Canada, Alltel, Cleartalk, Hibernia, Level3, MetroPCS, One Communications, Suddenlink, T-Mobile, Tyco Communications, and XO etc. In North America Region, Huawei cooperates with both competitors and partners to jointly create a favorable environment and share the benefits of the value chain. It has partnerships with ADC for OEM SONET products and Motorola for wireless switches (). It participants on the Board of Directors of 3G Americas and ATIS and also leading force in 3GPP, 3GPP2, IEEE, WiMAX Forum and IETF. In contrast, Cisco and Motorola have charged Huawei with stealing or infringing on intellectual property (Sun 2009). In addition to that, the regulation body for national security made fail Huawei’s attempt to buy 3Com in 2007 (http://channelnomics.com/2012/02/21/huawei-spends-6b-u-s-suppliers/).

In 2000, Huawei established its first office in Europe. It has over 3000 employees in Europe and 60% of them are locally recruited. In this region Huawei’s products and solutions have been deployed through operators like British Telecom, Deutsche Telekom, Vodafone, France Telecom, Telenor etc. (Huawei Europe Fact sheet). It took localization strategy for sustainable development in the region. It has 3 business hubs (Dusseldorf, Germany, Baasingstoke, UK and Warsaw, Poland), #1 subsidiaries to focus on local business, 6 multilingual training centers, 3 technical assistance centers (in Spain, UK and Romania), call centers, 2 regional spare parts centers and innovation centers in cooperation with top operators (Huawei Europe Fact sheet).

Since its creation and until now, Huawei led constant efforts on research and development. In 2008, Huawei counted approximately 37,000 employees working in research and development (about 43% of its total number of employees) and it counted in 2010 around 50,000 employees working in research and development (around 44% of its total number of employees) (Huawei annual reports 2008 and 2010). Huawei dedicates approximately 10% of its revenue on research and development. Its constant efforts on research and development made Huawei being ranked in 2008 by the World Intellectual Property Organization as the largest applicant under the organization’s Patent Cooperation treaty.
Huawei is committed to investing in R&D to create competitive products and solutions. Annually Huawei invest 10% of its sales revenue in R&D and 10% of this R&D budget in latest technology (Annual Report 2008). Huawei’s R&D expenditure has grown from USD 340 million in 2001 to 16,556 million (Low 2007 and Annual Report 210). It has 20 research institutes in countries including the USA, Germany, Sweden, Russia, India, and China and 20 joint innovation centers with leading telecom operators. In 1999, for the first time it opened a research center out of the home country (Low 2007). In 2001, around 13,000 employees engaged in R&D which increases to 51,000 employees in 2010.

In early 90’s Huawei focused only on domestic market. It targeted remote region where advanced firms did not spread their business (Sun, 2009). It heavily invested in R&D to grab domestic market share and produced product in low cost for which demand was huge in developing Chinese communication industry (Sun, 2009). In that time they emphasize mainly non-proprietary solutions. They designed solutions for open operating system which allows Huawei to customize its services (Low 2007). During late 90’s Huawei had made substantial investments in NGN and wireless technology. Huawei utilized its low cost and effective R&D facilities to produce products that they deployed in developing countries from East-Asia, Africa, and Latin America. Average working hours of European researchers is 1300 to 1,400 hours per year, while it is 2,750 hours for Huawei’s home researchers. In addition, Huawei’s average R&D personal cost is also one fourth to one sixth of its competitors from the advanced countries (Sun, 2009).

Since 2000’s Huawei focused more on the development of standards. In 2006, Huawei was member of 70 standard organizations. By the end of the same year they applied for a total of 19,187 patents (Annual report 2006). In 2008, Huawei ranked No.1 in the list of PCT applicants (Annual Report 2008). In 2008 it filed 1,737 PCT applications (Wipo). In the same time it held 20% of total essential LTE/SAE patents. The LTE technology is used in the most advanced products. At the end of 2010, Huawei had filed a total of 49,040 patent applications (31,869 in home country and 8,892 international patent applications under the
PCT and 8,729 overseas patent applications.) As at 31 December, Huawei served in 180 leadership positions including as board members in various organizations.

Analyzing Huawei’s products portfolio we observed that in the beginning they focused more on customization while later time they focused more on noble innovation. Luo et al (2011) also mentioned in their result that successful firms from the emerging market started with duplicative imitation and end with noble innovation. These kinds of duplicative imitation defined as “new to firm” innovation by Ayyagari et al (2011). While noble innovation defined as “new to world” innovation.

In the beginning, Huawei only operate their business in its home country and in the developing countries. In that time, rules and regulations of Huawei’s home country allow them to do “New to firm” innovation and rules and regulations of the developing markets also allow them to deploy their products that produced using ‘new to firm’ innovation. On the other hand, rules and regulation of the advanced countries is very strict and due to this “new to firm” innovation is not well accepted. Huawei once tried to enter in US market with products but they could not stay there due to violation of intellectual property rights. Later they entered in US and European market with advances and most advanced products. This time they used ‘new to world’ innovation strategy to produce products.

In the beginning Huawei’s market selection strategy was targeting the markets that have weak telecommunication infrastructure but have great developing potentiality (Wu & Zhao, 2007). By using “new to firm” innovation they were able to reduce cost. With their low cost advantage they were able to deploy their products in the developing markets. The developing market is the big part of the global telecommunication market. In short time they were able to hold leading position in most of the developing market. They generate huge profit from this market that they exploit to enhance their R&D sector. Improved R&D facilities allow them to apply “new to world” innovations and grab market share in the advanced markets.

By using cooperation with other firms, Huawei also developed its R&D department. In March 2003, Huawei and 3Com Corporation formed a joint venture company which focused on the R&D, production and sales of data networking products. In 2005, Huawei

From the analysis of the data collected, we can deduce that Huawei has the adequate resources to have generic knowledge and differentiated knowledge. Huawei was able to produce low cost products for which demand was huge in China, where Huawei started its activity. Thanks to these low cost products, Huawei gained market share and developed research and development inside and outside the firm via partnerships and joint-ventures. But most of its research and development activities are located in geographical areas where wages and salaries are low in comparison to the EU or northern America. That strategy enabled Huawei to acquire differentiated knowledge at low costs and therefore it became eventually able to produce the most advanced products at lower costs than Ericsson. The difference with Ericsson is that Huawei is able to have differentiated knowledge at lower costs, and therefore is able to produce the most advanced products also at lower costs.

**4.4. Market Analysis of Huawei and Ericsson**

At the beginning, Huawei only focused on the developing markets from Asia, Africa and Latin America which demand less advanced products and to enter these markets Huawei relied on the export methods. It took approximately 14 years for Huawei to enter in the advanced markets from West Europe, North America and other countries. To enter in the advanced market they cooperate with the firms from the host country.
Since the very beginning of its activity on the telecommunication industry, Huawei hired their employees locally. At that time, Huawei was operating only in China, where wages and salaries are low. Therefore, from the beginning, Huawei managed to keep expenses for human resources at a low level. Huawei started to operate in China on the countryside, in small cities or rural areas. Then the company managed to gain step by step market share and made its way onto the mainstream market (Christine Chang, Amy Cheng, Susan Kim, Johanna Kuhn Osius, Jesus Reyes, Daniel Turgel 2009). Huawei adopted the same approach outside China by targeting primarily areas where big competitors (like Ericsson for example) were not established, or did not hold a strong position, and then gaining step by step market share and getting onto the mainstream market. As an illustration, Huawei started operating in Africa in 1998 in Kenya, started operating where big competitors were not and gained progressively market share until it became the CDMA biggest supplier of the whole region. The CEO of Huawei is Ren Zhengfei, he is a former People’s Liberation Army officer. During his service in the army, he learnt a Maoist strategy of first focusing on the countryside, seize it, and then seize the big cities. Ren Zhengfei transposed that strategy to the business world in the way he led Huawei. A parallel can be drawn between the two strategies (Christine Chang, Amy Cheng, Susan Kim, Johanna Kuhn Osius, Jesus Reyes, Daniel Turgel 2009).

In a short time, Huawei managed to become a major player in the Chinese telecommunication industry. In 1998, it ranked at the fourth position as local switch supplier. At this stage, it had diversified knowledge of different technology instead of in-depth knowledge of any specific technology. Therefore, it chose domestic market to operate its business where it had in-depth knowledge of customer need. More specifically Huawei chose remote region where customers prefer low cost product more than high quality product. Applying a demand-pull strategy (Nemet, 2009), Huawei gave importance to the needs of the market and oriented its products with the objective of fulfilling market needs which were, in this instance, low price products.

From the late 1990’s to the early 2000’s Huawei’s development was technology driven. They started to develop and improve existing technology. In 1997, Huawei started its international career. In 1999, its revenue from international contracts was USD 0.05 billion
while from domestic contracts its revenue was USD 1.34 billion (Sun 2009). By 2000, the value reached by its international sales was higher than $100 million. Overseas business exceeded contracts in China for the first time in 2005 (http://www.bloomberg.com/news/2011-04-17/huawei-technologies-profit-rises-30-led-by-higher-international-sales.html). Initially Huawei focused on developing countries in South-East Asia, Central Asia and Latin America. Then, it moved into the Middle Eastern Nations (Low, 2007). Most of these developing countries had almost the same customer preferences like the Chinese Market. With the advantage of low cost Huawei rapidly captured large market share in Asia-Pacific and Africa region. By using value adding approach in developing market they became a strong competitor in developing country (Sun, 2009).

Along with time increasing number of Huawei’s research centers in advanced countries and also increasing involvement in advanced market with R&D facilities in places such as the Silicon Valley (US), Texas (US), Moscow (Russia) or even Stockholm (Sweden) (http://www.huawei.com/africa/en/catalog.do?id=703) Huawei increased cooperation with western firms. Huawei was for example the first to launch LTE in Norway (http://www.huawei.com/en/about-huawei/publications/winwin-Magazine/hw-094122-hw_094097-38193-38170-hw_094108.htm), LTE is at the cutting edge of technology in the telecommunication industry. Huawei gets British Telecom’s Contract on building a 21st century network in 2004 (http://www.huawei.com/en/about-huawei/corporate-info/milestone/index.htm). In Sweden, Huawei opened its first research center in advanced country. Its sales from international contract increase year-to-year (See Table). Along with international sales its year-to-year net revenue also increases (See Appendix 7).

Between 2002 and 2010, Ericsson saw its net sales increase. They were around SEK 145.8 billion in 2002, SEK 177.8 billion in 2006 and SEK 203.3 billion in 2010. Nevertheless, net income has not followed the same trend throughout the years. In 2002, Ericsson did not have an advantageous position with a negative net income of approximately SEK -19 billion. In 2006, Ericsson’s net income was SEK 26.4 billion high and in 2010 it was about SEK 11.2 billion high.

In 2002, Ericsson developed 3G in cooperation with Jupiter Networks. 3G was expected to develop faster on the market than it actually did, due to financial problems of certain operators. Mobile telephony has big perspectives with more than 1.1 billion subscribers at
that time worldwide, 190 million new ones in 2002. The goal of Ericsson was to maintain and improve their market leadership.

Still in 2002, in Latin America the shift from TDMA technology to GSM was stalled and the local macro-economic conditions caused the decline in sales in that region. In North America, the shift from TDMA to GSM enabled Ericsson to have only moderate decline in sales in that area. The decline in Europe is believed to be due to financial constraints caused by previous investments in licenses and acquisitions.

In 2006, there is the convergence of mobile and fixed networks into one which enables operators to reduce costs and offers new opportunities for suppliers like Ericsson. Ericsson is leader in the area of 2G and 3G and gets involved in the development of the next generation which is known as the Long-Term Evolution (LTE). In fixed broadband access, Ericsson strengthened its position in IP-DSL offering for fiber and copper-based broadband access networks by acquiring Marconi. Ericsson also strengthens its Internet Protocol (IP) product portfolio by acquiring Redback Networks. Broadband network and IP core developed together open new opportunities for multimedia services.

In 2010, Ericsson provides 4G/LTE technology as the evolution of mobile broadband and toward an all-IP environment. Ericsson is developing the coverage of these new technologies now accessible to only a small fraction of global population. Multimedia delivers software-based solutions for entertainment and business applications with the Business Support Systems (BSS). (see Appendix 8)

After analyzing the data above, we came to the conclusion than Ericsson managed to keep a strong position on advanced markets such as the EU or northern America. Nevertheless, we understood that Ericsson is losing more and more on developing and emerging markets while Huawei is consolidating its leading position on developing and emerging markets and also increasing its market share on advanced markets. The reason for the good performance of Huawei in developing and emerging markets is that their human resources costs are low and they use new-to-firm strategy, therefore they can provide to these markets what they mainly demand, low price products. Then, Huawei used profits generated to pursue new-to-world innovation strategy but still at lower costs than Ericsson. As a consequence, Huawei is now able to compete with Ericsson also on advanced markets and even perform better thanks to their cost advantage.
5. Our Model

Source: Created by the authors from theoretical framework and analytical output of Ericsson and Huawei.

*High differential labor indicates firm has capability to generate new knowledge.

**High generic labor indicates firm has capability to exploit existing knowledge.

*** Technological development of market and economic condition of market are interrelated, therefore a market is not possible where it has strong economic condition and low technological development simultaneously.
5.1. Explanation of Model:

This present guideline is aimed at making easier the reading and the understanding of the model above for the reader. We will provide an explanation of each part of the model and the interactions between each other.

The dotted square on the left deals with matters of human resources. From that part of the model, we want to find the different innovation strategies which the firm can use. Inside that dotted square, there is a matrix. We used that matrix to express the result of the combination of two factors: human resource cost (vertical axes) and firm competitive human resource (horizontal axes, differential and generic). After analyzed Huawei and Ericsson and from the theory we found these two are important factors for the human resources. From the consideration and combination of those two factors, we found four different outputs which are expressed in the table: differential resource with high or low costs and generic resource with high or low costs. As it is mentioned on the model, differential labor is needed for the firm to create new knowledge whereas generic labor indicates that the firm has the capability to exploit existing knowledge. Therefore, we express in the central matrix of the model (column on the left) three outputs of the left dotted square: new-to-world innovation strategy with high and low costs, new-to-firm innovation strategy with low costs.

The dotted square on the right deals with matters of market demand. From that part of the model, we want to find the different types of products which are demanded on a market. Like in the other dotted square, we use a small table to combine two factors: economic condition of the market (strong and weak) and technological development of the market (advanced and developing). From the consideration and combination of those two factors, we found three different outputs which are expressed in the table: most advanced products, advanced products and less advanced products. In the central table of the output, we express these outputs in the horizontal line at the top.

As a result, in the central table we use the outputs of the dotted squares on the left and the right. We combine new-to-world innovation strategy with high and low costs, new-to-firm
innovation strategy with low costs (left column) and the different types of products, most advanced, advanced and less advanced products (line on top). The stars in the table represent favorable conditions. For example, new-to-firm innovation strategy gives a favorable position for winning where less advanced products are demanded. The area in grey on the model represents, in our case, the position of Huawei which is able to develop a new-to-firm innovation strategy at low costs but also a new-to-world innovation strategy with low costs.

In this chapter, we explain our model that derived from the theory and analysis of Huawei and Ericsson cases. This model divided in three parts. In the left we explained different combination of human resources that firm can use. In the right side of the model we explained different market demand considering economic and technological development of the market. And finally, in the middle we explained different strategies that a firm can build considering its combination of human resource and how firm use these strategies to fulfill different market demand.

5.1.1. Firm’s Human Resources

To measure the efficiency of firm human resource we used two dimensional models. In vertical we put human resource cost (High and Low) and firm’s competitive human resource (Differential and Generic labor) in horizontal. By using these two dimensions we get four combinations of resource.

**Differential labor with low cost:** in this combination, the firm is able to manage differential labor in low cost. Generally cost of differential labor is high. This resource is only able to produce new knowledge. For “new to world” innovation firm need this resource. Only few firms can manage differential labor in low cost. This combination of human resources is most efficient.
**Differential labor with high cost:** in general all firms with competitiveness on differential labor spend high cost for their human resource. Only firms with strong financial background can afford this combination of human resource.

**Generic labor with low cost:** Generic labor cannot produce new knowledge. This resource is able to do routine work and can imitate. This resource cost less than differential labor and easily available. Most of the firms from developing and emerging economies use this combination of resource.

**Generic labor with high cost:** Firms with this combination cannot stay in industry for long time. This combination of resource could not create any value for the firm. This combination is the least efficient.

5.1.2. **Market Demand**

To understand market demand we used economical condition of market (strong and weak) and technological development of market (advanced and development) in market demand matrix. Three output we get from this matrix.

**Most advanced product:** Technologically advanced market with strong economic condition demand most advanced product. New technology use to fulfill this kind of demand. This is the most expensive product and demand for these kinds of product is very low.

**Advanced product:** Technologically advanced market with weak economic condition demand advanced product. Advanced product is the product that uses current technology. The price of advanced product is lower than most advanced product. Demand for this also higher than most advanced product.

**Less advanced product:** Market with lower technology and weak economy demand less advanced product. This product engage old technology and very cheap in price. Demand for this product is high in developing market.
5.1.3. Innovation Strategy

From the firm’s human resource matrix we get three successful combinations that the firm can use. Using each of these three combinations of resources a firm can take one of two different strategies. By using differentiated labor with high cost combination firm can imply new to world (N2W) strategy. However cost of this strategy will high. By using this strategy firm successfully fulfill only demand of most advanced product. In contrast, by using combination of generic labor with low cost a firm can easily capture market of less advanced product. Here firm imply new to firm (N2F) innovation strategy that allow them to produce less advanced product. And finally, by using combination of differentiated labor with low cost firm can implement new to world innovation strategy in low cost. This low cost advantage assists firm to win in a market that demand most advanced products and also in a market that demand advanced product.

6. Result

6.1. Answer of the Research Questions

1. How do Huawei’s and Ericsson’s human resources affect innovation strategy?

According to Grants (1991) ‘framework of five stage procedure for strategy formulation framework’ a firm resources have great influence on the firm’s strategy. For the innovation firms need to establish efficient R&D department. According to Hendricks et al (1999) human resources are the main and scarcest resource for R&D. In the beginning, Huawei
had few researchers and with this number of researcher it was difficult to compete with the advanced firms. Therefore, they applied “new to firm” innovation strategy. In this strategy a firm needs few researchers (differential labor) and more generic labors. In this strategy a firm normally imitates existing technology and modified them according to customer demand. Other way it can be say, in that time Huawei’s human resources allowed them to do only demand pulls innovation. Normally when products are in mature stage then increase number of demand-pull innovation. Mature product does not need deep innovation to develop and sell like a new product (Hansen et al, 1999). Therefore, Huawei was able to apply new to firm innovation. Huawei’s low cost and efficient human resources also have impact on its innovation strategy in a different way. Their low cost and efficient human resource persuade advanced firms to outsource their work to the Huawei. In this way it gets access in the advanced firms’ technology. This makes imitation process easier for them. On the contrary, Ericsson was not able to manage low cost human resources in their R&D department. This induces them to focus more on technological-push innovation instead of demand-pull innovation. Ericsson deep innovation capabilities and high cost human resources let them to practice ‘new to world’ innovation with high cost strategy. Huawei also manage to do new to world innovation. In addition, they were able to do this with low cost human resource. By establishing R&D centers in many different locations especially in emerging market and partnership with different advanced firms they able to manage knowledge in low cost.

2. How does market demand affect Huawei’s and Ericsson’s innovation strategy?

At the beginning of its activity in the telecommunication industry, Huawei was not able to compete with advanced firms in advanced markets. Huawei was not technologically strong enough. As a consequence, Huawei adopted a strategy which made it focus on the countryside of its domestic market, small cities and rural areas, and then gain progressively market share in order to, eventually, get onto the mainstream market. They applied the same strategy outside China also by focusing primarily on markets which were similar to
their domestic market. When they started operating, their R&D was limited and did not enable them to produce advanced products. They could produce less advanced products at low cost. This type of product fits with the demand of the markets on which they focused at the beginning: China, South East Asia, Africa, and Latin America. In addition to that, price is a crucial factor on these markets and Huawei could produce at low cost and Huawei has good knowledge about customers in these markets (Fang et al., 2011). Asset configuration strategy model explained two strategies that a firm can apply. In deep customer assets-broad innovation asset they explained that a firm modified its broad technology according to customers demand. As a result, Huawei used “new to firm” innovation strategy to serve these market. This innovation strategy enabled them to sell products demanded on the targeted markets at lower prices than their competitors.

After having gained a leading position in rural areas and small cities, Huawei started to grab share on the mainstream market. Huawei followed a strategy which made them first win the countryside and then the cities. First win areas where the market is not advanced and where demand is mainly oriented toward less advanced cheap products. Then, Huawei could start competing also on advanced markets.

The advanced markets demand advanced and most advanced products. In order to compete in that type of market, Huawei was required to do new-to-world innovation. Demand for the most advanced products is not the highest, but it is important for the industry and for its control. A firm needs to possess the technology which is required to produce most advanced products. A firm should control this technology to shape the industry structure and to benefit from this. In 2008, Huawei ranked No.1 innovation in telecommunication industry. Along with time, their number of membership in standard organization is increasing. It indicates that now it also emphasize on “new to world” innovation to fulfill current market demand of advanced market and to control industry in future.

The majority of Ericsson’s sales are made on the European market or on the American market. These are developed markets where the demand is mainly oriented toward the most advanced products. Moreover, Ericsson originates from one of these advanced markets (Sweden) where demand is oriented toward the most advanced products. As a consequence,
Ericsson has to focus on the R&D needed to have the technology necessary to produce the most advanced products. The innovation strategy which corresponds to these imperatives is the new-to-world innovation strategy. On the less advanced markets, demand is mainly oriented toward the less advanced and cheap products. In order to be able to produce such products, a firm needs to follow a new-to-firm innovation strategy with low-cost. But Ericsson cannot follow that strategy in its current state and therefore cannot win on these markets. Ericsson was the leader in new-to-world strategy, but when Huawei started to compete also on advanced markets and to implement new-to-world innovation strategy and theirs was low-cost in comparison to Ericsson’s. Ericsson follows new-to-world strategy with high costs, whereas Huawei manages to follow new-to-world strategy with lower costs.

3. Which factors of human resources and market demand are important for Huawei’s and Ericsson’s innovation strategy?

Human resources played a crucial role to create innovation strategy for both Huawei and Ericsson. Firms’ innovation strategy and ability to serve a market depends on its R&D. Human resources are mainly responsible to create knowledge in R&D. However, knowledge can be acquired from the outside of the firm by partnership or joint venture (Gumusluoglu&Ilsev, 2009). Huawei did partnership with several firms to use their technology. In this way, they were able to compete innovative firm like Ericsson. On the other hand, Huawei’s human resource cost is lower than Ericsson’s cost. This allows them to use same innovation strategy in lower cost than Ericsson. As a result, they able to grab market share from Ericsson. From this, we observed that human resource cost is main factor that made difference between two firms.

As it is observable on appendix 9 (world map with 2g and 3g coverage), 90% of the world population and 40% of it are covered by 2G or 3G. Therefore, we can understand that it represents a huge market which has to be seized (See Appendix 9).
The biggest part of world population is located in the countries where markets are still developing or emerging. As it is argued by Sheth (2011), on that type of market improvisation results in better performances than differentiated resources. Attention has to be given to the market, the firm needs to adapt itself to the market and that is why demand-pull approach fits better to that situation. Demand-pull approach can be fulfilled by new-to-firm innovation strategy because precisely it is oriented toward market need. As it is stated by Nemet (2008), technology-push approach ignores prices whereas these markets, where demand is huge, are very sensitive to prices as it is stated by Kim and Lee (2009) who also mention that on this type of market demand-pull approach is fostered and technology-push declines.

6.2. Discussion

In our study, we observed how Huawei developed its capabilities over a period from 1997 to 2011. As we can see from our study, Huawei progressively got in better position compared to Ericsson. According to resource based view, firms with strong base of knowledge should do better in innovation, which is supposed to provide them a competitive advantage but we observe that Huawei without a strong knowledge base is able to capture a major market share and generate more profit than Ericsson. When Huawei started operating on the telecommunication industry, Ericsson was the most innovative firm. Recently Huawei was recognized as being one of the most innovative firms in that industry.

Firms need to create knowledge in order to innovate; knowledge is the most valuable resource for innovation. Knowledge is supposed to be hard to imitate according to resource based view. But we observe that Huawei managed to acquire knowledge without sufficient human resources in that field.
At the beginning, Huawei used new-to-firm innovation strategy which relies on the use of existing knowledge. They imitated advanced firms and modified what they imitated according to customer demand. This time, they did only market-pull innovation and for this they only entered markets which were similar to their domestic market. Local rules and regulations and market demand for less advanced products enabled Huawei to acquire knowledge in that way.

When Huawei started producing products for the advanced markets they used partnerships and joint-ventures with advanced firms to acquire the latest technologies.

At the same time, Ericsson was still able to create knowledge and produce the most advanced products. However, they are losing market share to Huawei especially in developing and emerging markets. From our study we observed that Huawei’s low cost advantage made them able to capture leading position in emerging and developing markets. In addition, in advanced markets they are also getting stronger than Ericsson.

Huawei low cost human resources made them successful in emerging and developing markets which represent most of the global market. By being successful there, they managed to generate huge profits which they invested in R&D in order to compete on advanced markets. On the other hand, Ericsson always produced advanced or most advanced products for which demand in emerging and developing markets is lower. According to Utterbeck (1993), radical innovation is required in order to win against an established firm. But here we observe that Huawei most of the time used incremental innovation in order to fulfil market demand and in this way they were able to compete successfully with Ericsson.

6.3. Suggestions for Future Research

As we intended to show in our thesis, human resources and market demand shape the innovation strategy which is to be taken on a specific market. It also appears that the cost of human resource is crucial for the success of an innovation strategy.
A further investigation on the possibilities for firms with high human resources costs to reduce these costs would help to give an understanding of the situation on the long term by providing a sort of forecast of the actions which could be taken by firms from advanced markets in order to maintain their leading position confronted to firms with low human resources costs.

The possibility for Huawei to imitate technologically from more advanced competitors within its new-to-firm innovation strategy relies on rules and regulations in China, where it started its operation and, in a more broadly way, in developing or emerging markets. Knowledge is supposed to be hard to imitate due to its tacit nature and part of the strategic value of knowledge is that competitors are not supposed to use it but in that case, Huawei managed to do so. Therefore, investigating the importance of rules and regulations on that topic would help to understand and explain the subject in a more complete way.

We focus on the telecommunication industry in our study, and in that industry we focused on Ericsson and Huawei. Therefore, enlarging the scope of the study to other actors on the telecommunication market would be useful to give a more complete understanding of the subject. Not only would this, but enlargement of the investigation to other technology-based industries bring a more complete and broader range to the topic. This would enable to know if some factors are proper to the telecommunication industry or also applicable to other industries.

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7.1. Annual Report


7.2. Website

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Appendix 1: Five-stage strategy formulation framework

Source: The Resource –based theory of competitive advantage: implications for strategy formulation (Grant 1991)
Appendix 2: Asset configuration strategy model
Source: Effects of Customer and innovation assets configuration strategies on firm performance. (Fang et al, 2011)

Appendix 3: Value Discipline Model
Source: Customer intimacy and other value disciplined (1993)
Appendix 4: Percentage of employees by profession (2011)

Source:
Appendix 5: Number of Employees and Average Wages and Salaries by Region (Ericsson)

Number of employees (Ericsson) by region in 2002


Number of employees by region and average wages and salaries by region in 2011

Appendix 6: Ericsson sales by region in 2010


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<tr>
<td>Revenue</td>
<td>182,548</td>
<td>146,607</td>
<td>123,080</td>
<td>12,560</td>
<td>8,504</td>
<td>5,982</td>
<td>3,827</td>
<td>2,694</td>
<td>2,128</td>
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<tr>
<td>Net Income</td>
<td>24,716</td>
<td>19,001</td>
<td>7,891</td>
<td>674</td>
<td>512</td>
<td>681</td>
<td>624</td>
<td>384</td>
<td>108</td>
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<tr>
<td>Overseas Contract</td>
<td>120,405</td>
<td>90,021</td>
<td>1748</td>
<td>1224</td>
<td>586</td>
<td>466</td>
<td>228</td>
<td>105</td>
<td>55</td>
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<td>Domestic Contract</td>
<td>64,771</td>
<td>59,038</td>
<td>583</td>
<td>476</td>
<td>316</td>
<td>336</td>
<td>329</td>
<td>277</td>
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- *CNY Million
- ** US $ Billion

Appendix 7: Huawei’s international and local Sales (2002-2010)

Source: Sun (2009) and Huawei Annual Report.
Appendix 8: Percentage of population covered by GSM, WCDMA and LTE

Appendix 9: Countries that offer 2G/3G services commercially, mid-2011

Source: ICTFacts and Figures (2011)