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The Effect of Consumerization on IT strategy

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Master's thesis

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Abstract of master's thesis

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Abstract

Consumerization has been a hot topic in the IT world for the last decade, which refers to the trend of consumer technologies making their way into organizations and causing pressure for change in the traditional enterprise IT. It is considered to be one of the most influential IT trends of our time. Gartner's framework of the Nexus of Forces depicts the phenomenon as the core for four dominant technology hypes in the market at the moment; social and mobile technology, cloud and information or big data. All of these are linked to consumerization in one way or the other. The purpose of the study is to find out how the phenomenon effects present day IT-strategies, by using the Nexus of Forces as a framework to discuss the topic on a more concrete level.

The literature review begins from the concepts of strategy and IT strategy and introduces two theoretical frameworks explaining these concepts. The frameworks are the market driven perspective, also known as the positioning school, and the resource-based view, which explain strategy and IT strategy from differing point of views. The study uses these theories as basis for the analysis on changes in IT strategies. The review also explains the concept of consumerization further and discusses the dimensions of the Nexus of Forces more widely.

The empirical research of this study is conducted through semi-constructed interviews, also known as theme interviews. I interviewed twelve CIO's and CEO's in mid-sized and large companies in Finland to collect recorded data. I analysed the data and arranged the answers into groups according to the topic of the discussion and the types of answers. Finally, I reviewed these categories comparing them to previous research literature.

Based on the research the main influencers on IT strategy are the business strategy, the business environment and the role of IT in the organization. The impact of consumerization and the technology trends on the enterprise IT was visible in the dissatisfaction of employees in the traditional solutions, and the demand for lighter and more flexible systems was evident. Many positive things follow this development, but it also causes big challenges for the IT management in terms of security and service availability. From the IT strategy perspective the conclusions were mixed due to different interpretations of the concept. However, the dominant view seemed to be that consumerization is not directly a strategic matter, unless it was closely related to the company business.

Keywords IT Strategy, Consumerization, the Nexus of Forces

Contents

1. INTRODUCTION

I found the topic for my study through my employer, when I discussed the possibility of writing a thesis for them. I work for one of the biggest global IT companies and I was sure I would find many interesting possibilities from different fields. My personal aim was to find a subject that would be relevant for my employer, but was also compatible with my background in studying strategy and leadership. Finally, one of the managers of my business unit suggested that I could do a study about consumerization and its effect on IT strategy in our customer organizations. The idea seemed to fit my purposes perfectly, and I found it interesting because of the multidimensional nature of consumerization, and the fact that it is a very current and burning issue for businesses today.

My employer is doing business some of the biggest companies in Finland, which gave me a great opportunity to get to meet CIOs (Chief Information Officer) and other people from various levels of management in the customer organizations, and discuss their IT strategy and the effects of current IT trends with them. Through the contacts by my organization, I got to meet very important people and gain great insights from them. The interviewees were some of the most experienced IT professionals in Finland, and had a lot to say about my topic.

Consumerization has been a hot topic in the IT world for some years now, and especially at the time, when I started my study in the spring 2013. The term refers to the growing tendency of consumer technologies making their way into enterprise use and changing the setting for IT in traditional organizations. The phenomenon has been investigated rigorously by IT consultancies, like Gartner, and some of the biggest information system publications. What is missing is a more academic point of view on the topic and the background of the phenomenon. In my study, my aim was to look at the issue from a more theoretical perspective, and to maybe find new insights about the subject through that.

In 2012 consumerization was mentioned as one of the 6 big IT headlines in the yearly IT trends surveys done by the Society for Information Management each year (SIM, 2012). In the same study were listed the top 10 applications and technologies in 2012, of which five

were somehow related to consumerization (Big Data No.1; Cloud Computing No.2; Collaboration tools No.4; Mobile and Wireless Applications No.6; BYOD No.7). This signifies how relevant the theme is in the current IT discussion, and raises a question, why have academics not seized on the topic for research.

According to Gartner, consumerization continues to be one of the leading IT trends, and that the global IT spend will hit 3,8 trillion dollars in 2014 (ARN, 8.10.2013). In the article by ARN, they quoted the senior vice-president of Gartner:

> *"The Digital Industrial Economy will be built on the foundations of the 'Nexus of Forces' (which includes a confluence and integration of Cloud, social collaboration, mobile, and information) and the 'Internet of Everything' by combining the physical world and the virtual"*

'The Nexus of Forces' is a central framework in the consumerization discussion, first introduced by Gartner (2013), but has since been used as a basis for study by many other organizations interested in consumerization as well.

1.1. The goal and methodology of the study

The aim of my study is to clarify the role of consumerization in the IT strategy context. The research question of my study is thus: *How does consumerization affect IT strategy?* I intend to find out if consumerization has an impact on the IT on a strategic level, and how the effects will be visible in the IT strategy, if it indeed does influence it.

To be able to answer my research question, it is relevant to understand the prevailing IT strategy and its relation to the business strategy. Furthermore, it is important to get a general image of the strategy process, as well as the strategic alignment practices. For this reason, I took a top-down approach in the interviews, starting from the company strategy and IT strategy, and only then moving forward to the IT trends and their impact on the prevailing practices.

I approach the topic through four trends that consumerization has given rise to; cloud, mobile, big data and social computing, which all together form the Nexus of the Forces (Gartner, 2013). I investigate each of these trends first separately and then combining all of them under the headline of consumerization. With this logic, my aim is to approach the topic through the following sub-questions:

1. The nature of IT strategy and alignment with business strategy?
2. How does social computing affect the business and the IT strategy?
3. How does cloud computing affect the business and the IT strategy?
4. How does big data analytics affect the business and the IT strategy?
5. How does mobile technology affect the business and the IT strategy?
6. What does consumerization mean for the business and the IT strategy?

The reason for approaching the topic through 'the Nexus of Forces' is to give light to the otherwise somewhat vague concept of consumerization. The term typically has various different interpretations and I wanted to have an all-round approach to it, and appreciate its many dimensions. Furthermore, it is easier to interview people about topics that are closer to practice and a part of their everyday work than a phenomenon as abstract as consumerization.

I conducted a qualitative study that included twelve interviews in twelve different companies with CIOs or other management level people, who work with IT investments and IT strategy on a daily basis. The companies were all Finnish based, four of which were in the IT sector and the rest in various other industries. All of the organizations, except for one, were mid- and large sized businesses. The one exception was included because of the company's significance in the IT sector in Finland, and it is considered to be somewhat of a pioneer in their field of work.

I analyzed the interview results using two different theory frameworks; the market driven perspective, based on Porter's (1980) positioning theory and the resource-based view, concentrating on the internal resources and capabilities of an IT organization. The two frameworks helped me to approach the issue from different angles, enabling a more holistic view on the topic.

1.2. Relevant concepts and structure of the research report

Consumerization

Consumerization refers to recent a significant turn in the technology development pattern. In the past, businesses were the ones marching in the frontier of development, when it came to technological tools and gadgets. The devices and tools used in organizations were far superior to consumer technologies, and the consumer market followed, where the enterprises had gone. This pattern was visible in many of the technologies that are now common household products, like the fax machine, which was first expensive corporate technology, and later became cheaper and available to consumers (Moschella et al. 2004).

Nowadays, the situation has turned upside-down, with the consumer market being the leading engine of technological innovation and development. The increasingly tech-savvy consumers are investing in technology and gadgets far better than the standard solutions that are available in the organizations today. This causes the situation, where employees are used to using better equipment at home, and are demanding for more modern technology from their employees. In many places employees have started to use their own personal devices for business use, since they are not satisfied with the tools provided by the IT department. (Moschella et al. 2004)

Furthermore, there is a recent tendency for companies to implement solutions originally developed for the consumer markets or systems with characteristics typically associated with consumer products (Harris et al. 2012). The enterprise solutions are becoming lighter, more flexible, quickly implemented and containing more social features. Basically, businesses seem to be in the process of becoming more consumer-like, when it comes to IT decision-making and expectations, which, in turn, raises new demands for IT vendors. This consumer-like behavior in enterprises is speculated to be the change, which will have the biggest impact on business (Kvanzant, 2009; Blount, 2011).

Strategy

The word strategy is often used to describe a set of practices that have been drawn up to guide the operations in an organization. There is no official definition for the word, but there are elements of it that most academics and strategy professionals agree upon. It is some kind of a plan to reach a named goal, and a pattern of action, which aims to execute the plan (Mintzberg, 1987). Furthermore, it is often thought to be a decision of which business the company is in, and finding an optimal market position in it (Porter, 1980).

Strategy is therefore a fairly complex term used in various contexts and often also misused. The origins of strategic planning are in the field military and warfare, where the leader figures of army forces used strategy as a battle plan against the opponents. The term has later been transferred into business use, while the meaning and use of it has stayed quite similar, only in a different context. Strategy is still seen as a means to win the competitors with a predetermined pattern of action.

IT Strategy

IT strategy, or information technology strategy, is often seen as a typical example of a sub-strategy or a support strategy, which is drawn up to enable and back up the business strategy. IT strategy is not a term widely used in the academic world, but is in active use in organizations today. It is used to describe the strategy of the IT unit to endorse the business and to secure daily operations in the firm. A Gartner description of IT strategy is the following (Gartner IT Glossary):

> ***IT strategy*** *is about how IT will help the enterprise win. This breaks down into IT guiding the business strategy, and IT delivering on the business strategy. Although some or all tasks involved in creating the IT strategy may be separate, and there are normally separate documents, IT strategy it is an integral part of the business strategy.*

In the IT strategy are included, for example, decisions about outsourcing; what will be done internally, and what will be given outside. IT vendor management model and partnerships are another part of the IT strategy – is it better to have a few chosen partners and vendors,

or a large number of them? The IT strategy is not to be mixed with **the technology strategy**, since the terms are not interchangeable with each other. Technology strategy is often one part of the IT strategy, and is a set of guidelines and practiced for making decisions about the actual technology.

Many times the strategies are depicted in the form of a pyramid, where the general business strategy forms the top of the pyramid. Right under the business strategy are the sub-strategies for each separate function in the firm, like the IT, HR and procurement, for example. The bottom of the pyramid depicts the tactical decision making level, or the actual business operations. If strategy is a term somewhat hard to grasp, then IT strategy is even trickier, since the content and form of it vary in each company. Still, the term will be further discussed and clarified in the following sections of the paper.

The structure of the report

I have built my thesis with the following manner: in chapter two, I will go further into the concepts of strategy and IT strategy and introduce the theoretical strategy frameworks used in the study. Next, I will introduce the consumerization phenomenon and its theoretical background on a more detailed level in chapter three. I will explain my research methods and choices in chapter four, and describe the progression of the research process, as well as the reliability and limitations of the study. The chapter five introduces the research data and my findings. Finally, in chapter six I will present my conclusions and suggestions for future research.

2. STRATEGY THEORY AND IT STRATEGY

This chapter aims to go into the strategy topic on a deeper level and explain the relation between strategy and IT strategy. I will introduce previous research done about both of the topics, and the theoretical frameworks I will use in my own study. The different views I will discuss, are based on the positioning theory and the resource based view, or core competencies. The positioning and core competences view are very traditional theories, even classics among the field of strategy research.

The two perspectives are first introduced in general business strategy context, and after that explaining what they mean from an IT strategy point of view. In the field of IT studies there are two schools of thought that bear great resemblance to the positioning idea and core competences. The positioning school has given basis to *the market driven perspective* in IT theory, whereas the core competencies have arisen from *the resource-based view,* which has been used in numerous IT studies.

I will not take discuss consumerization yet in chapter 2, but leave that to be discussed as a separate totality at first, combining the two themes in the end, with the final research framework.

In the sub-chapter 2.1. I will first explain the different meanings of the term strategy, and then give a short description of the strategy frameworks used for the study. The introductions will form the basis of the theory, which will be then applied in the IT context.

The sub-chapter 2.2. will cover the strategy approaches in an IT strategy context and the principles from the section 2.1. will be introduced from an IT point of view. First, will explain the market driven view, which is based on Porter's (1980) positioning model. Then the second thing I will discuss is the resource-based model and it's connection to the core competences. Finally, I will discuss different approaches on IT in practice, introducing the internal, outsourced and hybrid IT organizations.

2.1. Strategy theory

Even though strategy has been studied for decades now, academics have still to come up with a unanimous definition for this term, which is commonly used in everyday business language. The word has many meanings and dimensions, and thus it has been quite difficult for strategy experts to describe it in an exhaustive way. Henry Mintzberg (1987) stated that due to the diversity of ways to use the word strategy, we need multiple definitions for it as well. Following this statement, he proposed four different definitions – *the 4 Ps*.

Firstly, most people agree that strategy is some kind of *a plan* - "some sort of consciously intended course of action, a guideline (or set of guidelines) to deal with a situation" (Mintzberg, 1987). It determines beforehand what will be done, when, and what the goal for the action is. In some cases, it can be seen as *a ploy* as well; a specified plan for a certain action to outplay an opponent. (Mintzberg, 1987)

On the other hand, strategy is more than just a plan, but a realized *pattern* of actions in an organization. In Minzberg's (1987) words: "*strategy is consistency in behavior, whether or not intended."* Sometimes it is hard to tell whether the patterns of behavior are based on a plan, or the other way around, or if the two are completely independent of each other. Either way, it gives a framework for desired action: *"…it resolves the big issues so that people can get on with the little details—targeting and serving customers instead of debating which markets are best, buying and operating machines instead of wondering about different technologies…"* (Mintzberg, 1987)

The fourth definition is strategy as *position*; understanding strategy as analyzing the business environment and finding the most lucrative niche in it (Minzberg, 1987). The aim of a strategy is to find a market position with no direct competitors and where there are high barriers for new entrants (Porter, 2008). With direct competition the businesses are in danger of eating each other's profits and "drying out" the markets.

In sum, strategy can be seen as a combination of analyzing, planning and a realized pattern of action. Still, the realized strategy may differ slightly or significantly from what the company intended originally (Mintzberg, 1987). In Mintzberg's view, deliberate strategy is

only a part of what is realized in the end, and the rest is something he calls "emergent strategy". Emergent strategies occur during the strategy process, consisting of individual actions and decisions done during the realization phase, which take the strategy in a new direction. Emergent strategies are an important part of strategic learning in dynamic business environments; doing things that work, instead of blindly sticking to what has been planned (Mintzberg & Waters, 1985).

Generally it is seen that strategies are needed to set a direction for the company and to cope with competition, as well as the changes in the environment on a more general level. Companies need something to direct the operations, and guide them to do the right things. Many times it is perceived as the determining success factor to beat the competition, even though many strategies fail in this mission, even the good ones. In addition to guiding action, it is also a tool to coordinate the activities in the company and to create a sense of direction. (Mintzberg, 1987)

Apart from the operational perspective, strategy is needed for defining the organization and to distinguish it from others: *"An organization without a strategy would be like an individual without personality - unknown and unknowable"* (Mintzberg, 1987). It also provides a sense of consistency in the company, promoting efficiency and forming a simplification of the reality. With an overly realistic view on the world and all its variables, it would be difficult to come up with any kind of a basis for action. (Mintzberg, 1987)

Positioning Theory

Another traditional way of looking at strategy is the classic view of Porter (1980), forming the basis for the positioning paradigm in strategy studies. Porter views the strategy question from outside-in, stating that the market is the biggest determinant of the business strategy. He depicted his idea of possible business strategies as what he calls "the three generic strategies", and his view was that a company should choose one of them and excel in that one, rather than trying to do everything and failing in all of them.

The Three Generic Strategies by Porter (1980, p.34-48) are cost leadership, differentiation and focus strategy (Figure 1.). Cost leadership is based on the simple idea that through internal efficiency, the company can lower their cost of doing business and can gain market share through low prices. The profit is made with low margins but high volumes of sales. The second strategy is based on product differentiation and being able to charge higher prices with a product that is unique in the industry. A current example of this strategy could be Apple products, which are more expensive compared to competitors, but perceived as higher quality than others. The third strategy is the focus strategy, which can be either of the two above, or a combination of them, but targeting a narrower market. The idea is to dominate a particular segment of the market, with less competition.

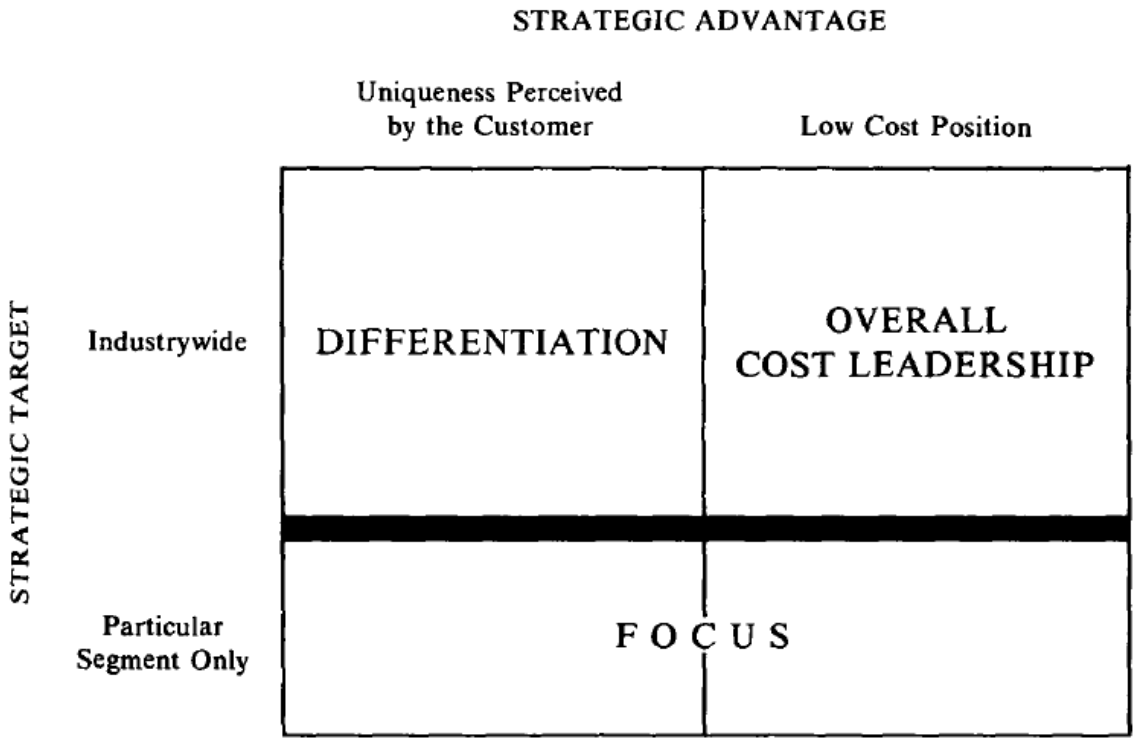

Figure 1. Three Generic Strategies (Porter, 1980, p.34-48)

Porter also introduced the model of five forces that drive the competition on a specific industry (1980, p.3-33). The forces are depicted in Figure 2. and they include the bargaining power of suppliers and the buyers, the threat of new entrants and substitute products, and finally the rivalry among existing competition. Where as the generic strategies are about the choice of competitive strategy and position in an industry, the five forces represent the external factors influencing a firm's position in the market and the state of competition in an industry. For example, a firm is less likely to succeed financially, if their suppliers have a strong power position over the industry, which usually leads to high prices of materials and stock. On the other hand, if the buyers have a strong negotiation position this will lead into a fierce price competition in the industry. Then again, if the industry has low barriers of entry, the competition will grow fierce very easily due to the rising number of new entrants, leading to decreasing profit potential. Also, if the product a company is selling can be substituted with something else, it once again lowers the profits of the business. (Porter, 1980, p.3.33)

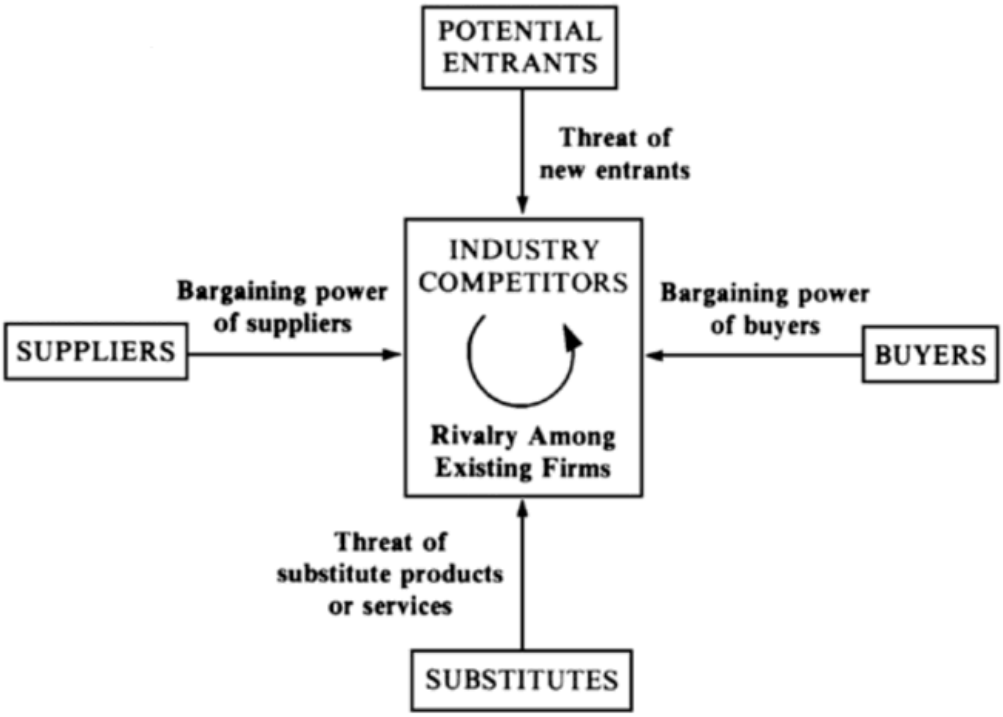

Figure 2. The Five Forces Driving Industry Competition (Porter, 1980, p.3-33)

The Resource-Based View and the Core Competences of a Company

The resource-based view of a firm is a different kind of perspective on strategy, which is said to have started from the work of Penrose (1959), who described a firm as a bundle of resources, and the success of a firm is limited and facilitated by search for the best possible usage of available resources. This idea has since been further developed by numerous academics, of which Barney (1991) came up with a more formalized concept of the framework. According to him resources include assets, capabilities, processes, attributes and know-how within a firm, which can be used to draw up and to implement a competitive strategy. The resources should differ from those of competitors and should be long lasting in nature (Mata et al. 1995). This view has formed the basis for many other theories, many of which talk about the issue with their own terms, like competencies (Prahalad & Hamel, 1990), strategic assets (Amit & Schoemaker, 1993) or stocks (Capron and Hulland, 1999).

Prahalad & Hamel (1990) had a similar take on strategy work, and argued that the strategy of a company should be based on its core competencies, rather than the business environment. They describe the core competencies of a company as something the company does better than anyone else, is hard to imitate or copy, and creates business value. They are "…the root system that provides nourishment, sustenance, and stability…" to the tree (i.e. the corporation). In this view, strategy is something that is created by looking inside the company, rather than the business environment, but still looking for some factor to distinguish the business from others.

Bacha (2012) defined a core competence as:

> *"… the expertise of a firm which is specific to it and allows it to create value and to offer products that are unique and difficult to imitate by competitors in the medium term."*

The core competence view has got a lot of support in the academic discussion, and also many studies support the idea that the internal factors in a company can be a source of competitive advantage, and the market is not the only determining factor, when it comes to

strategy. Agha et al. (2012), for example, found in their study that core competences do have a significant effect on organizational performance. They stated that a shared vision, cooperation and empowerment, all aspects of internal core competence, had a considerable positive correlation with also the financial performance of a company.

Wade and Hulland (2004) on the other hand, saw the core competences, or core capabilities [1], as one part of a firm's resources. The capabilities of a firm could include skills or processes, like managerial ability and systems integration. The other part of resources are the company's assets, which are any tangibles or intangibles in the process of creating, producing or offering products to a market (Sanches et al, 1996). The capabilities transform the inputs into outputs of greater worth (Capron & Hulland, 1999). Together the assets and capabilities define the company's set of resources, which can be used to create competitive advantage. (Wade & Hulland, 2004)

Grant (1991) suggested a practical framework of how resources and capabilities relate to strategy and competitive advantage (Figure 3.). In his model the firm's resources and the optimal usage of them create capabilities leading to competitive advantage. The view is slightly different from that of Wade and Hulland (2004), where the capabilities, are a part of the firm's set of resources, but gives a practical image of how resources affect strategy. This view is more close to the original idea of Penrose (1959), where the focus was on the best possible use of the available resources. Still, he includes tangible, intangible and personnel-based resources into the concept of organizational resources similarly to Wade and Hulland (2004).

In my thesis I will use both the view of Wade and Hulland (2004) and Grant (1991) when I discuss the information system resources, since they together capture the idea that both the assets and capabilities have an important role in the formation of competitive advantage. The assets are not valuable in themselves, but need to be combined with skills and processes, which best complement the assets available.

[1] Wade & Hulland (2004) determined that capabilities and competencies are essentially synonymous, and according to Sanchez et al. (1996) the only difference between them is the fact that core competencies are capabilities that lead to competitive advantage. I will take Wade & Hulland's (2004) view and use the terms as interchangeable, since my focus is on capabilities that create a business advantage.

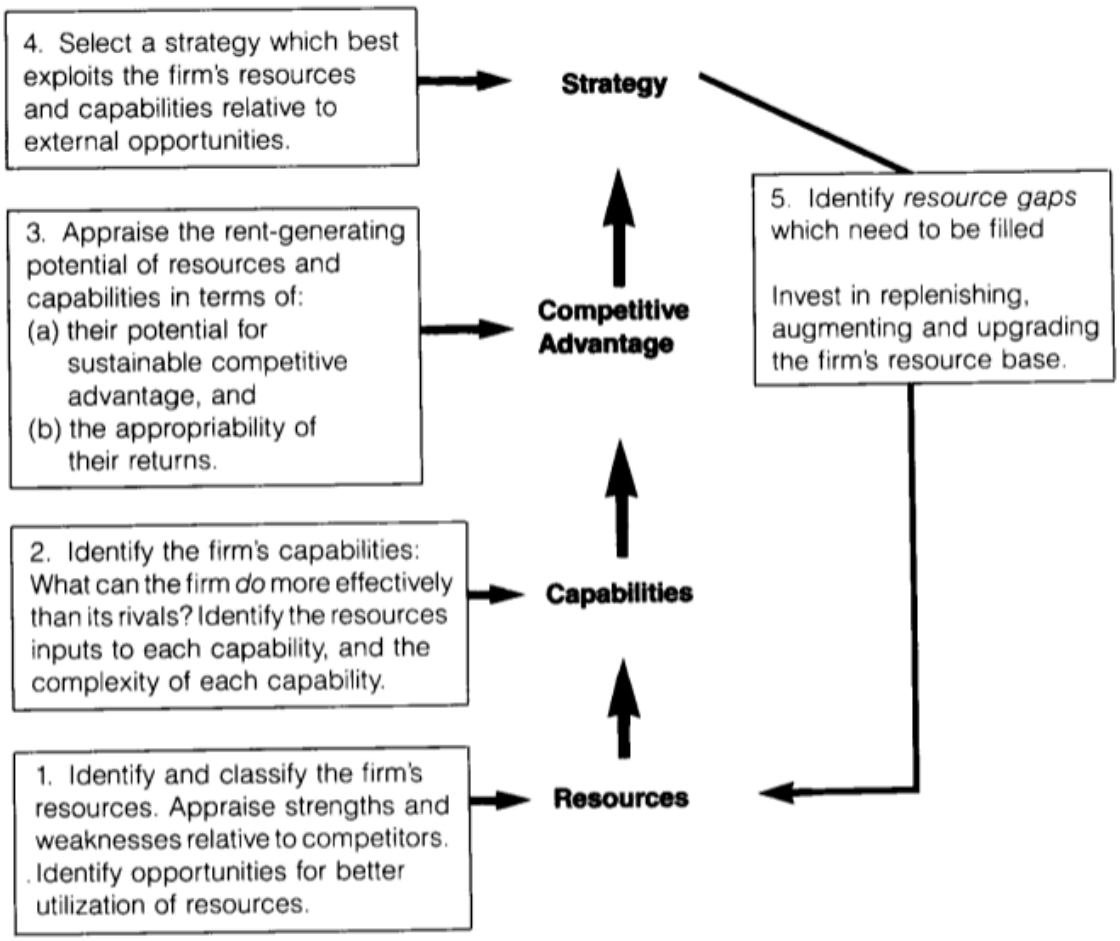

Figure 3. A Resource-Based Approach to Strategy Analysis: A Practical Framework (Grant, 1991)

The resource-based view (RBV) has been critiqued for multiple reasons, like lacking managerial implications or "operational validity" (Priem & Butler, 2001), the idea that basically anything can be considered a resource due to the loose definition (Priem & Butler, 2001) and the impossible nature of gaining sustained competitive advantage (Eisenhardt & Martin, 2000). Still, the theory has widely disseminated, and its value comes from the inside-out focus it has for organizational research. As Kraaijenbrink et al. (2010) point out, not all theories need to have direct managerial implications and that sustained advantage does not mean that the situation would be in any way static. Contrarily, the dynamic capabilities of a company can be at the core of their success. In the context of my thesis, it is very useful to have a complementary theoretical view on the topic.

In sum, the resource-based view of a firm includes the idea of core competencies (Prahalad & Hamel, 1990), but combining them with more tangible or concrete assets, like the network infrastructure or strong vendor relationships (Wade & Hulland, 2004). The resources of a firm are something difficult to imitate and long lasting, similarly to the idea of core competencies. The resource-based view has been used in numerous information systems studies and is still actively discussed among academics and researchers. Many have stated that it is a complementary view of strategy to the positioning theory by Porter (1980), rather than a competing one (Rivard et al.2006). Spanos and Lioukas (2001) have even suggested that the views represent the components of a SWOT analysis framework, where the positioning theory represents the opportunities and threats, and the resource-based view would be the strengths and weaknesses component.

In the next section I will discuss the same two topics, but this time in an IT context and explaining how the views fit into the world of information systems research. In the beginning of the chapter I will first introduce general ideas of IT strategy and its role in business.

2.2. IT strategy

Information technology (IT) or information system (IS) strategies[2] have often been seen as supportive strategies for the company business strategy. There has been an ongoing discussion about the role and importance of IT for organizational performance for decades now. Some academics see IT as a driver for growth and innovation (Porter, 1985; Christensen 1997), while some have criticized that the relevance of IT has been overemphasized (Brynjolffson 1993; Carr 2004). Carr (2004) also strongly opposed to companies making investments to technology based on the big hype around them. Nowadays though, IT is more and more recognized as a key competitive asset that can create real business value, if the investments are targeted in the right way (Henderson & Venkatraman, 1993; Wang et al. 2012; Ravichandran & Lertwongsatien, 2005).

[2] In this study the terms information technology and information systems are used interchangeably, even though usually IT refers to the technology involved and IS refers to the whole body consisting of the processes and frameworks built on top of the technology.

There are different approaches on IT strategy, and academic research hasn't been able to provide evidence on one being ultimately better than the others (Chang & Gurbaxani, 2012), since the productivity effects depend on many variables. Still, there is mostly a common agreement on the fact that a company's IT strategy should be aligned with the business strategy (e.g. Rathnam et al. 2004; Broadbent & Weill 1997; Henderson & Venkatraman, 1993), the greater the extent, the better. The strategy for information systems should be designed as tightly integrated with the business strategy (e.g. Rathnam et al. 2004; Broadbent & Weill 1997; Henderson & Venkatraman, 1993), and therefore the most suitable approach to IT depends on the company.

The importance of alignment is also widely recognized by business managers. This is especially visible in the yearly surveys done by the Society for Information Management (SIM), where "IT and Business Alignment" was seen as the number one concern in 2011 and as number two in 2012 from the top 10 most important issues for IT Management (SIM IT Trends Survey 2011 & 2012). This statement applies, regardless of whether IT is seen more as a support function or a central strategic focus in the company.

Basically, the IT strategy is based on the business strategy of the company and the entire IT infrastructure of a company is built on the IT strategy. The way the IT infrastructure is built and managed is almost like an embodiment of the IT strategy. According to the model of Broadbent and Weill (1997) the elements of an infrastructure are IT components (hardware, servers, networks etc.), human IT infrastructure (skills, policies and experience) and shared IT services (f.ex. databases, data processing systems, extranets) (Figure 4.). The human element of the structure converts the IT components into useful services shared by everyone.

On top of everything are the IT enabled business processes, which represent the applications and services visible to the end user. This is the user interface, where the investments made to the infrastructure actually get utilized and the benefits are realized.

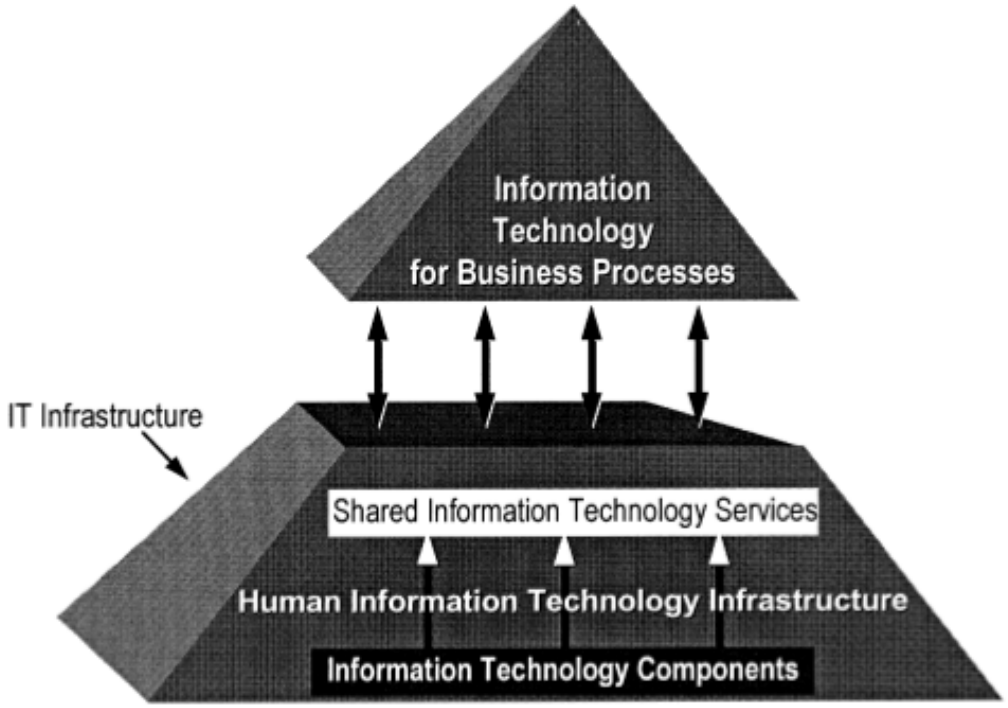

Figure 4. The Elements of IT Infrastructure (Broadbent & Weill, 1997)

A company IT strategy is also dependent on the way the effect of IT on the company performance is seen and understood – if it is seen as a way to build real business value, and should be built to enhance the firm's unique capabilities, or something that is determined on the industry structure (Wade & Hulland, 2004). The former approach is referred to in the academic research as **the resource based view (RBV),** and the latter is called **the market driven view**. Still, it is important to remember that no IT strategy is strictly one or the other, but the value of the different perspectives is to look at the subject from different angles.

Next, I will introduce both of the views in more detail, going further into the strategy discussion in the IT context. I will first discuss Porter's market driven perspective and then move on to the RBV.

2.2.1. The market driven perspective

The market-based view on IT strategy is based on Porter's (1980) strategic positioning model and moves that into the IT context. Already in 1985, Porter and Millar recognized the significance of IT in strategic planning and creating competitive advantage, and though it was published in the very early years of IT revolution, and before the current IT trends, the nature of competition still applies even surprisingly well. They summarize the relevance of technology by stating that information technology is becoming a key variable in all of the parts of a company's value chain. IT has an effect on the inbound logistics, operations, outbound logistics, marketing and sales, and finally and the service. With IT, a business can either lower their costs of business, striving for cost leadership, or they can create unique customer value and differentiate. (Porter & Millar, 1985)

Porter and Millar (1985) stated that information technology can affect the competition in a specific industry in three ways:

- By changing the rules of the competition and the industry structure by influencing the five forces of an industry
- By giving companies new ways to create competitive advantage and outperform their rivals
- By creating opportunities for completely new lines of business

First of all, IT can change the rules of the game in a specific industry by affecting the five forces of it. It can have a huge effect on the bargaining power of both the suppliers or the buyers in the field of business and, according to Porter and Millar (1985), the buyers are getting more connected with the suppliers due to stronger linkages through IT. For example, customers can be "locked in" the supplier by questions of system compatibility, which can pressure the buyer to acquire new systems from the same vendor to ensure that the systems will run smoothly.

IT can also increase or lower the barriers for new businesses to enter markets. For example, industries like banking and insurance require huge investments on systems and technology, which surely has an effect on the number of new entrants in the business. On

the other hand, it has made it possible for e-business to take share from traditional supermarkets in the retail industry. There are also numerous examples where technological advancements have caused a substitute product or service to take over an entire industry. (Porter and Millar, 1985)

Information technology can also provide businesses with ways to create competitive advantage by cost leadership or differentiation, or changing the scope of business in total. IT plays a direct role in the cost structure of a company, but it also alters the cost drivers of operations as well, for better or worse. New systems can take down the cost of production by a huge percentage, but then again, ill-advised investments can result into an unfavorable cost structure and great financial losses. IT also creates new opportunities for differentiation with greater ability to customize products or services, or to create a unique concept and level of service and operation. For example, further features of information systems can be embedded into a physical product to differentiate it from competition. Companies are also entering new lines of business, where the linkage to their business mission has not been so evident in the past, or targeting new audiences of customers. (Porter & Millar, 1985)

Finally, Porter and Millar (1985) stated that the information technology creates new business on three levels; giving birth to new industries, creating demand for new products and spawning new businesses within old ones. Nowadays, there are countless examples of each of these levels. Still, they remind the reader that the relevance and centrality of information technology varies between different industries, influencing the force and pace of the continuous change that is evident across all business in the modern world.

The market driven perspective on information systems sees IT as a way to gain competitive advantage by altering the competitive forces of the business environment (Rivard et al. 2006). It can affect the forces by differentiation or more cost efficiency. In this particular view the industry structure is seen as the primary determinant for strategy and firm performance (Henderson & Mitchell, 1997). As Rivard et al. (2006) described the idea:

> *"Resources are not valuable in and of themselves; rather, their value depends on how well they fit industry structure and how well they support a particular strategy."*

By improving the position in the competitive market, the company can create a sustained advantage, by making their operations and strategy difficult to imitate (Rival et al. 2006)

The market driven perspective is a tool for looking at strategy from different angles. Many IT researchers have indeed recognized the value of Porter and Millar's (1985) view. Levy et al. (1999) even stated that Porter's value chain and competitive forces are "invaluable in analyzing business processes and competitive drivers." Tallon et al. (2000), on the other hand, based their own research on Porter's idea (1996) that businesses often have two key objectives; operational effectiveness and strategic positioning. Correspondingly, Tallon et al. (2000) translated this into four goals for IT:

1. Operational effectiveness, efficiency and cost reduction
2. Market focus of extending market reach and changing the industry and market practices
3. Dual focus combining operational effectiveness and market focus
4. Unfocused goals, where IT is not critical to the business strategy

Even though the positioning and the market driven view on IT have been criticized for being outdated and rigid, it can still be applied to the modern IT environment and one can even find new insights on the way in which IT can affect business. Still, on its own the market driven perspective is not enough to capture the elements of IT strategy. Another take on IT strategy is the resource based view, which some claim to be a competing view (Duhan et al. 2001), and others see it as complementary to the market driven perspective (i.a. Rivard et al. 2006; Spanos & Lioukas, 2001).

Next I will move on to the resource-based view, which takes a more inside-out perspective on IT strategy. I will introduce the general idea of the framework and discuss its linkages to the core competences by Prahalad & Hamel (1990).

2.2.2. The resource-based view

The resource-based view (RBV) started to appear in the information systems research in the mid-1990's and yet the discussion about the business value of IT resources is still ongoing. There have been numerous studies about the connection between IT capability and firm performance, some resulting into an indication of a strong positive correlation between the two (i.a. Bharadwaj, 2000) but many also yielding mixed results (i.a. Brynjolfsson, 1993). Still, the RBV is among the most common strategy theories applied in the field of IT strategy. The basic idea of the RBV was well summarized by Wade & Hulland (2004):

> *"The resource-based view argues that firms possess resources, a subset of which enables them to achieve competitive advantage, and a further subset which leads to superior long-term performance."*

As discussed in the strategy theory section, the RBV links the performance of a firm to the resources and skills of an organization, which are firm specific, rare and difficult to imitate or substitute (Barney, 1991). The researchers supporting this view have argued that since competitors easily duplicate IT investments, the assets by themselves are not a source of competitive advantage. It is rather the way firms leverage their investments, which creates inimitable IT resources that have a real effect on a firm's performance (Mata et al. 1995). Bharadwaj (2000) sums up this idea by stating that despite uniform investments in technology, there will be different patterns of IT use and effectiveness due to the heterogeneously distributed IT resources and skills.

Bharadwaj (2000) separated three different groups of IT resources[3] according to Grant's classification (1991): the tangible resources (the physical IT infrastructure; servers, storage devices and other components), the human IT resources (technical and managerial skills) and the intangible IT-enabled resources (customer orientation, business networks etc.). According to Keen (1991) the IT infrastructure is key in determining the freedom a

[3] Evidently, Bharadwaj (2000) used the terms resource and capability in an opposite way to this thesis, but the content of his IT capability view matches the resource-based view of Grant (1991) and Wade and Hulland (2004), the terms are just used the other way around.

firm has in its business plans. Brahadwaj (2000) stated the importance of the human resources in integrating the IT and business processes, but Wade and Hulland (2004) saw the strategic significance in the difficult transferability of the skills, which can create sustained competitive advantage. The three key IT-enabled tangibles, according to Brahadwaj (2000) are customer orientation, knowledge assets and synergy. Together the three components of resources form the IT capability of a firm.

Ravichandran and Lertwongsatien (2005), on the other hand, identified two dimensions of IS competence. The first one is *transformational competence*, which represents the ability to transform the organization using IT. Basically this means that it is possible to use IT for organizational development and projects aiming for change. Second, there is the *operational competence,* which represents the ability to provide reliable and consistent IT support to the business. At the same time, when IT is used for transformation and change, the systems need to be up and running to ensure maximum efficiency. In their view, the two competencies would have a direct effect on firm performance, and especially, if the firm embedded IT within the areas of core competence. Indeed, they found positive implications that the firm is more likely to gain greater value from the investments when information system initiatives were targeted towards the areas of core capability.

A rising theme in the field of the RBV and the IT strategy is *the dynamic capability approach* (Teece et al. 1997; Helfat & Peteraf, 2003), which was developed as particularly relevant to industries, where competition is based on innovation, price/performance rivalry and increasing returns. The idea of Teece et al. (1997) was that accumulating impressive stocks of technology assets and heavily guarded intellectual property rights does not seem to guarantee competitive advantage for a very long time. Instead the industry winners seemed to be the companies demonstrating timely responsiveness, rapid and flexible innovation and the management capability to coordinate and reallocate internal and external competencies. The researchers referred to the rapidly changing technology – focused markets at the time, but in the modern world this description fits most industries one can think of.

Teece et al. (1997) defined the terminology as follows:

> *We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions.*

As more and more companies find themselves in a need of the ability to rapidly change and respond to change, the dynamic capability approach is ever more relevant. McAfee and Brynjolfsson (2008) stated that the Internet and enterprise IT are accelerating the competition within traditional industries, due to the fact that the processes are becoming ever more digitalized. There has been research about how IT capability can affect the company's dynamic ability or organizational agility[4] (Lu & Ramamurthy, 2011). The results show that it can indeed have a positive relation on the dynamic capability of a firm, when the IT spend is directed correctly. IT investments allocated on the wrong things, on the other hand, can be a sign of an IT group that is off track, and lead to decreased agility. Lu and Ramamurthy (2011) also suspected emergent IT strategy to gain a bigger role, when firms are faced with the modern world of rapid change.

In sum, the RBV emphasizes the importance of the firm-specific resources and capabilities that are valuable, rare, inimitable and non-substitutable. According to Brahadwaj (2000) a firms IT capability consists of the tangible and intangible resources, as well as the human IT-resources, which are all key in building an IT capability that can create competitive advantage. Ravindchran and Lertwongsatien (2005) recognized two dimensions to the capability, which were the operational capability and the transformational capability. Finally, the dynamic capability approach stated that the winners of an industry are the companies, with the ability to respond to change and to adapt a constantly changing business environment. Furthermore, all of the representatives of the different perspectives

[4] For the purposes of the thesis, I will assimilate the terms dynamic capability and agility, since they are both terms referring to the ability of a firm to adjust to rapid change and thrive in a constantly changing business environment (Teece et al. 1997; Lu & Ramamurthy, 2011).

to the RBV pointed out that it is vital to direct the IT investment in the right place, according to the needs of the strategy.

Now when I have introduced two possible frameworks for discussing IT strategy, I will introduce different takes on IT strategy on a practical level. Since nowadays one of the core decisions of every IT strategy has to do with the question of outsourcing, I will introduce the three basic models of it. The section is less based on theoretical discussion but is still very relevant when analyzing IT strategy models and consumerization. It is important to understand the common logic behind outsourcing decisions.

2.2.3. IT approaches in practice

From a more practical perspective, most of the IT strategies can be separated into three categories, two of which are internally managed IT and outsourced IT. The third group includes solutions that combine the two, where only parts of information systems infrastructure and operations are outsourced to an external party. All of the approaches have their up- and downsides, which will be discussed in the following sections.

Internal or owned IT is the more traditional way of building IT systems in organizations. In this approach, the IT hardware and human resources are owned and managed internally by the company. The machines are located in the firm compound and maintained with internal efforts. The advantages of having and internal IT systems are thought to be less dependency on external partners, more control over IT decisions, as well as more reliability through shared responsibility and goals. On the other hand, having and maintaining a company's own datacenter is in some cases more expensive and requires staff with deep IT expertize.

Another approach to IT, a constantly more popular one, is outsourcing the function. In 2010 the worldwide spending on IT outsourcing grew to $821 billion and continued to increase (Gartner Dataquest, 2010). The discussion of the reasoning behind outsourcing IT often revolves around the firm's core competencies (Prahalad & Hamel, 1990) and how

competitive advantage is achieved. When IT is only seen as a support function, and not as a core competence, it can be outsourced to a vendor with sufficient expertize. This way the company can focus on their own core business and leave the IT into capable hands. The underlying assumption is that IT vendors are more likely to retain the real experts of the field, which causes benefits of specialization and scale (Shi, 2007; Chang & Gurbaxani, 2012). Other benefits of outsourcing are managerial flexibility and rapidity of setting up the infrastructure.

According to Shi (2007), the most common reasons for this IT outsourcing have to do with cost cutting, and often unrealistic expectations of savings. Outsourcing also has its risks and the company might end up losing more money due to outsourcing problems instead of achieving any savings. This kind of project failure can result from many things, which might be problems at the client, the vendor or the client-vendor relationship (Shi, 2007).

Quite often companies end up building an IT environment, where only parts of the system are outsourced to an external vendor. The outsourced part can be only the hardware, where the physical machines are located in an external datacenter, but the company chooses to operate and manage the systems and applications internally. Another example is a model, where the company owns the hardware and manages the software and applications, but the operating and maintenance function is outsourced to an IT service provider. In the hybrid-outsourcing model, companies try to pick out the best features of outsourcing like cost savings, while similarly minimizing risks and maintaining control of the functions that are most central to them.

Basically, a company might choose to outsource the entire infrastructure depicted in Figure 4. or pick and choose only parts of it for outsourcing. Some companies still prefer to have an IT function that is entirely owned and managed by them, or only outsource minor things, like the helpdesk function. All of the models have their pros and cons, which means that many companies are constantly optimizing the best possible solution and weighing the costs versus the risks versus other benefits, trying to find a well-balanced solution.

2.2.4. Summary of the IT strategy framework

In this section I will wrap up the chapter and gather the discussed themes together into one image. The picture (Figure 5.) is a summary of the topics discussed in chapter 2. and their relation to each other. I have modified it from the IT infrastructure pyramid (Figure 4. p. 21) by Broadbent & Weill (1997) by adding the IT strategy as a basis for the infrastructure. It gives a visual image of where the different topics stand compared to each other and the structure and logic I build my research on.

As discussed before, on the top of the pyramid are the business processes, the applications and the systems in the user interface. What is important to understand is that the tools and solutions visible to the end users are only a small tip of an iceberg of information systems, networks, integration layers, platforms, hardware and IT experts (Broadbent & Weill, 1997).

In the middle is the IT infrastructure, consisting of the IT components, the human IT resources and the shared services. This is the layer, of which parts can be outsourced or performed internally, depending on the IT strategy. The IT infrastructure should be tightly integrated, which is the most challenging part of building it (Broadbent & Weill, 1997).

The IT strategy is a basis for the entire structure, determining how the infrastructure will be organized and what are the main goals for it. The IT strategy should, in turn, be tightly aligned with the business strategy to ensure the same direction of development and operation (i.a. Broadbent & Weill, 1997; Henderson & Venkatraman, 1993). The IT strategy is investigated from two perspectives, the market driven view (Porter & Millar, 1985) and the resource-based view (i.a.Bharadwaj, 2000; Ravichandran & Lertwongsatien, 2004), which also includes the theory of core competencies (Prahalad & Hamel, 1990).

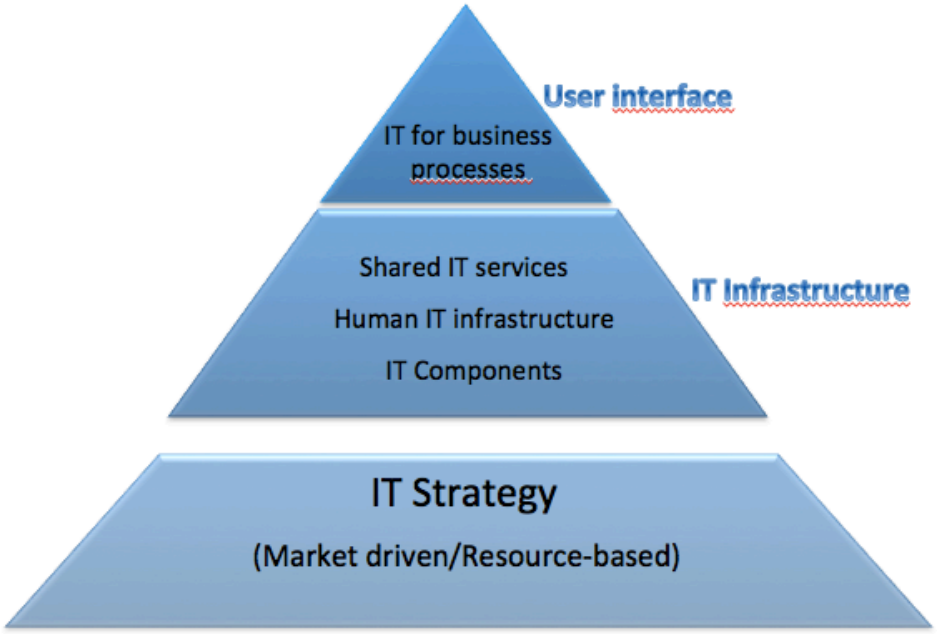

Figure 5. The IT Strategy and Infrastructure (modified from Broadbent & Weill, 1997)

In the next section I will describe the phenomenon of consumerization and its effects on the world of IT. I will start by explaining it on a more general level and then proceed to its different aspects and related technology trends. I will introduce the trends individually, and explain their relation to consumerization. Finally I will give a short description on the effects and future prospects of the whole phenomenon.

3. CONSUMERIZATION OF IT

There has been an ongoing turn in the information technology industry from technologies being developed primarily for businesses and then spreading them slowly to the consumer markets to consumers being the driving force of IT. This phenomenon has been referred to as consumerization of IT. The implications of the consumerization turn are visible in, for example, mobile application stores, low-cost video conferencing tools and the social media. All of the mentioned technologies have been widely adopted by the consumer markets, but are still in the process of being established on a bigger scale in the business world. Also, the so-called Bring Your Own Device (BYOD) –strategies are becoming more common in the working world, which is seen as a result of the consumerization turn as well.

Unfortunately, there are not many academic research articles published on the topic, probably due to the fact that the concept has arisen to the public discussion only during the last few years. Furthermore, the theme is extremely multidimensional, and very hard to grasp as a whole. In contrast, the material published by IT firms and consultancies are various, demonstrating the busy discussion around the matter. The manifestations and the consequences of the phenomenon are numerous and diverse, and even in the IT professionals sometimes seem to have a very limited view on what it means. Often, the discussion revolves around the BYOD-policies, underestimating the magnitude of the ongoing change.

The trend has caused a lot of concern in the IT management level, since often the consumer devices cause a big information security risk for the company. As stated by Harris et al. (2012): *"The prospect of employees bringing consumer IT to work raises concerns about data security, reliability and performance, and apprehensions about accuracy, dependability availability and connectivity."* On the other hand consumer technology has it's pros as well, being cheaper, more flexible with current technology, simple to use and install, and can be used in innovative ways. (Harris et al. 2012)

Harris et al. (2012) have described the phenomenon from three different perspectives:

Employee perspective: *"…IT consumerization captures an individual's usage of, and familiarity with devices and applications in his or her personal life that are useful when applied to the individual's job; experiences gained from personal life are seamlessly transferred and expected in the workplace."*

IT department perspective: *"…IT consumerization is the plethora of devices and applications used within the corporate firewall that may not be part of a company sanctioned list and/or have not been formally approved and that may be seen as either a threat or an opportunity."*

Market perspective: *"… every device and application that originates in the consumer market and that, at least originally, was not targeted to be used in addition to, or in lieu of, enterprise IT."*

Harris et al. (2012) point out that it is not only about employees using their own IT at work. The IT department deploying customer-oriented technology as part of its portfolio qualifies equally. But consumerization goes beyond social media and different gadgets in the company internal IT policies (Harris et al. 2012). This causes pressure for change in the user interface, which in turn, has an effect on the other levels of infrastructure and systems.

Consumerization not only affects the demands for technology used by the regular employees, but also the way in which enterprise IT is acquired and used. The customer expectation in the enterprise IT market is changing rapidly and the vendors are facing new demands about delivery times, support services hours, usability of the services and so on. This kind of consumer-like behavior and service expectations are also penetrating the field of enterprise IT, alongside the consumer technologies (Blount, 2011).

Companies are moving towards a direction, where the employees are more like consumers throughout the organization and across job roles. This trend is accentuated by the big generation change in companies, where the incoming young workers are more technically oriented and want to use similar technology and systems at the office. Furthermore the

focus no longer seems to be on the functionalities of the systems designed for enterprise use, but instead the usability and easy adoption are increasingly important. (Blount, 2011)

The ongoing change is not only related to technology per se, but is an implication of a shift in control from the IT departments to the users. This means that the IT will have less control over the resources, but a wider responsibility of device management and security. In practice, the users will make their own decisions about technology and the IT will have to adapt to it. The trend is escalated by the generation shift in the hiring market, with the younger and tech-savvy employees forming company preferences according to the technology used for working. (Blount, 2011)

The shift in power relationships between the IT unit and the employees can also be looked at as an extension of a bigger ongoing change in the world of management. More and more employees today, especially in the western countries, are considered to be knowledge workers; people with high degrees of expertize and education, working with their brain rather than their bodies (Davenport, 2005). Their expertize is an important and rare asset to the employer, and organizations do not want to let these people and their information "capital" leave (Reboul, 2006 in the article Mládková, 2011).

Knowledge workers cannot be managed with a traditional factory management model, with strict restrictions, punishment and reward. In fact, this type of leadership will even have a negative effect on their motivation and productivity (Mládková, 2011). Furthermore, legitimate power, which refers to power given by organizational position, has been found to be negatively related or unrelated to managerial effectiveness, when it comes to knowledge workers (Aguinis et al, 2008). In short, the knowledge workers do not have the same respect for hierarchy and formal guidelines as the average employee.

According to Mládková (2011), they are in a position to choose their own working methods and standards, and they make their work decisions independently. Due to the fact that they possess information and expertize, both tacit and explicit, they are in the power position to do this (Mládková, 2011). This statement bears great resemblance to what is going on with the consumerization trend in organizations. Employees choose to act against the formally set standards of working, and choose their own technology and equipment for their job.

This has caused great interest in the academic world, as well as businesses, and the desire to find the optimal way to manage these types of people. Managing knowledge workers is a challenging task, also due to the fact that their activity can be hard to measure. Still, there has been a tendency to create a more flexible work routine and give more autonomy to the knowledge workers. One strategy is called HISPLA; Hire Smart People and Leave Them Alone. The HISPLA approach is somewhat extreme, but gives an image of which way the management trend is going. (Mládková, 2011)

From a consumerization perspective this means that the employees are increasingly making their own decisions about their work, and the employer's role is to adjust to that and to enable maximal productivity. From an IT perspective it means, that the IT manager's job is to ensure security in all situations, and to cope with the diverse technologies.

Next, I will introduce the different technological dimensions to consumerization; that is, a few of the dominant trends in the IT market today. I use "the Nexus of Forces"-framework by Gartner (2013) to introduce the trends and how they relate to consumerization.

3.3. Dimensions of consumerization

Gartner (2013) introduced the basic framework of "The Nexus of Forces" (Figure 6.), which depicts the four main forces that are visible in the current IT development, all of which originate from the phenomenon of consumerization. They describe consumerization as

> *"… the canvas on which the nexus is painted. As business consumers find technology more approachable, they begin to innovate using that technology to change business. The easy availability of cloud services, social communities and mobile devices – and the means to consume a wide volume, variety and velocity of information – places a great deal of power in the hands of the average business consumer."*

The forces represent four major trends that are visible the IT business at the moment and they are called social, mobile, cloud and information (depicted in Figure 6.):

Social - The social network applications and other media (i.a. Facebook, LinkedIn, Dropbox, Wikipedia, GoogleDocs) for sharing information and material

Mobile – The rise of mobile technology and applications usable in devices like smart phones and tablets, increased connectivity and availability, as well as the rise of enterprise application stores

Cloud - Software and services based on an Internet platform, which can be accessed from any computer or mobile device, and the charging is based operational expenses

Information – Systems designed for collecting and analyzing big amounts of data to gain valuable insight on the business or customers

In the following sections I will introduce the elements of the Nexus of Forces more thoroughly and explain the connection to consumerization. According to Gartner (2013) the trends are mutually enforcing in nature, and their relations with each other are also further discussed during the rest of the chapter.

Figure 6. The Nexus of Forces (Gartner, 2013)

3.3.1. Social

Social is probably the most familiar of the forces to an average consumer. The last decade has been a real triumph for social media, and the most popular social platforms have spread almost everywhere around the globe. Facebook currently has over 1,1 billion users (Statisticbrain, 2013) and a hundred hours of video are uploaded to YouTube every minute (YouTube, 2013). The development is enhanced by the mobile and cloud technologies, which ensure access to the platforms from anywhere, at any time (Gartner, 2012). People want to be connected to the social apps and tools constantly, regardless of where they happen to be.

The rise of social media has many faces from a business perspective. Probably the most traditional way to look at social media is a tool to communicate with customers and consumers and to get input or to find new business opportunities. Furthermore, they can provide new possibilities for companies' internal communication and collaboration. Finally, they are increasingly used as a source of data and consumer information to be used in data mining and analytics, which will be discussed further in the information and analytics section 3.3.4.

Since the rise of the social media and web-based collaboration tools there is a new demand for enterprise tools as well. There are a variety of social platforms designed for different purposes for personal and business use. There are tools for personal and professional networking (f.ex. Facebook, Linkedin), document sharing and collaboration (f.ex. GoogleDocs, Yammer, Dropbox), information sharing and discussion (f.ex. Twitter, Blogspot) (Kaplan & Haenlein, 2010). All of these platforms or ones with similar characteristics are being adopted in businesses as well. Many times, employees perceive the consumer tools tools to be – and often they are – more powerful, more useful, easier to use, faster to obtain, and more fun than those provided by the enterprise IT (Harris et al. 2012). The traditional enterprise solutions provided by IT departments are often seen as stiff, old-fashioned and no-longer adequate for supporting efficiency (Blount, 2011).

The social phenomenon has raised the interest of academics around the world and especially social networks and their effect on job performance has been a hot topic. They can be seen either as a distraction to the daily work duties, and many do see them that way, or as a resource and a contributor to performance (Zhang & Venkatesh, 2013). Still, an increasing number of studies indicate importance of communication networks both online and offline should not be overlooked (Zhang & Venkatesh, 2013), and social networking can indeed have a positive effect on the job performance. Not to even mention the positive effect on employee satisfaction, if they are allowed to use social media tools freely (Harris et al. 2012).

There are still big challenges related to the social media from an organizational perspective. Due to the social media turn, companies have very little control of the information shared about them in the Internet and social media (Kaplan & Haenlein, 2010). Kietzmann et al. (2011) state that corporate communication has been democratized, and the power is no longer in the hands of the marketing or PR people, but the individuals and groups that create, share and consume YouTube videos, tweets, Facebook entries and pictures. The list goes on and on. There always is a risk in the public social media that the employees will accidentally or on intention spread confidential or detrimental company material. Naturally, also the people outside the organization can be the ones sharing unwanted material in the social media.

3.3.3. Cloud

Cloud computing has been a hot topic in the IT world for some years now, and faces huge expectations for the future. The global spending on cloud has increased tremendously over the last few years (from $75.6 billion in 2010 to $109.3 billion in 2012) and is predicted to rise to more than $200 billion by 2016 (Gartner, 2013). A widely cited definition for cloud computing was provided by the U.S. National Institute of Standards and Technology (NIST), though later the organization has closed down. Still, the final definition is used in various publications (i.a. Williams, 2012, 2; Zhang et al. 2010; Walterbusch et al. 2013).

> *"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers,*

storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models."

The five characteristics mentioned in the definition are on-demand self-service, broad network access, rapid elasticity, resource pooling and measured service (Williams 2012, 2; Dihal et al. 2013). The idea is that customers are able to purchase the services quickly through self-service portals, and access them from a broad range of different devices and systems, through internet. The cloud resources are scalable to a large pool of users at all times and can be updated easily by the supplier. Measured service refers to the feature that the supplier can calculate the utilization of the service by every customer very precisely, and apply a usage-based pricing model for it.

The three service models refer to different kinds of cloud services; Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). The most commonly used is SaaS, where the company buys an application, such as the travel expense system or email, and it runs on someone else's cloud infrastructure. Here, all the updates and maintaining the software is done by the service provider. With PaaS, the customer buys a platform, where they can build and manage their own applications. They are often used as test environments or application "sandboxes", where the customer can design and test new applications. Finally, IaaS is a model, where the necessary hardware capacity is delivered by the service provider and the customer can run their applications on it. (Williams, 2012, 2)

The four deployment models are private cloud, public cloud, community cloud and hybrid cloud (Williams, 2012, 2). **Private cloud** refers to a cloud service that is built for a single organization and can be managed by the company internally, or by a cloud provider. **Community cloud** is based on the same idea, but is built to be shared by a specific group of organizations. **Public cloud** means a service, which is purchased from a cloud provider, who manages the infrastructure and offers basically the same standardized solution to all customers. For example Amazon, Google, Microsoft and Apple are all known public cloud

providers. **Hybrid cloud** is simply a combination of two kinds of cloud, and is the most commonly used of the four. The aim is to combine the advantages of the deployment models, offering more flexibility, while addressing the security problems related to public cloud. All of the introduced elements of different kinds of cloud services are depicted in the visualization of cloud services (Figure 7.), originally published by NIST.

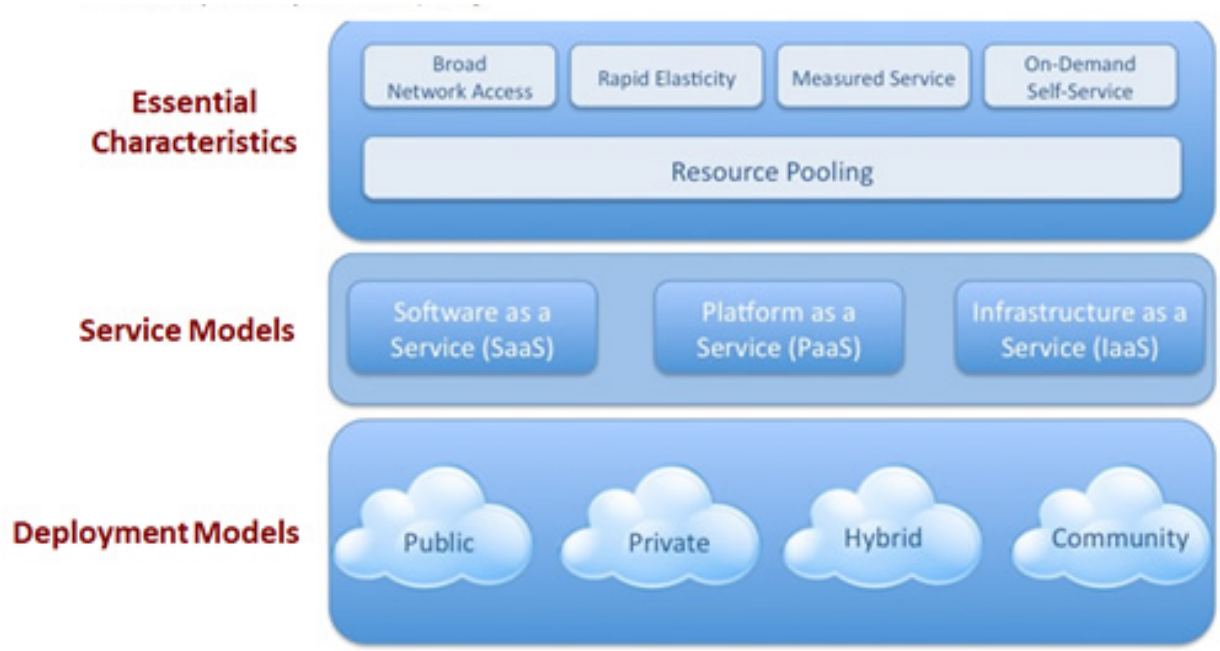

Figure 7. The NIST visual model of cloud (Coalfire, 2012)

The framework provided by NIST has been the basis of the common way to look at cloud computing. Plummer (2012), on the other hand, took a more practical approach to defining the technology:

> *"Cloud computing means someone else runs your computers and software while you use what they deliver and focus on delivering value"*

Plummer's (2012) definition basically sums up the more elaborate descriptions on what cloud computing is based on, when it comes to using cloud services from an external service provider. It can be understood as a new way of outsourcing parts of processes or just tiny sections of a company's IT environment. Respectively, when it comes to private cloud environments, it is a new way to build the IT architecture within the company.

The benefits of cloud computing from an organizational point of view are ease of implementation and use, flexibility, scalability and transparent pricing systems. They are traditionally seen as a tool to increase IT agility without having to do a big up-front investment, since the costs are based on utilization. On the other hand, there are further problems or at least questions with security and privacy, as well as the relatively high cost compared to traditional solutions, when it comes to the total expenses. (Zhang et al. 2010)

3.3.4. Information & Analytics

With the social media, mobile technologies and other phenomenon of the digitalized world, there is more data available than ever before. In fact, in 2012, 90% of the data in the world had been produced in the two previous years alone (Paknad, 2012). Furthermore, there are the resources to store it, since storage capacity is cheaper, faster, more flexible and has higher performance than ever. With the cloud technologies, a lot of this information is not only available, but also available in a virtual form and reachable through the Internet. Finally, the tools for analyzing data are now capable of handling large amounts of data and performing more sophisticated and multidimensional analyses based on it. All of this has helped in giving rise yet to another IT trend: big data analytics and advanced analytics (also referred to as business analytics, data mining, data warehousing and predictive analytics). (Russom, 2011)

Interestingly enough, Porter and Millar (1985) were already aware of the possibilities of data collection and analytics in the 1980's, even if the level of technology was quite different back then. They captured the essence of big data before it actually existed, and their description still applies today:

> *"Information technology is generating more data as a company performs its activities and is permitting to collect or capture information that was not available before. Such technology also makes room for a more comprehensive analysis and use of the expanded data. The number of variables that a company can analyze or control has grown dramatically"*

Big data analytics is a combination of two elements: big data and advanced analytics. According to Manyika et al. (2011) big data refers to *"datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze."* Russom (2011) extends the meaning of big data by adding the attributes of data variety and velocity into the definition, in addition to the volume of it. His idea is that there is a large amount of various kinds of data stored (structured and unstructured), and in various velocity or speed, which means the frequency of generation and delivery. The velocity of data can be divided into *batch processing,* which means analyzing data at rest, and *stream processing*, which are real-time analytics on data in motion (CSA, 2013). Russom's (2011) description of the topic is well in line with McAfee and Brynjolffson (2012), who named the key elements of big data as volume, velocity and variety, which separate big data analytics from the traditional BI and analytics.

Advanced analytics, on the other hand, is "a collection of related techniques and tool types, usually including predictive analytics, data mining, statistical analysis, and complex SQL" (Russom, 2011). Basically it refers to the state of the art tools and techniques used for analyzing big data, in order to discover new business facts, to find new business potential and to understand change, customer behavior, or other valuable information. (Russom, 2011) As pointed out by McAfee and Brynjolfsson (2008), data analytics can also be a way to generate ideas and innovation complimenting the internal work done in organizations.

One major thing that makes analytics and information particularly difficult to grasp is the vast variety of different terminology used to describe it. The founding of this technology lies in the field of business intelligence (BI), but with the more advanced techniques and systems, it has developed into its own field in the world of IT. The development is so recent that the terminology has not yet been regularized, so the discussion around the topic forms a jungle of synonyms and terms with only a slight difference in meaning (big data, analytics, advanced analytics, data mining, etc.) (Russom, 2011). For clarity and consistency, I will be using the terms big data and advanced analytics, to discuss the information theme throughout my thesis.

Huge potential is seen in this new field of technology, and it can be exploited in various contexts to create business value. According to studies, data-driven management has a positive correlation with the productivity and profitability of a company (McAfee & Brynjolfsson, 2012). It can be used to gain deeper customer insight and information, and to map out consumer opinions and attitudes, through data collected from the customers or only by scanning the Internet. Other uses could be more general business intelligence related things, like price and cost optimization, planning and forecasting, and understanding of business change. Finally there are analytic applications for very specific tasks, like fraud detection, risk assessment and proactive maintenance systems. (Russom, 2011)

Information and analytics seems to be the hardest aspect to connect to consumerization directly, since the technologies used are quite far from anything a typical consumer would use. Rather, it is an area of IT, for which consumerization is a great enabler. Due to the new technologies there is a vast amount of consumer data available, and the value of it is tremendous for businesses today, especially combined with their internal information sources.

3.3.2. Mobile

There has been an explosion in the sales of mobile technologies during the recent years. Credit Suisse has predicted that the trend is not about to turn very soon and the annual sales numbers of smartphones will hit one billion globally in 2014 (Reuters, 2012). Mobile technology is quickly changing the way we communicate and collaborate at work. Accenture has forecasted a high-level of adoption for mobile business apps, which support general business activities, and mobile enterprise apps, which provide access to internal IT systems, within the next few years (Stieglitz & Brockmann, 2012).

When I discuss mobility or mobile devices, I refer to portable computing devices that run operating systems designed specifically for such devices, such as smartphones and tablet computers, according to the definition of Tama (2012). I will separate laptops from the topic as its own entity, somewhere between the mobile and traditional IT tools, even though they can be considered to be mobile devices as well.

The general assumption has been that mobile devices are a means to increase employee productivity and to support more flexible working practices:

> *"From an organizational perspective, mobile technologies such as smartphones, tablets and laptops enable users to engage with customers, suppliers and colleagues at any time and from anywhere"* (Dery & MacCormick, 2012).

Dery and MacCormick (2012) emphasize that there has been a shift in the usage of mobile devices in organizations from the promoted higher ability to access and respond to urgent messages towards an expectation of constant availability. According to them, mobile devices are no longer a tool, but a part of life.

The mobile devices also provide flexibility in the physical working conditions and decrease the significance of traditional office settings, and a growing share of work is done outside the workplace. Organizations are increasingly turning into, what Stieglitz and Brockmann (2012) call "mobile enterprises", where the enterprise systems can be accessed wirelessly via a smartphone or a tablet. Many organizations are enabling access to business processes and key enterprise systems like the ERP or the CRM with mobile terminals. The mobile technologies have been shown to create business value by increased productivity by real-time access to data and by faster provisioning of ad hoc communication. (Stieglitz & Brockmann, 2012)

Still, there are downsides to the mobile technologies used for business purposes as well. Firstly, the devices are often considered a security risk for the company, since the mobile security software are not always up to standards, and on the other hand, the devices can be lost or stolen fairly easily, due to their small size. Stieglitz and Brockmann (2012) state that mobile devices that contain confidential business information, are especially vulnerable from a security perspective, and need high-level security systems for access and data.

Secondly, the mobile technology usage for business has raised a big discussion around the work-life balance, and blurring of the boundaries between work and personal life. Dery and MacCormick (2012) found in their study that the aim of increased connectivity with mobile devices turned into an expectation of constant availability round the clock in a few years

after implementing the “mobile enterprise”-idea. There is not as much respect for people’s free time now, when they can be reached so easily at all times. They also found that people even started to feel guilty about the times they were offline, because of the unofficial norms that had formed (Dery & MacCormick, 2012). Naturally, this increases the stress levels and risk of work exhaustion.

Next, I will end this chapter by doing a short summary of the consumerization phenomenon and introduce how businesses have reacted to some of the outcomes of it, trying to take the topic into a more practical context.

3.4. Consumerization summary & reactions in the business world

The vastness of the topic and the many faces of consumerization make it difficult to understand and to grasp the effects of it. On a general level, the idea is clear; the consumer technologies and characteristics of them are making their way into the enterprise IT. It is often confused with BYOD, but in reality, BYOD only represents one small part of the whole phenomenon, though one of the most visible ones. Either way, the meaning of the change on a practical level often stays somewhat blurry.

Gartner (2013), has tried to capture the more technological part of the change, with the Nexus of Forces (Figure 6.), which depicts technology trends that have sprung up (at least partly) due to consumerization or further enabled it. Consumers are getting more technologically oriented all the time; they take their smartphones everywhere and they are constantly logged in to social media. The enterprise IT is facing demands for wider accessibility and agility, resulting into increasing utilization of cloud –based solutions and applications. Finally, the amount of consumer data available in digital form nowadays has exploded during the last decade, causing a constantly rising interest in collecting and analyzing it for business use.

Harris et al. (2012), on the other hand, came up with a framework of approaches by businesses to the new demands caused by consumerization. Note, this model only discusses the problem of consumer-technologies, like personal smartphones, entering the company arena. Their model separates three main categories of reactions: laisseiz-faire (giving employees freedom to use the devices they choose), authoritarian (exercising tight control over the devices and applications used) and the middle ground strategies (somewhere between authoritarian and laissez-faire). There are four levels of middle ground strategies from slowly accepting individual new technologies to be used, to a gadget-budget, to new technologies being adopted and encouraged by the management The framework by Harris et al. (2012) succeeds in presenting some implications of consumerization into an easily captured form, showing the impact of consumerization on a more practical level. Still, it does not grasp the phenomenon as a whole, but only a small part of it.

Finally, the consumer-like behavior is also slowly moving into the enterprise-arena, and the decision-making models and criteria are closer to the consumer market than before. The service expectations of enterprise IT is shaped by the consumer technologies (Blount, 2011), causing pressure for IT vendors to modify their solutions and models, changing the IT game on a wider scale.

I will now move on to describing the research design and the aim and phases of it. First, I will give a short introduction on the general choices and assumptions, as well as the basis of the research logic. After that I will explain the research method and the data collection phase in more detail. Finally, I will go through the data analysis and how it was conducted, and in the end evaluating the reliability and validity of the study.

4. RESEARCH DESIGN AND PROCESS

In my research I will reflect upon consumerization and its effect on IT strategy, using two different strategy frameworks, compatible with IT strategy studies. To get a better grasp of the phenomenon, I will use the concept of the Nexus of Forces to study the different characteristics of consumerization, and the IT trends related to it. The IT trends represent different perspectives of looking at consumerization and how it has already influenced the world of IT. In this section I will introduce how my research is done and why I have chosen this particular approach. I will start by explaining the more general choices and continue with the more detailed explanation of the interviews and analysis. First, I will explain the basis of my research and then describe the progress and phases of it.

Most of the research of consumerization is concentrated on the direct effects of it on everyday decisions of company employees, but the indirect effects of it have yet to be analyzed. The primary impacts of the phenomenon have to do with the user interface of the IT architecture, like demands for more mobile possibilities and social media usage, but I want to know how that will affect the other layers of the infrastructure and whether that impact will reach the foundations of the whole IT function; IT strategy. My research problem is depicted in Figure 8, which I have formed using the models from Gartner (2013) and Broadbent & Weill (1997).

The IT infrastructure in companies can be presented as a pyramid shape, like the model introduced in chapter 2.2.4. (Figure 5. p.31), where the applications and business processes, which are visible to the end user, only represent a small peak of the whole construction. In the middle are the system management and system software related items, the human IT infrastructure and the actual hardware (servers, networks and storage capacity). The two top layers of pyramid are the elements of the IT infrastructure according to Broadbent and Weill (1997) (see Figure 4. p.21). The model is a general picture of how an IT infrastructure is built.

The way the IT infrastructure will actually look like, depends on the company's IT strategy, which I have placed as being the foundation of the pyramid. Everything starts from the IT strategy, like decisions about organizing the IT function or the hardware components - if they will be outsourced or not. The IT strategy can theoretically be viewed to be market driven or resource-based. Realistically it cannot be said to be one or the other, but all IT strategies can be investigated from both perspectives.

In businesses, a big part of the impact of consumerization is on the user interface level, or the business process level, causing new demands for technology by the everyday users. Employees are looking for systems that are more flexible; allow them to access, share and store information in from anywhere, any time and with any device. Furthermore, all of it has to happen in real time, with up to date information. In my study, I will try to understand how all of this will affect the lower levels of the pyramid; the hardware and system management levels, as well as the IT strategy itself, which I have communicated by placing the trends (Gartner, 2013) pointing to the top of the pyramid.

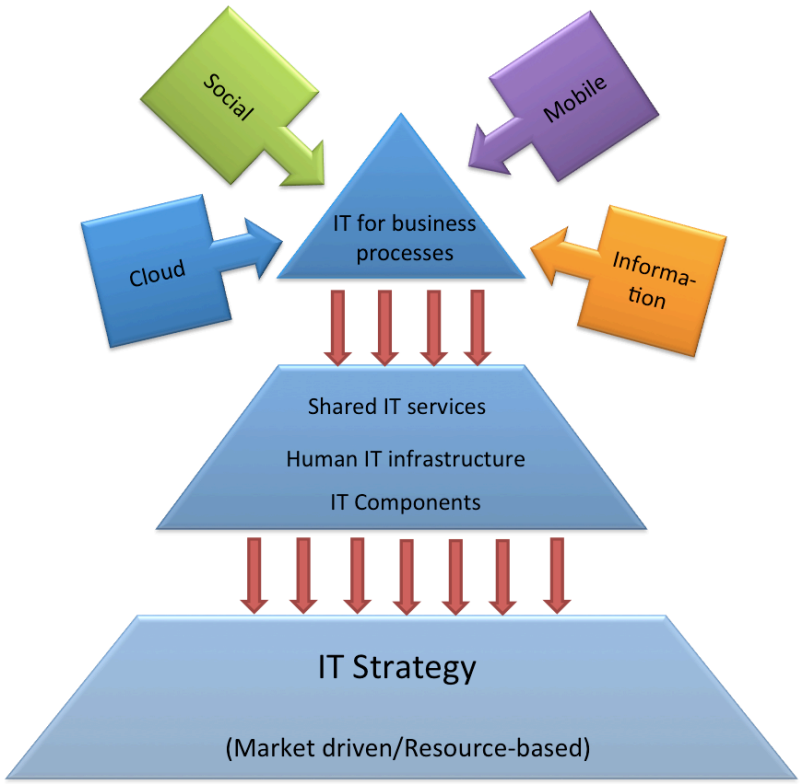

Figure 8. The Indirect Effect of Consumerization on IT Strategy

4.1. Research method and data collection

I chose to do a qualitative study because of the freedom it gives in studying things from different angles. Due to the complexity of the topic a quantitative analysis didn't seem sufficient in finding an answer to the research question: "How does consumerization impact IT strategy?" With a qualitative approach, I was able to study the subject from a more holistic perspective. Since the phenomenon has to do with human behavior and choices, statistical analysis would not have been sufficient to dig out the more subtle tones of attitudes and opinions about the different trends.

Due to the lack of previous research, there was little theory basis suitable for investigating my topic, and thus the aim of my study was to find new insight for regularities and patterns in decision-making, and to get an image of the underlying logic. The assumption was that there can a correlation between consumerization and IT-strategies. My aim was to discover mutual indicators that could give insight on where the IT development might be going in the future, constructing elements for theory, in the absence of an existing one.

The empirical data was collected trough interviews with top-level people in organizations, who make decisions about IT strategy and solutions in their everyday work. In practice this means that most of the interviewees were CIOs and some were heads of IT procurement processes. The titles of the interviewees vary somewhat due to the different way of constructing the IT function in each company. Still, I will refer to this group of interviewees as CIOs from here on. The representatives of the IT companies were people from the higher levels of management, since typically the companies in IT business do not have a traditional IT unit managed by a CIO.

The discussions were conducted in the form of recorded semi-structured interviews or the interview guide (Patton, 2002, p.283-284), also known as a theme interview. I chose this method, because the aim of my interviews was to end up with comparable answers, so it was good to have some structure in the interviews. This also helped in finding patterns and regularities between the comments. Still, it gave freedom within the interviews to dig deeper into the upcoming issues that seemed relevant to my topic. It was hard to know

beforehand, whether some parts of consumerization are more influential than others. I wanted to have the freedom to emphasize the topics that seemed most relevant to each interviewee. All of the interviews were taped with a tape recorder, and afterwards transcribed.

For the purposes of the research I divided the IT procurement strategies into three general categories, to make sure the interviewee pool was diverse. The first category was owned or internal IT, in which the IT hardware is owned and managed by the company, usually through a centralized department dedicated for this task. The second main strategy is outsourced IT, where the company is using an external IT service provider, who builds the systems, maintains them and provides the hardware capacity for this. Hybrid solutions, combining aspects of owned and outsourced IT, form the third group.

My aim was to find companies that were very diverse, when it came to IT procurement and processes, which is one indicator of IT strategy, to be able to analyze the effect of consumerization in different contexts. Making this decision, I maybe lost some depth from the end results, but gained a better general outlook on the current direction of developments. The companies were all mid-sized or large Finnish based companies, except for one, small firm of specialists, which is quite influential in the current IT market in Finland.

The basic framework was the same with each interviewee, but the actual content varied somewhat in each discussion. The focal point of the discussions formed according to the interviewees' stand on the relevance of each topic to their work. I followed the interview structure more closely in cases, where the interviewee was not very talkative, and let the conversation flow more freely, when the interviewees got excited about the subject and kept the discussion going without my strict guidance. Also the interviewees were all highly occupied people, and sometimes I had to skip a few small steps to stay within the time limit. I prepared 1-3 questions in advance about each that I asked every interviewee, and the rest were topics I wanted to cover during the interview, if possible (Appendix 1.).

1. INTRODUCTION, BACKGROUND INFORMATION
2. STRATEGY & IT STRATEGY
3. SOCIAL MEDIA – Effects on it strategy
4. CLOUD COMPUTING – Effects on IT strategy
5. INFORMATION/BIG DATA – Effects on IT strategy
6. MOBILE TECHNOLOGY – Effects on IT strategy
7. CONSUMERIZATION
8. OTHER UPCOMING TOPICS

The duration of the interviews was around one hour, and I conducted 12 interviews in total. The choices were in alignment with Stake's (2005 p.451) statement of focusing research efforts in the place, where one can learn the most. I conducted ten of them in the first interview phase, mapping out the general picture and outcomes, bearing in mind that there might be a need for second, smaller round of interviews.

Due to the complexity of the topic and the diversity between the businesses, it was difficult to analyze the topic comprehensively with the interviews I had, so I decided to do two extra interviews on top of that. The results of the final discussions supported my findings from the first round of data collection, so I came to a conclusion that there was enough material to conduct a proper analysis. The information about each interviewee and the time and duration of the interviews are listed in Table 1. Due to the nature of the topic and my criteria for interviewees, eleven of the people I had the chance to discuss with were men and only one was a woman. IT is typically a field of expertise still dominated by men, and this is a good reflection of it.

Even though the interviews were about consumerization, I decided to leave the term unmentioned in the beginning. Many times people's understanding of the phenomenon is narrower than the entire topic is, often focusing on one particular aspect of it.

	Sex	Title	Industry	IT Infrastructure	Time of the Interview	Duration
1.	M	Head of Managed Services	IT Services	Internal	31.5.2013	1:05:36
2.	M	Corporate VEO	IT services	Hybrid	3.6.2013	0:51:27
3.	M	Group IT Service Manager	Packaging	Internal	20.6.2013	0:50:10
4.	M	Managing director	IT consulting	Internal	26.6.2013	1:01:44
5.	M	Purchasing Manager	IT Services & Software	Internal	26.6.2013	0:44:20
6.	M	CIO	Technical wholesale, Cross-Sector	Outsourced	28.6.2013	0:56:09
7.	M	Technical Executive	Telecommunications & Connectivity	Hybrid	25.7.2013	1:11:19
8.	M	Head of Business Development & IT	Banking & Finance	Outsourced	31.7.2013	0:50:37
9.	M	Group CIO	Retail, Cross-Sector	Internal	5.8.2013	0:55:24
10.	F	CIO	Media, Cross-Sector	Hybrid	23.8.2013	0:57:14
11.	M	CIO & Manager of Hosted Services	Telecommunications & Connectivity	Internal	8.11.2013	0:35:44
12.	M	CIO	Foods & Restaurant Services	Internal	13.11.2013	1:21:48

Table 1. Information of the interviews and the participants

This is why I decided I would rather go through the different aspects of the topic individually, to ensure that the subject is discussed as a whole, not leaving anything out in the first stage. Introducing the term of consumerization right in the beginning might have directed the answers to focus on individual characteristics of the phenomenon. I only brought out the word consumerization in the last phase, to tie the discussion together below one headline.

I had started to collect material as the theoretical basis of my study before I conducted the interviews. This was mainly to be able to determine the approach to the topic and it proved to be helpful in constructing the interview model as well. I could also get more relevant information out of the interviews after getting to know the topic better, and was able to ask additional questions about upcoming topics that were relevant to the study.

With each theme I asked how they understood the term, to find out the depth of their insight on each topic and to be able to discuss the theme from their point of view. I did not give them ready-made definitions on any of them, since I wanted to avoid directing their answers to a certain direction. A few times I had to give my own input on the definition, but only when the interviewee asked me to specify the meaning of a question or a topic.

4.3. Data analysis

To analyze the data, I first transcribed the interviews into written form, and then use a coding method by Strauss and Corbin (1998) to create a theoretical framework. According to Strauss and Corbin (1998, p.275) it is a general methodology, a way of thinking about and conceptualizing data, applicable to quantitative as well as qualitative studies. The total duration of the interviews was 11h 21min, which turned into around 170 pages of transcribed text, which I then went through and analyzed.

I conducted the analysis according to the steps introduced by Eriksson & Kovalainen (2008, 11). In the open coding phase my intention is to try and find categories, to which the interview answers can be divided, through constant comparison (Eriksson & Kovalainen, 2008). I went through each of the interview transcriptions and picked out the core of each answer, and then translated those parts into English. I arranged the English quotes according to each trend and then under subcategories. The subcategories basically included "meaning of the term and current situation", "possibilities", "challenges," "future prospects and effect on strategy", only slightly varying between the topics. I kept the quotes from the IT-company representatives and the other companies separate throughout the process.

After that I arranged the quotations into response types into categories within the subcategories in the axial coding phase (Eriksson & Kovalainen, 2008), trying to find similarities between the views and attitudes towards the different trends. Finally I had six topics, with approximately four subcategories and a varying amount of response groups in each. From these codes I formed the structure for the findings section of the study.

I chose Strauss & Corbin's (1998) approach, since the methods fit well with the aim of my study, which is to find regularities and patterns in behavior, in response to the consumerization phenomenon. With a lacking theory basis the goal is to come up with elements for a theory framework, which are generalizable at least to some extent, and can be used as an indicator for future development in the discussed areas. The benefits of the grounded theory approach according to Locke (2001) are that it can capture the complexity of contexts; link with practices and, thus, organizational actions; enable theoretical work in new areas of organizational life and put life into well-established views, which seem to fit rather well with my research topic. After all, strategies are the result of organizational practices and actions.

The quotes I will introduce in my analysis are presented according to the interview structure, and I have picked out the quotes that summarize the point of each response group. The categories are somewhat overlapping, and some of the quotes would surely fit into many of the different groups. All of the citations have been checked and approved by the interviewees, in both Finnish and English, to ensure that the message of the texts has not changed during translation, and they have all given their permission to publish the quotes. Many of them gave a request that the quotation would be edited to be less colloquial to make them more easy to understand. Furthermore, two of them wanted to do the editing themselves. I have used the edited forms of the citations and also changed the rest of them into a literary language by taking out excess words and changing some forms of the words into a grammatically correct form. Still, my aim was to hold on to the original meaning and message of the statements.

The whole research and data analysis process can be described as a circular process (Eriksson & Kovalainen, 2008), where I had to return to the theory background for the study time and time again, as I found new insights from the empirical data. Even though I had familiarized myself with the existing strategy and consumerization literature before conducting the actual research, I had to go back to the literature many times and to find new theory material to form a more solid theory basis for the study. The topic is extremely complex and multifaceted, which made it basically impossible to make a clean-cut study report with a totally linear process.

4.4. Reliability and validity of the study

The *reliability* and *validity* of a study in the qualitative research context refer to the question of whether the results of the study are reliable or not and whether they create understanding or not. There has been a debate over the question if reliability and validity even are relevant terms in qualitative research at all, and whether the evaluation terms should be changed to "the quality of the study" (Golafshani, 2003). Still, I use the terms reliability and validity according to the conceptualization of Golafshani (2003), who summed up the meaning of them as trustworthiness, rigor and quality of a qualitative study.

The qualitative studies are less likely to produce the same results if the study were repeated, so the quality of the study is assessed by the information given to the reader about the study method and progress. This enables the reader to see how the results have been produced and whether the conclusions drawn from the data are fair. I have described the progress and challenges of my study very openly in the chapters 4.1. and 4.2., giving a realistic view of the research process. I have backed up my conclusions with citations taken directly from, and approved by, the interviewees.

Still, if the study were to be repeated, there is a possibility that the results would be somewhat different due to the rapidly changing nature of IT. The statements of the interviewees might also be different due to changes in the organization, or the interviewer, and their way of discussing topics. Many times, the views about a specific technology or a solution might change after a single positive or negative experience related to them as well, though the risk of this is reduced by the high level of expertise of all interviewees.

Another relevant thing to mention, which might have influenced the results, is my own background as a strategy student, and the limited knowledge I have in IT, when it comes to technological details and more refined features. Because of this, there is a risk to miss some factors that might otherwise show up as relevant in the coding phase. This risk was mitigated by consulting a technological expert, who supported me in conducting the research, taking a supporting role and assisting in finding suitable interview participants.

Even though the topic for the study came from my employer, an IT company, they did not affect the structure or the position of the study. The form and the approach for the research was chosen with the assistance of my thesis supervisor and my employer was not involved in that, nor did they give me any internal material or data directly used in the thesis.

Next, I will introduce the findings of my study, introducing each of the topics individually at first, and then combining them in the consumerization section 5.6. of the chapter. I will explain my observations and back them up with the interview quotations, presented in an anonymous form.

5. FINDINGS OF THE EMPIRICAL RESEARCH

In this section I will introduce the findings of my research. With these discoveries my aim is to find an answer to my research question: How does consumerization affect IT strategy? I will unfold the results from the interviews in the same order as the interviews were conducted, first starting from the general picture of the current situation, then going through the different trends and their effects, and finally proceeding to the megatrend of consumerization as a whole. The themes of the interviews were the following:

1. IT Strategy and its relation to the business strategy
2. Social media
3. Cloud computing
4. Information and Big Data –analytics
5. Mobility and mobile technologies
6. Consumerization and its effect on IT strategy

The citations from the interviews are presented as anonymous, and information that connects an answer to a specific company has been removed to ensure confidentiality. However I have indicated whether the company, where the interviewee works, is one from the IT industry by adding the letters 'IT' after the quotation. This is because it is valuable for the study to show, whether the impressions vary between the suppliers and the buyers.

Furthermore, I have indicated unfinished sentences or long pauses by the interviewee, with the '…' –marking, without brackets. To separate the actual pauses in the interviews from the sections removed by me afterwards, I use the marking (…) to indicate parts of the conversation I have taken out as non-relevant, or as information that will compromise anonymity of the interviewees or their companies.

I will start introducing the findings with describing the nature of IT strategy and how it is conducted, in chapter 5.1. My aim is to understand the factors influencing the IT strategy, the planning process of it and who are the people involved. The chapter also introduces the

general goals of IT strategy and how they relate to, and are aligned with, the general business strategy.

The following chapter 5.2. concentrates on the social media movement and what kind of effects it has in IT strategy and systems in companies. I study how social media is used in external as well as internal communication, and what demands it causes for the IT environment. Furthermore, I intend to map out the possibilities that are seen in the social media from a business perspective currently, and in the future.

The next trend I will discuss are the cloud technologies and their effect on the IT strategy and infrastructure, which is the topic for chapter 5.3. My aim is to understand the benefits and challenges of these new technologies in practice and see how the IT professionals see the future of them. Furthermore, I try to emphasize the reasoning behind the decision making, when it comes to cloud assessment.

The topics of chapter 5.4. are information and Big Data –analytics. My aim was to find out where advanced analytics could be used in their line of business and if the systems are being used already. I wanted to understand the future prospects of these technologies in the eyes of a CIO. I will also discuss the challenges, and the reasoning behind the decision-making, when it comes to Big Data.

The final part of the IT trends discussion is mobility and mobile technologies, which I introduce in the chapter 5.5. The mobile technologies have strongly made their way into business use and my aim was to understand why and how it affects the IT environment on a broader scale. I study how the mobile technologies are being used and what does it require from an IT perspective. I also discuss the different approaches businesses have taken to this trend.

Finally, in the chapter 5.6. I will introduce the changes in IT strategy from a broader perspective, specifically trying to find answers for how consumerization contributes to this change. My aim is to understand the effect on IT strategy, when we bring all of the four IT trends together and study the changes they cause combined.

5.1. IT Strategy

The first theme of the interview was about the IT strategy in general; what did it look like in their company and how it was drawn up. I wanted to find out who are involved in the strategy process and what kind of things did the IT strategy include. Specifically, my aim was to understand what were the dominant factors affecting the IT strategy.

There were clearly different conceptions about what IT strategy is and how it should look like, but most of the interviewees stated that the IT strategy is formed directly according to the demands of the business strategy. The general basis for IT strategies seems to be trifold; demands caused by the business strategy, the changes in the environment and the positioning or the role of IT in the business.

> *"Now when our strategy is growth, organic as well as acquisitions-based, then naturally all of our system purchases we do need to be very dynamic and scalable. We used to be a 2 billion company and we are aiming to be a 3 billion company, so that means that there will be a lot of new users, a lot more of everything, so we should also be bigger in the IT-sense. And usually it doesn't happen in the way that the number of employees increases with the same ratio, but instead we need to have better performance with fewer resources. That's the trend."*

> *"(...) on the whole, all business is nowadays faster and more prone to change. That naturally raises a demand that our service IT needs to be faster and capable to change more." IT*

> *"Our strategy is our thread of life. It tells us, what we need to do. Everything we do in the IT-services, for example, if we discuss the IT-services, everything we do has to be compatible and motivated by our strategy, or the business strategy."*

The business position might also influence what the company will not do, or what they will not do internally. A central question in the IT strategy is the role of the IT function and their goals in supporting the business strategy; what their responsibility is on a practical level.

"We will never build our own datacentres, with which we would produce capacity or cloud services for our customers, so that is outside of our business and long term strategy. We are a cloud builder and a top professional in cloud management." IT

"Our philosophy is that we are the interface between the supplier and the business so we don't actually do anything. We understand the field so we can guide the supplier and they... If we have 25 suppliers, we unfortunately have probably 200 people working for us. We have strongly outsourced all of it, and that is the starting point [of the IT strategy] that we give everything out."

Many of the interviewees brought up the dual nature of IT in the strategic decision-making. In fact, ten of the interviewees indicated that they separate two different objectives for organizing the IT function; the operative IT and the development or business IT.

"(…) we want that it has two layers. We want the ICT to have this reliability IT, so we want all the basic things to work, telecommunications to work, devices to work, information systems to work… So it functions well and it is robust and fast and easy and high-performance. Then there is this performance IT, which means that we need to invest in applications or services that assists our business; a global CRM system that we use in Finland and Sweden, a global service management system that we use in Finland and Sweden. So in general, my opinion for this kind of IT service is that the two layers should be separated, so there is the basic infrastructure and related services, which need to work, they need to be reliable. Then on top of that there are different IT projects, which are closer to the business and contribute to the activities of some area of the business." IT

"It [the IT strategy] is divided into two, so… Well that much I can say that naturally we have our own internal IT, which is then managed as its own layer, and then there is our service IT. So probably in our IT, as well as here, the strategy is to study quite carefully, what we do ourselves, and what we outsource. Traditionally we haven't done any outsourcing, besides for some SaaS-based services, which have been in use for a long time. And now, of course, we are going into SaaS more and more. This kind of

enterprise outsourcing is something we have not done at all. So we have done everything ourselves, that has been our choice." IT

A significant force in the IT strategy alignment seems to be the centrality of the function to the business. The seven respondents, who referred to the duality of IT, told also, that they had either partly or entirely outsourced the non-core activities, or they are just managed as their own separate entity internally.

"The thing in our outsourcing strategy in general, is that we can't outsource the technology decisions or the total architecture, so we have an architecture unit, and for that we have these development managers and so on. Our interpretation of it is that, since ICT and technology is for us this... If we were a paper factory, then we [the IT department] would be the paper machine, so we are not administration IT, but production IT. Sure, we have part of the administration IT as well, but there we try to take the easiest possible way out, and concentrate on the production IT."

In sum, the IT strategy involves decisions about how the IT should support the business units and the competitive strategy in the best possible way. It determines the role of the IT function; what they do themselves, what they outsource and why and how the IT function is managed. Still, many pointed out that the role of IT is often somewhat dual in nature, where one part is concentrated the operative, internal IT solutions and systems, and the other is the IT related to business, production and development projects. The biggest influencers to the IT strategy are quite naturally the business strategy and environment and changes in them, as well as the role of IT in the business.

5.1.1. IT strategy process

Basically all of the interviewees indicated that the building the IT strategy is a management lead process, when it comes to the coming up with the strategy frame. The CIO is a central figure in the strategy process and also other executives, like the CEO and the CFO, or someone else, are usually actively involved. Furthermore, usually representatives from each business unit or the relevant units are contributing to the process. The IT strategy

process follows the general business strategy, and is often conducted in cycles varying from five to three years, and then refined yearly or quarterly.

> *"We are still practicing doing this corporate strategy, even though… We do it in three year cycles and once a year we refine it. Just recently we had the corporate management group strategy day, where we went through the current situation. And that will be ready, I mean this refined strategy, next fall. And based on that we refine the strategies of the corporate services, of which IT is one."*

> *"Practically once a year we do this update; we view the development prospects with a five year perspective, and based on that we do our technology strategy, and a part of it is this IT strategy. (…) What we do is, to a great extent, directed by the business functions. Of course, we plan our target architecture and other things based on the input we get from the business units. (…) It is precisely our IT management unit, who takes part in this and then people from the different business units (…)"*

Even though the clear majority of the interviewees stated that the executive level is the driving force in the IT strategy process, along with the business units, there were a few examples of companies, where the formation had two-way elements in it. The business strategy is still in a key role in driving IT, but respectively, the IT function gives their own input towards the top management, and is responsible of driving the parts of IT, where the expertize of the business units is not adequate.

> *"Our business strategy is so that business drives IT, in the sense that we have five segments, and they should coordinate their own business IT, ERP, business intelligence, the shop floor -systems. All the systems related to driving business should be coordinated, developed and taken into the segment roadmap. But then again, the nature of IT infrastructure, even though it is always said that business should develop IT, but business cannot develop IT when we go low enough. So this is the sort of different side of it, that there is a part of IT that needs to be developed by IT itself (…), since the business side doesn't have enough knowledge of what it should look like."*

There were various methods of aligning the business strategy with the IT strategy in practice, but basically everyone stated that goals and key projects of the IT unit come directly from the general business strategy. The importance of the strategy alignment was evident, and taken into account in the process.

> *"Actually, when we draw up the business strategy, we specify and see, how in this business, what kind of a role IT could have there (...) There can be very concrete IT obligations or things that affect IT... Business decisions, that then in the yearly planning, when we do yearly planning or an action plan, IT evaluates how we will carry it out in practice - what are the key projects, we need to get moving? But those are also decided upon together with the business units, or business is the primary motor, when we implement them."*

It was clear that mostly the companies use quite conventional strategy construction models, and some of them had taken more of a bottom-up approach in certain pre-defined areas. Still, there were two interviewees, whose descriptions were contradictory with the more traditional model of doing IT strategy work. Basically, the goals for IT strategy were similar to the other respondents but the strategy formation process was different. They also indicated that in the modern business environment, agility is the key in IT work.

> *"Well first of all we don't have a written IT strategy, I'm not sure if it's a pro or a con, I don't know which one it is. But if we think from an IT management perspective, our one and only mission is to support the strategic goals of the business and that is the way we should build our supporting operations. That's our IT strategy, and of course it always has the questions included of what we do ourselves? Where do we lean on our suppliers? What kind of technology choices do we do and in what way do we organize communication with our internal stakeholders? Then we need to make sure things work on a practical level."*

> *"(...) you should not plan the business plan and the market development evaluation very precisely for even three years ahead. In the changes in the market and cloud, you need to be alert at all times, so you are capable of very rapid changes in the IT strategy and making sure it is always serving the needs of the business units." IT*

The need for dynamism and shortening planning cycles were also referred to in the other interviews, but it didn't reflect visibly in the strategy process, as such. Still, one of the interviewees indicated that there are sometimes topics that are on the strategy discussion list for year after year, but no immediate action is taken to take the matter forward. Then suddenly it might jump up to the top of the priority list due to sudden changes in the market, for example. This indicates that even with the standard strategy planning cycles the current business environment causes a need for rapid changes in strategic focus.

In sum, the IT strategy formation processes looked quite similar to each other in most of the companies. The whole process was usually led by the executive board and possibly facilitated with the help of strategy consultants or other experts. The business strategy is built or updated first, with predetermined planning cycles. After the business strategy was done, the targets, key projects and role of each function was determined, including IT, on which the IT strategy was then based. Even though two of the interviewees informed to follow a clearly different model, they all agreed on the fact that the most important input for the IT strategy comes from the business. Also, many of the interviewees indicated that there is a need for strategic flexibility nowadays, and even with the conventional planning model, the strategies are not set in stone.

Next, I will move on to the first of the IT trends, social computing, and introduce the ways the social channels are used nowadays and plans for the future. I will also discuss the challenges that arise with the social media from a business point of view, and how the social media impact is maybe visible in the IT strategy.

5.2. Social media & technology

The use of social media was fairly active in most of the companies, and 11 out of the 12 interviewees implied that the main focus in using it is communication with their customers and the public. Not surprisingly, marketing and sales was seen as the biggest priority and the most common channels used were Facebook and Twitter, and a few had some activity in Youtube or Linkedin, as well. Furthermore, some of the companies had interactive discussion portals on their company websites.

"The company in itself is very active towards customers in these social media channels. We do customer communication and try to be the first on that side, so we would be included in the learning process and know what is relevant in the future. "

"Primarily, the social media has to do with our customer interaction; marketing and a channel for feedback, like direct and fast interaction with the customers."

"(…) the most important thing is that since our services need to be the best in the world, then the social media needs to view them as the best in the world. So that is the number one thing, why we follow the social media."

The one interviewee, who said they don't use social media for corporate communication, explained that the tools aren't suitable for them, because of their placement in the market and the global nature of their business. The company's products are not recognized by the consumers, who are still the end users, and this makes the use of social media challenging for them, when it comes to marketing efforts. Furthermore, the social media have not established themselves as business useful in all cultures, and are still regarded as private communication tools in many places.

"Our end users are not our direct customers. That's our challenge."

"It is, by no means, an official tool, when we talk about the corporation level. In Finland we are a bit more forerunners with these social media, than in many other countries. If we go to somewhere like Vietnam to talk about Facebook, we find that it is like a curse word in there, and has no place in the working world. So you also have to take it into account that many of us have different cultural backgrounds, and ways to look at things. But that social media thing, it is definitely coming and we have to take it into consideration in IT. When we talk about its current presence, it is still mostly internal."

Almost in all of the subject companies, there were many social platforms used in internal communication and collaboration. What stood out was that the company intranet had been renewed to have more social elements, or there were plans to implement these kinds of models in the near future.

"Yes, in the internal communication, we definitely drive the development to that direction, our own tools that are to be used within the company, and it will maybe offer some portals for adding external partners, so it is not only limited to the company site. But we recognize it brings possibilities. The social media is a combination of tools, there is [instant messaging service], there is this new intranet of ours, and, in a way, our web platforms are also remodeled... So yes, there are going to be new tools and their importance is increasing. We still use a lot of email for communication, but we try to bring alternative communication methods in addition to it."

"We have this intranet renewal project, where we want to make the traditional, static intranet more open and social."

Two of the interviewees, on the other hand did not really grasp the idea of an internal social portal, and did not see as a relevant tool due to that. On top of that, there was one interviewee, who stated that they had done an experiment, where they launched an internal social channel and found it unsuccessful. Due to this, he did not see the idea as very viable, and doubted whether they actually work anywhere.

"I don't actually believe that [company name removed] could have its own internal social media, I don't really believe in that. But that means that our own employees are in the public social media as well, like everyone else. (...) We had this pilot about 18 months ago and it was this internal... But that didn't take wing really. It didn't really work. I don't know if they really work anywhere (...)"

Not surprisingly, the social media was widely utilized in all companies for marketing and consumer interaction, except for one. It was used for customer interaction and participating in public discussion, with the purpose of building a positive image and promotion. The relevance of social media was seen more as marketing related, but many of the companies had also ongoing projects for building internal social platforms to enhance communication. Next, I will go through the possibilities provided by the social media that the interviewees found most important.

5.2.1. Possibilities of the social media

The possibilities of the social media were seen mostly as marketing and sales related. The interviewees said their company wants to be actively visible in the public, and to build a positive company image. Interaction with the customers provides valuable feedback to the company and a way to connect with the customers more and to provide better service.

> *"Well, of course, when we talk about our business, we have had these different collaboration things in use for probably decades already. It is for customer service, customer support and we have been able to get and give questions and feedback both ways. So in that sense it is not such a new thing. We try to listen to the customer and to a great extent it is through our customer service portals. That is where the final, important information comes from, about what our customers think of our products. The fact that we think it's really great, is not necessarily enough." IT*

> *"(...) we are looking for interaction and this dialogue [with the public]. If we think about the fact that nowadays no one can control the word that is out there anymore. Back in the day it was really easy; companies published on their website the things they wanted to publish, and that was it. And if someone wanted to complain about something, it was possibly the editorial column of [the daily newspaper], letters to the editor, where you could write something. At the moment all of the discussion and all of that happens at lightning speed in the digital arena. We have seen from the start that it is important we are involved in it, so we can react, we can correct, if something false is published about us there."*

Another reason, related to the company image, was that social media activity is seen as a way of attracting new employees and raising interest, especially in the younger generations. The companies are looking to create a reputation as an interesting employer for new talent, and the best way to reach the target audience is often through the social media. Six of the interviewees mentioned the fact that their company wants to be a good place to work for younger people, and also want to show it to the public.

"(...) the younger generations are maybe more like this multitasking generation; you are in Facebook and Twitter at the same time, when you do something with your phone, your laptop is open and you're watching TV. This generation you can reach best through social media, which ever it might be."

"(...) why we are in there, it is because people who would like to, or are looking for a job, so we hope those people would get a good image of us. (…)" IT

Furthermore, two of the interviewees stated that they see the social media tools as a more direct communication channel with the customers, which is useful with communicating temporary service problems, or something else they do not necessarily want to announce to the entire public. It gives an opportunity to reach all of your customers at once, and getting the message through rapidly.

"For one, it replaces this traditional customer service quite well. And it is a lot more effective. (…) So you can answer every phone call that comes in and explain the same story to everyone and in one day you can maybe get the information about it to a few hundred people maybe. But then again, in the social media you can reach everyone immediately. And for example, when we have had these [product] pull-backs (...) the social media enabled the fact that you could get the information distributed there right away."

In the internal communication the possibilities were recognized in more efficient and well directed communication, decreased amount of email, increased participation and building more of a community feeling inside the company. Especially the two-way communication between the management and the employee level came up in many of the discussions. According to seven of the interviewees, also the staff is happy with the possibility to take part in the internal discussion and possibly have an impact on the decision making.

"The benefits are, of course, that we can communicate, we know what people are doing, we can keep track of them. And it is the communality, which is probably built in many enterprises by forming virtual communities, where they do things." IT

"If you compare the Chatter to our intranet, which is now being remodeled (…) it [the intranet] is very passive, and the messages we receive, like work related messages, management messages, other messages, they are not very actively read or followed. It is also not mobile, which is necessary these days. (…) The way I see it is that they make your job easier, decrease the amount of email, speed up the flow of information, improve the quality of information, and this certain kind of responsibility and authorization, so everyone can take part if they want to."

One interviewee also brought up the possibility that the social media could be used more in B-to-B communication and business in the future. In his view, in the near future, the social media will not be a tool for consumer business only, but will extend into the other areas of business as well.

"(…) then again Facebook is interesting and problematic, in the sense that what it means for our business, so when does this Facebook-type, social community model, when do we start connecting it to actual business? What does it mean when we start doing it? Now it is mostly marketing, not really the core doing, so that opens a lot of possibilities." IT

When asked, a majority of the others stated that the B-to-B communication through the social media channels is possible in the future, but that it was not right behind the corner. They did not see it happening in the immediate future, due to the fact that people are used to maintaining their business relationships in a certain way and change in behavior takes time.

Even though the biggest possibilities recognized in the social media territory were related to building a brand and an image as an attractive employer, and interaction with the customers, some of the companies still identified other potential possibilities in the social arena. First of all, the channels can be used for more effective crisis communication and dialogue with the public, to get information out quickly, and take part in the public discussion. Furthermore, the participants said that the new channels were used to decrease the amount of email and to enable more efficient communication within the firm. In the future, they might be used for communicating between firms as well, but that was not seen

to become a dominant practice very soon. Next, I will discuss the flip side of the matter, introducing the biggest challenges that come with the social media, biggest of which is security.

5.2.2. Challenges caused by the social media

With the social media come many risks and challenges as well. Seven out of the ten interviewees named security threats, internal or external, as the biggest challenge that comes with the social media. From an internal point of view they recognized the need for education and training to create awareness and to manage the risk that forms, when their employees interact in the public media. Nowadays, the communications department does not control the company image, but it is a responsibility of everyone.

> *"Well probably the same challenge that has traditionally had to do with information security. From the perspective of a single employee, it is quite an amount of work to go over and over about this basic knowledge. Among others, don't upload copyright material into Facebook or YouTube or to any public platform. So the level of all-round education about these things, even with having had these Snowden-scandals and all kinds of things, it is remarkably bad."*

> *"It was not so long ago, when we had all of them blocked; Skype, YouTube, Facebook etc. So there are always these information security challenges, from a technical perspective. We have this internal netiquette, with which we give guidance to people about how to have the discussion there, if you use the company name. And there are certain things, where only the named people can comment on. It is easy to get provoked out there, but we need to manage it somehow. (...) Hand in hand with the freedom comes responsibility. And then, on the other hand, the guidance, so how you instruct people. It is not all so self-evident to everybody."*

On the other hand, controlling the discussion out in the social platforms is close to impossible. Five of the interviewees pointed out that the fact that anyone can say or claim anything in the social media discussion is a big risk for the businesses, since the negative

comments might spread far, even if they are not based on reality at all. Three stated that the ability of a company to control their public image is very little nowadays.

> *"Well the biggest [challenge] is precisely that you can't monitor or control it. So the challenge comes from the fact that if someone wants to harm you or something, it is very easy to do. You can publish anything there [social media] (…) That's why it is a big challenge and because of that, we need to follow it and have this kind of credibility capital built (...), so if we publish or tell something, then it is true."*

> *"Well, if we think internally, the social media is quite quick to react and if you don't think the things you write to places through properly, there are sometimes these accidents, when someone gets upset about something, it stays visible on our website." IT*

On the other hand, from a more technical point of view, many of the interviewees noted that there is also the possibility that an external party somehow gets access to the internal company information, because of the use of social media tools. One of the companies had even switched a social platform used for internal communications to their own private one, to prevent outsiders from being able to access the tool.

> *"Now these things have come out that some groups can get to at any (private) conversations in the public social media. We're not afraid that the Americans are spying on our conversations, but it is the same phenomenon that they are easily used... There is a risk that someone can get into the community, like old employees, for example. (...) We have now built our own internal tool for that, where we try to direct the group's internal discussion. There we can have the discussion in a much more relaxed way, with less mediation. We don't have to worry, whether we talk about prices or any other things, and we can use more direct and free expressions than out there... You can speak your mind freely, since in the public media you always need to think it through a bit, and you easily use expressions that look uglier than they are actually meant to, and that can easily cause disfavor."*

Some of the social media solutions also have extended services, which can access the user's email or other information, which are easily overlooked. Once you click on the wrong button or approve the wrong thing, they can automatically scan through your email.

> *"For example, the kind of things, like we have bumped into this thing that LinkedIn... LinkedIn has these plugins to the email, which means that it starts to browse through and see which users it can find, based on that. So the social media tools become bombshells, since my notebook information can be retrieved by LinkedIn. And we have had these cases, where, due to usability they have these components that when you click on something once, that is it. That way people's information can then spread (…)" IT*

From a communications perspective, the social media can also be challenging, because of the nature of business the company is in. Two of the companies noted that it is difficult to find topics in their business that would raise interest or catch the attention of an average consumer.

> *"...we want to bring our expertise and know-how and insight and differentiation there. Then some characters from the CEO down, accounts for them, so they could start telling their own visions and maybe that would create some following [by the customers]. But then we have maybe seen that on this professional field there are not, necessarily, so many topics that raise active brainstorming and interest [among the public]."*

Another problem was, as one interviewee put it, that even if you catch the interest of some customer group, it does not mean that the information you get by interaction with them, is actually valid or directly usable in their business. He felt that the views you find in the social media discussions, are biased, since the people who take part in it, often represent only a narrow customer segment.

> *"(...)they promote their own opinions in articles and the social media, and then the like-minded people from the field are giving thumbs-up for them and then (...) We have the impression that this is the predominant, public opinion. And it is only a common*

opinion in that tool, in that channel, in that network, in that networked social community. And 99 percent of people are outside of that network and stand for another opinion. (...) So it is not a representative sample. We want to direct the service to a wider audience, but in the social media you are faced with a group of activists or a group of active people..."

In sum, the social media can create various challenges and security threats to firms, both when it comes to the company image, as well as loopholes in the technical security systems. The public reputation of a company is no longer in the hands of a firm, even though they can influence it. Other problems were related to creating interest and finding relevant information about the customers through the social media. Next, I will discuss how the possibilities and challenges are reflected in the IT strategy.

5.2.3. The effect of social media on IT strategy

Most of the interviewees saw the biggest influence for IT as education-related, rather than systemic or technology-dependent. They saw that for security reasons, the employees need to be well educated on the digital media and the company policies, when it comes to presenting in the public platforms.

"It is significantly different from the traditional security problems, because (...) In a way, the possibilities for watertight support and automatic surveillance for their use, practically there are none. It is specifically the person, who is centrally involved there. And it is like, since we get a lot of temporary [employees] and such, it is about keeping the basic education cycle going and reminding the management about these things (...)"

Some of the interviewees did mention also technical changes that might happen in the future and solutions already done for enabling the safe use of social media. Also four of the people mentioned the need to get everything working on mobile platforms as well.

"It has quite an impact to the fact that we can get things in order in these traditional tools. And we have to get everything to work in these (takes a smartphone in hand),

We realized it already in quite an early stage that we have to make sure the systems work. Safety is one big thing we have had to work for, to be able to make sure that in this kind of network the things stay, where they are supposed to." IT

Basically, most of the interviewees saw the biggest influence to be the need for education and training. Social media was not seen as much a technical thing, as it was seen as a "human" problem. The companies are training their employees to understand the risks that come with those channels and trying to find a way to use it for their benefit. Still, some technical demands arise from the social platforms, like the need for solid security systems and network capacity, system integrations and enabling the use of the internal social tools with mobile devices.

In the next section I will proceed into cloud computing and cloud technologies, and their effect on the IT strategy. I will start by introducing how the interviewees understood cloud services and how they are being used currently. I will then move on to the possibilities and challenges related to the solutions, and finally discussing the future prospects as the interviewees saw them.

5.3. Cloud computing

All of the interviewees were quite familiar with cloud computing services and were able to give a very clear definition for the term. One of them said that their company had even come up with their own definition for the term to clarify it to everyone and to make it easier to communicate.

"The definition of cloud is that we have a service, where there is self-service, a high degree of self service, high automation, so as such, you can't touch them manually, then there's security, or this continuous availability, so a cloud service can't be in one place, but it has to be actually available that it is accessible. Then there is this wide network access, so you can access the environment with... many kinds of network solutions. Then the pay-as-you-go model, so purely this opex-model [operational

expenses], so only variable costs from the business point of view. These things define cloud. That's what cloud is. "IT

Some of the interviewees had a skeptical attitude towards cloud services, or pointed out that the novelty value of them is not as great as it is often thought to be. A notable thing was that three out of the five respondents, who stated that the hype around the topic is widely overstated, were working in an IT company, selling cloud services in one form or another. Two of the interviewees made references to the industrialization and stated that the same kind of development is now going on in the world of IT.

"Luckily it [cloud] is a word you that is used a bit less nowadays. The way I feel is (...) People, why they took a liking to it, is that it brings unconcern, you dump your sorrows on someone else. It comes from somewhere, and you don't care where it comes from. There is nothing new in cloud services per se; it is just a fancy term. (...) how we see a cloud service is... capacity, be it internal or external."

"Of course with this IT service business, there the market determines quite much, and we go along with the hype. We talk about cloud, even though we have offered cloud-type IT services for customers for like ten years now. Of course, they have been under a different name then (...) so in a way, it's not really a new thing. Now we have renamed it, so it is cloud, and everyone is really happy with it, when we are merely just following the name of the trend." IT

One of the respondents pointed out that even with using the cloud-based models, you need to have internal expertize to be able to manage the outsourcing. He said that they had not originally expected that they would need so much of internal understanding when using these cloud services.

" (...) the world has taught us that you need to know a lot about the applications, and to learn, and to be able to do it yourself to be able to develop it and take it further. (...) We have this service contract from one supplier, but in such a way that we have clear ownership for it, and the lesson has been that we have had to develop our own expertize and ownership more than we originally thought."

Two other interviewees still had the view that the cloud services require less effort than internal systems, for example, when it comes to software update cycles. They saw it as an easy solution especially for parts of the IT that were not related to the core business functions.

> *"Well you seek speed and agility and transparency, when it comes to pricing and also, of course, since we buy a lot of things as service, then it is logical to buy also functionality as a service. (…) And you kind of shift the work, I mean your own effort, of course you pay for it too, but you shift certain, let's say, version management related, integration related effort (...)"*

> *"They are easy and it doesn't make sense for us to invest in them, so we buy as a service if we can get good quality cheap. (…) In the future we probably want to buy them more and more, so we don't want to do big product development projects that only serve us, but we want to buy ready-made [solutions].So especially these support things, like HR and CRM and such standard things will come from cloud more in the future. Someone will deliver them for us."*

Basically all of the cloud models the companies were using were some type of hybrid solutions, combining both public and private cloud services. The comment of one interviewee was that the reason for this is the fact that there are simply not enough of the public cloud services to be able to cover the needs of a normal enterprise. There are very few to no companies that manage to run their entire infrastructure in cloud.

> *"You can't get these basic services from the public cloud, so at the moment a company like us can get maybe three percent of the services they need from the public cloud. And it has been forecasted that in 2016 they would get maybe five percent. (…) you need to buy an accounting system, a payroll system; there are these basic systems for everything. Right now you can't get them from the global cloud, but you can get the email system, or you can get Twitter or something like that. (...) if you are, for example, a factory manager, you need to buy a logistics system or something like that, then they usually come from, what we call, a local or a private cloud, because people want that it is definitely secure, your business won't fall down when it is somewhere... And the*

legislation says that in certain things the data has to be physically located in Finland or let's say that it has to be physically located in the EU area. That's why it's hybrid." IT

5.3.1. Possibilites provided by the cloud

The upsides and future potential in cloud services were transparency, flexibility, quick delivery and implementation and the possibility to end the service if it is not needed anymore, which is a big benefit compared to the traditional hardware investments.

"The charging is a transparent, the licensing models are simple and transparent, implementation is usually quite easy and handy, and development projects, for example, in the CRM-side in Sales Force, you can execute them with these agile methods."

"And what everyone should know, even if they don't want to, or don't want to understand it, is that it is [buying a service from cloud] still more expensive than doing it yourself. But there are these other benefits you get with it. (…) I mean speed, performance, flexibility, and these traditional things. And of course, you can get rid of it if the business doesn't fly after all. Then you just announce that you will stop paying for it and it ends there." IT

One big benefits of the cloud model was being able to deliver services to distant locations, which opens great new possibilities for companies in the IT business. Cloud enables them to expand their operations to places, where they do not necessarily have physical presence.

"The customers want to buy our services so that they run on Public Cloud Service, for their own reasons. And if we think about production, we are a global firm, so even though we have more than a dozen datacenters around the world, we don't have this kind of presence somewhere like in South-America that it would make sense to or be possible to start producing a service there for customers like "the day after tomorrow". If you started to negotiate about a traditional data center contract and to order hardware to Brazil or somewhere, it would suddenly take a half a year... Whereas, if

you go to a Public cloud available in South-America, after day one you have something up and running already." IT

Another point was that it is possible to have the non-core activities running on a cloud platform, to minimize internal time used on managing it and reducing datacenter costs. This is consistent with the phenomenon of outsourcing functions that are not central to the business.

"[Name removed] is our system area that has the least to do with the core functions and production of [company name removed], but we still have quite a lot of stuff there. So there our main principle has been that we try to get by with as little internal resources as possible and we buy product-based solutions and nowadays cloud services as much as possible, so that the machines wouldn't be located in our own datacenter."

In short, the benefits of cloud from a business point of view are similar to traditional outsourcing models, but the cloud solutions can be procured through the internet and implemented faster, if they are from the public cloud. The view about the cost of the services seems to vary in each case, which implies that the possible savings are not guaranteed and need to be calculated case by case. Next, I will introduce the problematic that comes with the cloud.

5.3.2. Challenges caused by the cloud

The interviewees did point out that there are still many questions left unanswered, when it comes to cloud computing and buying cloud services. There are still technical difficulties in running systems on cloud platform, regardless of the promise of easy implementation, which increases the cost of integration.

"We are actively trying to find solutions that could be put into cloud, for the reason that the need is temporary and the data is the type that it doesn't have significance to others. But there is still the integration challenge to be solved. The solutions become easily very expensive from an integration perspective."

"So back in the day, our datacenters have been set up to meet the needs of that time… and there are still these software that you can't put in cloud, so they cannot run there, they can't communicate with our other IT and those systems in the way that it just doesn't work in cloud. So they just have to stay where they are, also in the future. (...) It will be a hybrid environment; we know it already beforehand that we won't start re-coding certain software, since they are at the end phase of their life cycle anyway. (...) It is also a question of cost, since we have thousands of these virtual servers around the world, which run in our own datacenters, so the infra is already there, so it doesn't make sense to start running some of it in cloud, since a big portion of services are going to be and stay there anyway. So the fixed cost does not disappear anywhere, so it is better to use the benefits then."

On the other hand, the licensing models are not suitable for everyone. Some of the respondents said they were using some individual SaaS-based solutions, but the problem with the wider service models were the costs that quickly build up, and the nature of information that is run on the cloud platform, which causes questions about system security.

"In the shared services side we have a lot of these SaaS-type models, or even if we own the licenses, but it is completely hosted anyway. And then again, on the infrastructure side we have used this Infrastructure as a Service to build these kinds of testing environments. (...) We really hope we could get some of our storage capacity outsourced to cloud, but so far just hasn't proved to be a cost effective solution for us."

"We have some resource planning related, for example optimization related solutions, which we buy as a service. (...) Then we have quite little this generic performance in use, since our data has so much this... Some of it is suddenly this information that has to do with our customer owner and we are extremely careful with where our customer owner information is. We want to know precisely where they are located physically and so on, and that's why we don't... With our business systems we haven't begun to lean on cloud technologies that widely. We have mainly experimentally some limited

technical... or technical calculations, business calculations related, marketing related things that we are testing."

Furthermore, cloud computing raises a lot of the same questions as outsourcing projects in general. Some interviewees brought out the fact that sometimes cloud and other outsourcing models only appear to be beneficial, when they are actually not, and therefore one needs to identify carefully, what to outsource. There are still going to be costs from the outsourcing itself, since there need to be people, who manage and control it.

"It is more flexible and economic to do yourself than to buy from outside. We have experiences of it quite well that we have this outsourcing service (…) we bought the capacity as service and the service work and everything as a package, so we just outsourced our sorrows. But in the end we saw that the outsourcing didn't take the sorrows anywhere, because then we needed people internally anyway to manage the outsourcing. (…) I thought it was a good example, when we brought in [used to be outsourced] one big ERP solution and with the same team we had managing the outsourcing, we ran half of Europe after it."

Finally, the expertise level of the vendor should be carefully evaluated, since many services are very industry and company specific. In these cases, for one, the public cloud solutions are out of question, and secondly, there needs to be very tight cooperation with the vendor, who provides the private cloud service. In every company, there are processes where standard solutions don't apply.

"My view is that before me, there was an urge here, or they kind of thought of it like… just like water from the tap; "there it comes - buy and forget", but that's not how it goes. Your own business processes are quite unique, after all. It is hard to take them to a vendor and tell them to take care of it. So we have to know it and oversee it. (…) partly it is because, the suppliers haven't got the capability. The [identifiable information removed] industry is not that big in Finland, so the suppliers don't really have expertise. They do in some fields and some places, but it is not a given."

The discussion with the participants made it clear that the promoted benefits of cloud computing do not always apply, and sometimes the effect is even the contrary to what has been promised. Seven of the interviewees stated that cloud does not remove the need to have internal expertize and understanding for the systems, but does add the expense of managing the outsourcing. Furthermore, the implementation of the systems is not that easy in many cases, especially with the wider cloud models, since they are often not compatible with the existing systems and the licensing models are not suitable for everyone. The third big challenge is the question of security, which is never waterproof, if the solutions run on an Internet platform.

5.3.3. Effects of cloud computing on IT Strategy

Seven out of the interviewees stated that the cloud technologies will affect through the fact that there will be more alternatives, when doing IT investments. Still they didn't see it as something that would affect their strategy, but that their strategy would determine, whether they would choose to use cloud services. Cloud offers a new way of producing IT services for a firm, and the decisions related to using them are tactical, not strategic.

> *"In my view they don't affect the IT-strategy, so it is still… It is a production method, so it maybe influences our operative functions more and not really… And the price, so we source services and look for efficiency and price with it (…) It could be a strategic question on the operative level, so how will we produce this service, so do we take it from the cloud or do we build something ourselves, like on-premise. Maybe it is for them, but I don't see it as strategic."*

> *"In my opinion (...) it is kind of quite tactical level, whether we implement something as cloud or not. Cloud technologies are one of the possible implementation architectures and we use it, when it is functionally and financially reasonable. But that we would write in our strategy that we want to use as much cloud as possible - that wouldn't make any sense."*

Two interviewees even pointed out that the cloud technologies and the alternatives they provide might even get companies to re-evaluate the role of their internal IT organization. The role of the IT function can change, since more and more solutions can be bought through the Internet.

> *"(…) the IT managed by the CIO should naturally be the one closest to the business We even have clients, who have stated that the traditional CIO organization is too old separated from the business units and they want to build a new organization virtually or organizationally, that is closer to business, where the CIO and the services produced by the CIO are one possible service provider for the business units. So they build a setting, where they practically have the CIO competing against public cloud services." IT*

A big theme that came up was the way the cloud technologies can change, not the internal IT strategies as such, but the IT ecosystem and the vendor market in general. The technologies give rise to a whole new group of players in the IT market, the cloud brokers, who build their business by selling cloud services, but not producing them.

> *"(…) we use some of these public clouds… we use Google (…) And in the future we will probably go more and more towards this cloud brokerage, so we sell services from several companies, and also that we aggregate, so practically the customer buys a service X from us, but behind it are our own services, and could be cloud services from others. (...)" IT*

> *"(...) and then also there will be, there will be many layers. (...) So first there will be someone, who has produced the service, then there will be these brokers in the middle, who sell the cloud services by the producers, so there will be many levels of cloud services." IT*

The main effects of cloud seem to mostly involve other things than the IT strategy, like the power position of the IT function and the CIO or the technological infrastructure of the company. It also seems to be changing the IT business in the sense that nowadays companies might sell IT services even if they do not produce them and never have. In short,

there will be new players in the IT industry, due to the low barriers of entry. The answer to my original question seemed to be that cloud, in fact, does not impact the IT strategy, but the IT strategy determines the suitability of the cloud services for the firm. If the strategy is to outsource support functions that are not central to the business activities, cloud provides a good alternative. On the other hand, if cost efficiency is the number one strategic focus, it seems that cloud is probably not the choice those companies go for.

5.4. Information and analytics

Information and big data analytics was clearly the most controversial of all the trends. First of all, there was the most variety in understanding what it means, and second, there very contradicting views on its usefulness. Some clearly separated big data from the traditional business intelligence methods and others thought of it as just an extension of the old BI systems, and did not find the novelty value that impressive. Furthermore, there were a couple of interviewees, who did not really recognize the term at all.

> *"You have a huge amount of data collected. (…) And then the big data, what they mean by it, is that there are guys or programs or people, who analyze it. They can tell the management of [company name removed], how the customer behavior is, so the managers of [company name removed] can direct their services or... much better than before, what the people wants to buy or where it wants to go. (...) So it is about analyzing massive amounts of transactions, so they can direct the business better." IT*

> *"How we define big data is that big data is, when I look up to the sky, I see a huge number of stars there, and when I look at stare at them for a while, then I start to notice some kind of… I realize something about it. (…) And now this big data, it is actually, it is this statistical analysis and fuzzy logic. (...) You know, that things that are entirely separate from each other, suddenly they have a connection of some kind."*

A big thing that stood out in the interviews was that this topic, out of all of the discussion themes raised the most skepticism in the interviewees. At least, when the theme was

brought up, four of the interviewees pointed out that they saw the phenomenon as an unfortunate hype and that analytics is not actually a new thing at all, even though it is a hot topic in the IT business. The skeptics saw it more as a status thing, and something that is often done because it is 'cool', and not because of its actual value to the business. Interestingly enough, three of these respondents were representing an IT company.

> *"Yeah well... Big data is one of these unfortunate hype-things. I mean, big data has always been there, there are suppliers around the world, who have done these statistical analyses and based on those they have been mining data into these information storages. Big data probably emerged because now there have come quite remarkable tools, with which the mining turns a lot cheaper; typically the solutions have been extremely expensive. And now, these new solutions, these new technical solutions make it possible for someone to build them in one's home, if they want to." IT*

> *"(…) it is just a "big shit". It's just a new word for something that has existed for a long time already, meaning that storing is storing and analyzing is analyzing. (…) We are a hosting provider for ourselves, so we have a massive amount of logs, so if there are some problems, then we have tools, which scan through our logs automatically. So that is not like… analyzing is not a new thing either. Now it just has a new name, and of course now when there is a huge amount of data accumulating through the social media and other things, then it is beneficial for a business to utilize it. When there is information that someone can use somewhere and that probably happens too." IT*

Still, a couple of the companies were utilizing some form of analytics tools already in their business. It is debatable, whether the systems actually count as big data, though, but the interviewees saw that they did.

> *"Well, let's say that maybe on the business side it means that we process the customer segments and customer behavior, and based on that we try to find even individual customer solutions (…) When the customer contacts us, then the customer service gets a popup directly on their screen, about what kind of offer she could make and so on. (...) We develop the business strategy as a background for it, so we have to have it*

analyzed open, how each customer segment behaves and where should we invest in for development.

Three of the interviewees stated that they did not see advanced analytics technologies as a very relevant development area in the near future. They explained that the biggest problem was their technological readiness, and that they had a long way to go before they could even consider implementing advanced analytics systems

"It [big data] has come up a little, so we have got these visits from a vendor, who says that we can help you bring all of the data back here in [the headquarters], and I ask them all a counter question: 'Why?' Ok fine, our organization too has probably massive amounts of data scattered around the world. We could do this big data thing, bring it here and then process it, but still someone needs to understand about the business first, and what the data is in the first place. (...) We are not there yet (...) that we would bring all of our ERP data here, for example, and process it with something and do some magic tricks with it. It doesn't give us the kind of business advantage at the moment that we wouldn't get from our other consolidation systems."

The topic raised a lot of opinions and many seemed to have quite a negative image of the whole term, at least more than with the other trends discussed. Four of the interviewees said they had some analytics systems in use, and two informed that they had solutions, which were still in the development phase. The rest saw potential in the solutions but had not started any projects on them yet, and some were not planning to do so, at least in the near future.

5.4.1. Possibilities of Big Data

Regardless of the skepticism, all of the interviewees saw some kind of future potential in the big data technologies, and ways to utilize them in their line of business. Some of them said that they had even recognized the areas of business, on behalf of the company, where these systems would be potentially developed. A clear majority of them had to do with customer insights and developing more personalized services based on the customer data. Others had thought about applying big data into maintenance and the life-cycle

management of machinery. There were some ongoing projects for developing these solutions, but mostly the interviewees said they had only identified areas, where analytics could be used in the future.

> *"Typical application territories are of course sales and especially sales, where you have consumers as customers, that's when the amounts of data grow huge and you gain from the things quickly. The other one of the typical examples is, what we have as one area, is analyzing the log territory. So log information, when different machines, information security systems produce these logs. There forms considerable amounts of them here, so mining them, in the sense that you could dig up some irregularities or problems from an information security perspective." IT*

Still, in most of the companies there were a lot of questions and challenges yet to be answered before the projects would turn into action. One stated that their existing data was not very well harmonized or organized in itself, so it did not make sense to combine that with other information sources yet.

> *"It starts from the fact that all of the information, you can divide it into this fourfold table, so you have this predetermined internal and external data, and then you have informal internal and external data. So typically the informal external data is, say, data that is in the social media. Whereas the internal predetermined data is traditionally your own databases, ERPs and the information in them. But then we get also a lot of external, predetermined, exchange rates, for example. And then again we have internal, inharmonic, and precisely this not predetermined, like some intranet or something like this. And now our challenge is that we need to get a hold of these elements, before you could think that you will start using them for something. The information we have available, when it is not, the harmonized part is not well organized, then kind of the fact that we would take some big data and tried to do that. It is a bit like shit in shit out."*

He also stated that analyzing the external sources of data is not valuable by itself, but the external data needs to be combined with the internal information sources to give context to it. Otherwise it is only "background noise" with no connection to the firm activities.

In sum, the interviewees saw the possible value that could come out of big data and analytics, but mostly they had not taken the ideas very far. Four of the companies were systematically analyzing customer data, but whether that in itself can be seen as advanced analytics, is debatable. Two of the companies had an ongoing project to develop the solutions, but they were not yet being used. Next, I will discuss the problems related to big data.

5.4.2. Challenges with the Big Data

The biggest thing that came up, when discussing the challenges of big data is the fact that it is not only about the technological solution, but requires expertise and understanding to be able to use the tools. Six of the interviewees explained that the technology in itself is not enough, but there is a need for internal competence to be able to capture the value from it.

> *"(…) first of all, I guess it requires the IT-leader, who actually understands what he wants and what he is looking for. So, what you use there (…) is a more of a technical question, but the most important thing, when you consider buying something, be it service or an application or something related to big data, is to understand, what you will do with the information or the report, whatever it is you get. (...) So in general, if you ask for something, you need to use it too, and it is not because it is hip and now we need an analysis that no one will ever read or use for anything. That is waste of money." IT*

> *"(…) the central thing is that people understand that everything starts your own understanding. So these kind of ready-made cookbook -solutions are rarely optimal. It is through the understanding and insight of our people, how we can do these things. Previously they have been bought a bit like from a sales catalogue "We'll take this, we'll take that, we'll take that..." But then you spend a million and a year and "This wasn't good after all... It would have been ok a year ago." Everything starts from the fact that your own understanding develops and what you need in order to develop your understanding."*

There were also four participants, who said the technological solutions are still not at the level, where they should be, if you actually want companies to buy them. The systems are complex and difficult to implement, which makes the projects long and expensive. The analytical capacity of the systems might be very impressive, but the usability is still a problem.

> *"It is a very central tool for business units, for example, in how they analyze their own business, customer behavior or the markets and marketing (…) the productization and building of it is still somewhat rocket science in many places, so the projects take too long." IT*

> *"What is missing is that there are very little real applications. There are extremely few of these breakthroughs in the sense that now this will solve everything. It [analytics] has been done for years, and now when we are on this hype-curve, then everyone is talking about it up here [top of the curve], and there is a big boom. Soon they will come down from there and that's when it starts realizing, what can you... You can do many things with this big data. You can pour the data, mine it, and solve things, but it is still calling for applications a little bit." IT*

Finally, yet again there arose the question of security and privacy, specifically with the solutions for collecting and analyzing consumer data. It causes a big risk to store big amounts of customer information into one place and people are getting more and more suspicious about the information that is collected about them.

> *"There will be this very challenging question for IT too that we need to maintain the information security in all circumstances. That there is a guarantee that when the information, when we use it, it is ethically right and according to the promises and contracts and the person genuinely feels that his/her purchase history (...) When he/she gives a permission to store this information and to use it for something, we keep that for certain, also when it comes to technical solutions, so we are able to operate according to that promise. The privacy demands will probably be emphasized."*

It seems that the big data and analytics solutions are still in quite an early phase of development. The first challenge is the need for adequate expertize to determine the right questions that need answering and deep understanding of the business and the logic of the systems. Furthermore, before the solutions can be utilized the existing data needs to be harmonized and prepared so that they are possible to process. Finally, many of the interviewees stated that the technologies available are still quite complex to use and the security of them is not necessarily guaranteed.

5.4.3. Effects of Big Data on IT strategy

Possibly due to the fact that the big data technologies are quite new and it is not that well known, what they are actually capable of, most of the interviewees did not see that much strategic significance in them yet. Still, one participant had a clear view on the strategic benefit that could be attained with the help of big data. They wanted to position themselves and their services in another way, to be able to capture greater profits from their work.

> *"(…) our whole [unit name removed] strategy is based on doing this kind of life cycle service, and to support that we are looking for conclusions and information and insight. Maybe some consultative aspect into what we already do on a practical level. Of course, (...) we need to get involved early in the sales cycle and on another value level, than where we are at the moment."*

Many speculated about how the solutions will maybe look like in the future, but did not have a clear view on what that would mean for them on a strategic level. Anyway, seven of the interviewees pointed out that in the future the big data analytics will probably be built into systems like the SAP, or can be procured through cloud. That would mean a change in the way advanced analytics is sold, meaning the strategy of the vendors.

> *"Well as a solution, the techniques are quite good and in that sense (…) data will become this kind of a reserve. So in the future you can, with these tools, mine it easier, when there are those tools that you buy a package, and this package (…) will investigate your sales or customer behavior (...) or anything at all. (...) My view is that in the future they need to reach a point, where the data, when it is stored, you could*

define beforehand that this data will go there, some ERP system invoice archives, production documentation, these kind of things, they will then be subordinated to the use of the big data -solution." IT

"The future will be that you can by big data-analytics from cloud, where the service can be integrated into the organization's own information sources and it can produce business useful information very fast, even within hours." IT

The effects to strategy are not significant yet, but future prospects are promising. Companies are waiting for the systems to get better and looking for areas where analytics can be used for their business purposes. There were very diverse attitudes towards the technology and most of the people, who saw future potential in it, did not see it changing their strategy, but it was merely a tool for more educated decision-making. The strategic change many suspected to happen was in the IT industry and the way the vendors compete in selling the solutions.

5.5. Mobile technology

The mobile technologies seemed to be one of the most visible indicators of consumerization. Nine out of the twelve companies had a completely free or quite free mobile policy, when it came to supporting different mobile platforms. iPads and other tablet devices were still somewhat more controlled. A few of them had catalogues of devices available, and the employees could choose the one they liked best. Two of those firms had some official standardized solution, but in practice people were using which even gadgets they pleased.

"Practically we enable the use of all of these services. And especially now we are moving into this simple work, and enabling it that people can work from home more. And through that we have quite little limitations about what solutions to use."

"(…) Here we have a completely free choice on mobile devices smaller than PC:s can be completely freely chosen, for example, no one defines the brand of your phone or tablet. If someone needs one for their work, they will get the one they want. We can access our basic systems quite well nowadays. Then again, PCs are standardized into a specific brand and models. It looks like enterprise IT, our PC policy (...). It is very mobile and flexible here for mobile employees, so they can work when they want and where they want. The general rule of thumb is that you should come to work before noon and you shouldn't leave work before noon."

Two companies had standard solutions in use, but one of them had a clearly more traditional approach, and the interviewee did not indicate that the policies would change in the near future. In fact, the attitude was quite the opposite, partly because of the cost structure of the mobile systems.

"There is this problem connected to these solutions, which has to do with intellectual property that many of the producers of these technologies define the price of the technology according to how many people have a possibility to use the solution. And we have a shared network, so there are immediately 40 000 employees, who have the possibility. In some cases, from them, 2000 or 3000 might benefit from using it. So it is difficult for us to implement these solutions, because the price is defined by the 40 000, the added value is realized by the 2000. (...) There is quite a limited set of these solutions, so many times it turns out that it is not worth it. (...) There are these mental images about where the benefits come from. 'All companies these days, of course they have this kind of a solution.' Could be, but since it doesn't do any good for us, we won't take it."

In addition to making phone calls, the primary uses, for the smartphones were still, perhaps not surprisingly, the email and calendar. Some of the interviewees even forgot to mention them, when listing the applications used, apparently since they have become quite self-evident in the smartphone discussion.

"(…) most of the use, it is electronic calendar and email, they are definitely the biggest ones. Then after that there come applications, I would say. And maybe there the

remote working -thing is emphasized probably. But I mean, technically I can approve travel expense reports with my phone and purchase invoices and such. The question, if I want to do so, is a different thing entirely. (...) it is not such a pleasant experience."

In many of the companies, there were also some types of collaboration tools or chatting possibilities to enhance communication.

"Probably email (…), all kinds of social media things, communications, but increasingly these different reports (…) I mean, when the information is in cloud or wherever, then it is not device-dependent. Whether I have a laptop or this [smartphone], I can get it. This simplifies people's behavior and work." IT

Some of the firms had gone even further with the mobile technology and had made basic enterprise tools available through mobile portals as well. One company had built their own AppStore and many of the interviewees indicated that this kind of model of enterprise applications was the future of mobile computing.

"At the moment many clients are wondering, how we can build Enterprise AppStores, so how do you combine the applications from different Marketplaces and AppStores into one catalogue, independent from terminal, for all the users in the organization and also build a politics for which are funded by the company and which ones they want to pay for their employees. " IT

It seemed that in most companies the mobile policies were already quite free and enabling flexible working was a big priority. There was only one interviewee, who informed they have a standardized solution and that is not about to change. The variety of work duties that can be performed with a smartphone or a tablet seemed to be expanding even further. Next I will introduce the biggest benefits the interviewees had recognized from this.

5.5.1. Possibilities of the mobile technology

When discussing the up and downsides of mobile technology, the opinions of the interviewees were mostly very similar to each other. Clearly the biggest benefits of mobile technologies the interviewees recognized were productivity related. People are more available and able to work also after office hours.

> *"(…) practically everyone here is online at all times, and that gives flexibility, when it comes to working time management and so on, so basically from 6am to 10pm people still communicate with each other and do things. All in all, the efficiency increases significantly, when people have all the tools in their use at home as well as the office."*

> *"The biggest benefit is probably this efficiency, so for better or for worse. From the company point of view it is probably good that last night I have still been going through my email around ten and sent all kinds of things there. From my own point of view it is not necessarily good at all. It is this certain freedom, the more efficient usage of time and that..."*

Flexibility was another big theme that arose in the discussions. It is closely related to better productivity and efficiency. A very concrete example of this flexibility is the remote working possibility that is provided by mobile technology.

> *"(…) why we call them work productivity devices is that you can see straight from the mobile, where you need to go. The intranet is really good now, because you don't have to open the PC, so you actually save a huge amount of electricity (…), so from now on, you have the intranet, email and calendar here [the smartphone]. So basically in the normal life (...) you can do quite a lot with that device. That means, people can move from one place to another flexibly, move to the meeting rooms, you have all the tools with you at all times." IT*

> *"(…) I never have to wonder if I have the Nordic Strategy with me, if I'm in Stockholm, for example. It is always available, where I am, with these tools. So I don't have to*

worry about whether I remembered to take the memory stick or did I remember these kinds of things. So the information is available easier and faster." IT

Furthermore, most of the companies had some particular group of employees, who had a role that required them to be on the move a lot more than an average worker. Especially for these kinds of jobs, the mobile technologies brought significant benefits, compared to the traditional methods of working.

Finally, a big benefit that has to do especially with providing the employees with the kind of phones they want is the effect on the employee satisfaction and image as an employer. Many of the interviewees, eight out of twelve, stated that one of the biggest reasons for having a free mobile policy was that they had happier employees because of it. Furthermore, it has an impact on the general atmosphere of the company, where employees can make their own choices and they are not heavily limited by company guidelines.

"It creates this… this kind of generally uninhibited atmosphere, so you are not tied to a certain place or a certain time at all. (…) It has probably to do with the company culture overall that we a have very limited amount of these compelling rules, how you should do things."

Most of the interviewees agreed on similar positive aspects that come from mobile technology. Employee productivity and work flexibility were clearly the biggest upsides of the solutions. Furthermore, employee satisfaction was the third big benefit of enabling the usage of freely chosen devices. Some saw the last one as more of a 'bonus' on top of the productivity benefits, and others saw it as more central, influencing the company image as an employer.

5.5.2. Challenges of the mobile technology

The problems related to the mobile solutions had to do with costs, security, lack of personal contact and face-to-face collaboration, and finally the work-life-balance. Firstly, the mobile technologies cause the support costs to cumulate in different ways. The average users are not able to maintain their devices themselves, which puts the pressure on the IT operations to provide a support service for the gadgets. This is especially tricky with the smartphones and tablets, since there are so many ecosystems and models to choose from. Another problem is that the enterprise tools should be made compatible and accessible with the different platforms.

> *"(...) it is not an easy or cheap business to support the different platforms"*

> *"For example, around two years ago we controlled very precisely, for example, what kind of phones we have. (...) and then we released it [the policy]. So we said that hey, we will give only a recommendation. So we went a little towards this, this type of thinking that Bring Your Own Device, so it is any gadget... [Company name removed] will pay for it, so the only thing is, it has to be able to do these and these and these things. Well at first it made things easier and people were really happy (...) But afterwards it has caused this thing that still they require the support and the problem solving should be available by the company. And that is completely impossible, of course, when everyone can have, and they can make their adjustments themselves. (...) The other thing is that it has increased our costs significantly."*

Security was a big question also with the mobile technologies, since the devices can be easily lost or stolen, when compared to traditional workstations. Due to this problem, the companies have had to invest in heavy security systems, authentication and identity control, as well as remote management systems to be able to shut the devices down or wipe them clean, if lost or stolen.

> *"(...) the fact that the devices that are mobile and out there, also more things can happen to them, they can be stolen or something else. The ones that are here on the*

office table are in a relatively safe state, so that is clearly one thing that needs to be taken into consideration in it. So this kind of authentication and identity confirmation, they are probably challenges that come with the mobile. (...)"

"The information security management is the most challenging part in it [use of mobile technology]. When company data starts moving around in them and then, on the other hand, the mobile device is easily forgotten in a taxi or gets lost somewhere, so you need the technical solutions, so when it gets into the wrong hands, they can't get anything out of it. And that's a central demand in it."

The digital collaboration and communication possibilities also seem to have a negative side effect. Some of the interviewees indicated that because of the increasing mobility, it is nowadays harder to have people gather together even if the task in hand would demand it. One of the interviewees said that the lack of personal contact affects some people negatively, having somewhat of a paralyzing effect and decreasing motivation.

"Well the downside is of course, when we work a lot remotely, there is less of this personal interaction. And there are still people, who value that more than the possibility of working remotely. So some people find it more important that you are physically in the same place, so the downside is that that doesn't happen anymore. That just doesn't suit everyone."

"(…) in certain tasks you need collaboration and planning and doing, so then you should actually be present. Especially, when the firm grows, there are starting to be more stakeholders, so it is getting quite difficult to gather people together." IT

Finally, a challenge recognized by a clear majority of the interviewees, when it comes to mobile technologies, is the question of work-life balance. Because of the increased availability through mobile solutions, some employees are finding it difficult to set the boundaries of free time and work. This can cause exhaustion and stress, if it goes too far. Still, many of the interviewees saw this as a problem of the company management and HR personnel, rather than the IT unit.

"(…) Maybe, of course, the fact that we have to be worried about the workloads of some people, but that is more of an HR-thing to think about that, and this supervisory and manager thing. But that is, where it leads to, inevitably."

"Of course it then affects this rhythm, so you are always available. So when you are working, you are available every second, and then, of course, comes this privacy and free-time, so we almost have to constrain people that they spend too much of their free-time there, and they're always available and have their work with them." IT

In some of the interviews the challenge of constant availability was discussed from a different point of view; it was seen as an indicator of a bigger change in the working culture that has to do with the role of work in people's lives. In their view, work should not be seen as a stressful factor separate from the personal life anymore, but as a natural and seamless part of living.

"Then the side effect is that it brings the work home (…) so work is just one part of a person's life, and the boundary between work and non-work is fades. So your whole life is like that, not work, but that the work is a seamless part of the life, in the sense that it doesn't start at a specific time in the calendar." IT

"It is harmful when it goes too far, but there everyone, themselves, needs to make sure that it is not too much. But now when everyone is on holiday, and it previously used to be like that that when someone went on vacation, the next time you heard from them was after a month. But now, even though they are on holiday (...) if I email them, they have read it within a day or two. (...) You shouldn't look at work as such a stressful factor anymore, but it is a part of life. So why should it be stressful if you go read your email?"

The mobile solutions create many challenges for organizations as well. The biggest problems facing the IT department were increasing cost from enabling the use of enterprise systems on various mobile platforms and the maintenance of the devices. The other thing was the increasing security concerns, when more and more business critical information is stored in smartphones and tablets. From a more general management point

of view, the increased availability through mobile technology can lead to increased stress levels and distortion of the work-life balance. Two of the interviewees even recognized a greater change that is happening, where the role of work is changing entirely, being seamlessly tied in with the other aspects of living.

5.5.3. Effects of the mobile technology on IT strategy

The effects of mobile computing for the IT function were quite tremendous and caused a lot of need for new kind of technical support and system integration and security solutions. Still, once more the changes had to do with the actual technical issues more than the IT strategy itself.

> *"There will be, of course, these technical demands with it. They come to the security and this telecommunications and authentication thing; there you have some more need for skills."*

The interviewees explained many reasons for enabling quite a free mobile policy, which were introduced in section 5.5.1. but when discussed on a more general level, some of them stated that they had almost given up trying to control people and their choices of tools.

> *"(…) we haven't limited the usage of personal devices very much at work. We don't support it, of course, so if someone uses an iBook here, it is ok in principle, but if it breaks, then it is your own fault and you have to fix it yourself. (…) It is a bit like this silent approval, and of course we make sure that the access to the network requires security and anti-virus and so on (...). That is where the world is headed now; people use what they like and the IT [department] just has to accept it."*

Only one of the interviewees stated that they were holding on to the system, where the IT management determines the use of technology and backed up this decision with simple cost logic. This view was clearly different from the other interviewees, even though the problematic was basically the same. Even though in the quote he discusses laptops, his general view was the same with smartphones and tablets; so before the people can arrange

the maintenance and support themselves, there was no business case for them to release the mobile policy.

> *"We have also outsourced our IT, the technical operations are outsourced, so every hour by a consultant and I can tell you it costs 100 euros (...) That kind of a workstation costs 500e, below 500e a piece, so if the workstation gets broken, it's no use to have it fixed. It's better to buy a new one. The same logic goes for these [mobile] services as well, so they easily, when we set up some service, it easily causes customer service situations, failures or support requests or something. The cost of them is so high that there has to be a lot of user, and significant improvements in their working possibilities, before we have a business case."*

In general, the biggest things that came out in the mobility discussion were that the interviewees saw a lot of good things that came out of the mobile revolution. From an IT perspective it still causes a lot of technical challenges, and the expenses of resolving them might skyrocket quite quickly. What was clear was that in many places the IT department is not in the position to dictate the tools people use anymore, in fact, only one of the interviewees said that they have a policy that needs to be followed, and they seemed to have quite a firm grip of the organization still. In all of the other companies the IT department was either not even trying, or was not successful in controlling people's behavior. This raised the question of how much is the mobile policy a political thing in organizations, indicating who holds the power in making the decisions over IT interfaces.

5.6. Consumerization

The word 'consumerization' was familiar to a clear majority of the interviewees. Nine out of twelve were able to give a clear definition for the term, and the others were able to give examples of its effects, once the term was explained to them. Still, what was notable was that the term consumerization was in many cases understood mostly through the Bring Your Own Device –phenomenon. Because of this, the challenge was to get the interviewees thinking about the phenomenon in a wider context.

"Well the things that go forward there at home and elsewhere in the market, (…) it comes into companies even faster than before. (…) we have had a lot of people retire. (…) But then we will get quite a lot of young people, and they do have a totally different take on these things, their abilities are on a totally different level, so we have quite a big range here. And just like, people kind of demand the same things here at the office that they have at home."

"It is, for example, on this device side the fact that the definition is blurring, whether this is a company tool or a personal tool. (…) kind of the idea that you work with the same tools and partly the same software that you use in your personal life.

Some of the interviewees recognized some ways in which consumerization influences the decision-making models and service expectations in the B-to-B markets as well. People are not satisfied with the traditional enterprise IT models anymore, when they have experienced a faster and more flexible service model on the consumer technology side.

"(…) A customer asked me once that '[name removed], why do I get this application that I buy from AppleStore into my phone after three minutes, and why can't you get us one damn server delivered in the same period of time? Or one service that does some things in the datacenter? How can it take two weeks for you to get it done, when Apple can deliver it right here and now?' And that was a moment that brought us back down to earth and the starting point for our internal discussion about it." IT

"It is probably more of a culture shock for IT that people bring their own equipment, and they have always brought them, even though it is prohibited in some firms. Then again the IT says that ok, they won't support the devices that are not according to the catalogue. Probably this consumerization has to do more with that, so it influences the firm practices and the firm's customers' practices. So people make decisions in a different way, more like consumers, and not necessarily always based on Excel sheets and other things (...)" IT

A thing that was visible in many of the interviews was the power shift in the organizations, and the change in the management model. Many of the companies had recognized the fact that there are things they cannot control or prevent from happening.

> *"(...) the information security people are horrified and then of course... We have had like, since we do these solutions ourselves, we have always had quite a free policy (...) We have tried to control it, but also keeping in mind that we cannot stop it from happening. So in that sense the strict prohibitions have usually turned to the situation that the house of cards has started to collapse from some part, so you can't do that with megatrends (...)" IT*

Some of the companies had standards in place, but in reality people were doing, as they wanted to a great extent. Officially it was not a company practice to use Apple computers, but the IT management had acknowledged that it is better to let people use the devices they want to and just adapt to the situation.

> *"(…) there is this basic problem in IT-management nowadays that what the IT department offers, is bad compared to what people have at home. And if we give this laptop to people here (…) very few use it at home. At home they use ultrabooks, iPads, mobile devices, Wi-Fi-networks, 4G-connections and so on. And the traditional challenge for IT is to offer something at least as good. And it is not possible really. That leads to the fact that people use and bring their own gadgets to work, and it depends on the viewpoint, whether it is a security risk or not (...)."*

Also many of the other companies had been gradually decontrolling the IT policy, after realizing the traditional methods were not working any longer.

> *"So far we have been offering the work equipment from here. (…) We were actually thinking about doing this model for buying a phone that the company would have subsidized it somehow and the person could have bought exactly the phone they want. But then our dear tax authorities in Finland are quite particular with that, and in a way, it would have become so expensive that we decided we [the company] will buy any kind of phone, in fact."*

Only one of the companies had a different take on the phenomenon, and seemed to be in control of the situation with the consumer technologies. What was very clear was that their decision-making models on a corporate level had not changed much due to consumerization. They had a very traditional and analytical approach to all IT decisions.

> *"We are evaluating its benefits. This IT-work is so brutal that you don't have to think about anything else, than what kind of a solution it is, how are the costs and what benefits would it bring. And it is the same in this situation."*

This almost paternal attitude raised the question of whether the issue was more about politics than cost optimization. Either way, the answers of this one CIO were consistent in communicating a strategic goal of minimizing the cost of IT.

5.6.1. Possibilities provided by consumerization

Many of the companies saw consumerization as partly a positive development as well. Enterprise systems have traditionally been quite heavy and complicated solutions, which need extensive training in the implementation phase. The lighter and simpler consumer solutions reduce the need for education in that sense. On the other hand, they also said that the need for Web and social media education has increased

> *"There are a lot of positive things to it, since the solutions made to the consumer side are usually simple, you don't need a big training stage, but people can start using them right then and there."*

One of the companies also indicated that consumerization has benefited them, when it comes to making IT investments, since the contracts are more flexible and the services can be disposed much easier than before. IT companies are accepting it, since flexible service model is an opportunity for them to differentiate and outperform their competition, since nowadays the actual technical solutions do not differ that much in quality from the buyer point of view. This means consumerization gives greater power to the customer side of IT transactions.

"First of all it is really good that, exactly because it [technology] has become so mundane (…). You can buy the capacity without committing to some, say, if you buy a server, you need a server, you can get it from cloud and you don't have to sign a ten year contract, where you have to pay penalties if you give it up after a year."

Another thing about consumerization is that it gives the companies a possibility to differentiate themselves from others with an image of a being more modern employer and keeping up with the development. A majority of the interviewees indicated that they want to be a more attractive employer in the eyes of capable workforce. The meed to lure potential future employees is emphasized even more on the industries, where the companies compete on knowledge workers and experts.

"(…) all of the forecasts are pointing to the fact that we will suffer from a lack of work force [in the future], so we will not have enough employees. Then you can maybe think that if we don't keep up with the development, then if we think about a situation, where you are applying for a job, and all of these, you are used to technical devices and that world. And then the company, compared to another, seems to clearly lag behind, then it could be this... Maybe it [consumerization] is a certain alluring possibility in a way (...)"

It is not quite clear though, whether consumerization and mobile technologies and the flexibility provided through them will force people to commit to their work more, even too much, or quite the contrary. Two of the interviewees had completely opposing opinions about how it will influence the culture of working. Both of the views can be backed up with sensible arguments, but it is hard to say what the actual effect will be.

"(…) in my view it is a good thing that it brings a little bit of this… you put your mind into the work a bit more maybe, since it is closer to you. It is not this thing anymore that I go to work in the morning and you go into your work mode and then in the evening it is off. (...) A negative thing is if you can't turn off the work mode ever."

"(…) People are not that committed. There are a lot of people who are not that committed to their work, they're not interested like that. Like I said, they work with

this on demand -style, so these kinds of models could emerge and these mobile devices enable precisely these kinds of flexible working methods."

In sum, the consumerization phenomenon is beneficial to firms in the sense that the consumer (or consumer-like) systems are light and flexible, quickly implemented and don't need extensive training. Furthermore, the IT vendor contracts are also becoming more flexible for the buyer, leading to decreased risk and prices, and better provisions. Since employees are becoming more and more demanding, it gives companies the possibility to differentiate from others with an image of a flexible and modern employer for young, capable workforce. The trend also seems to have an effect on the employee commitment, but there were contradicting views on how it will influence it. The employees might be pushed to commit more with the trend of increased availability, or, they might be less committed to work due to the flexible working possibilities. The answer remains to be seen. Next, I will introduce the downsides of consumerization named by the interviewees.

5.6.2. Challenges of consumerization

The biggest question that arises, when talking about consumerization is yet again security issues and the cost of supporting various platforms and enabling access to the company systems from a diverse set of devices. Many of the most notable concerns had to do with BYOD especially and mobile devices.

"If you think about, if we were some software house, where then some product development group, that they would get a mandate that 'you have 1500 euros, by any computer'. I think it would be fine, because they can manage with it. Here, some manage, but the most people don't manage. They might want fancy devices, but they can't use them. And then this, kind of, the more of these product- and device groups you support, the more challenging and difficult it is. (…) what already has happened is that the devices need to be good and the tools need to be good. And they need to be the same ones the people use at home."

"Well the thing with this is a bit same, as in cloud and all of these others. Since we have outsourced our support services, it causes a situation (…) If we implement a new technology, then we have to have the support services to offer for it, because our users are not, in contrast of their own view sometimes, they are not able to maintain their devices. (...) When it comes to BYOD, these systems, they are beneficial only after the company gets rid of the support services for the devices, and lower their costs through that, and move the cost of maintenance (...) to the user."

Sometimes it is also difficult for people to recognize the difference of using applications for business and the fact that there might be additional legal requirements and different licensing models attached to the solutions. Making sure the systems and applications are used legally is a challenge companies are trying to tackle with training and enterprise 'AppStores'.

"But the thing is these license and data ownership questions, which is the tricky thing for an individual, non IT-contract and technology familiar person. So they push all kinds of apps at people so much, and a lot of the times people have learned in their personal life, whether this is a free app or an app subject to a charge., but then when you adapt those apps into business use, then a lot of the times the licensing goes that when the amount or volume is small enough, it is free, but in business use it turns chargeable quite easily."

A big question is with the system and support availability. The systems need to be available at all times, regardless of demand spikes and other challenges. The employees and customers are used to getting service around the clock, no matter where they are. This is especially challenging from a maintenance point of view, since usually the systems need regular updating and service. This applies both internal IT and outsourced support services.

" That is a thing that might sometimes cause this conflict and even the services and equipment provided by us here, are more old fashioned or aren't on the same level as their personal devices. So that can cause a challenge. Many times it also happens so that the company needs to look at them through different lenses, so when we acquire

some services or deliver services, they normally have to function 24 hours a day and they need to be able to serve 5 or 17 thousand people."

"Then there is this 24/7, which is the worst scenario caused by consumerization. We have a completely new requirement of a 100% availability presumption [of systems] from the end user point of view. (…) This causes us the problem of when we will overhaul the machines? When? Never, so everything has to be up and running 24/7." IT

One of the IT professionals pointed out that the new demands are especially shocking to IT management, since the common impression has been that the territory of IT systems are highly automated and functional, but the reality is, in fact, something else. Two of the interviewees even paralleled the current development to the industrialization period in the past, particularly in the cloud context. Their view was that the same thing is happening now in the world of IT; individual operations are being replaced by whole parts of a process.

"(...) in IT they are, we have been kind of this... How would I put it? There has been this illusion of a high degree of automation. So it is a very, it's a very (...) absurd situation, that we talk about automation, we used to talk about automatic information processing [ATK in Finnish] but actually the situation is that (...) it consists of individual atomic operations to a great extent. (...) The service providers will have to automate tremendously more of [their processes]. (...) And this is a bit of a new concept in many places, so they have made very fancy applications, but their system management they haven't been able to automatize" IT

"I believe in the fact that we will move more to the direction, where we kind of buy pieces of a process."

Another IT professional brought out the power of social media and the rapid communication nowadays, since the view of the social media can turn the situation of the company upside-down in one night, in a negative or positive sense. In other words the company needs to be prepared for sudden spikes in demand or vice-versa, a public blow to the company reputation, which can turn the demand curve to plummet.

"Well the consumers are fast to move to new technologies and applications, so we need to be fast, in principle. And the trends are changing rapidly, so it might be that the day after tomorrow they want something completely other. Or then someone finds our service, that's good and practical to use and it works, and suddenly our demand might jump to be tenfold. Of course that is a good thing, and then how should we be able to react to it. Practically the only way of reacting for us is cloud." IT

In addition to the security problems and increased costs of operation, the interviewees also recognized other significant challenges that follow the consumerization trend. The first is legal questions concerning device ownership and software licensing, which need to be resolved when the boundary between personal and business devices is blurring. The service requirements have also grown significantly, since the expectation is that service availability is around the clock, the systems are running 100% and the service scalability needs to be immense, having to handle significant turns in demand. These turns are intensified further by the influence of the social media. These challenges have made 'the automation bubble' to burst, making it clear that the IT processes are not as automated as previously believed.

5.6.3. The effect of consumerization on strategy & IT strategy

Many of the companies indicated that consumerization development leads to companies coming up with more modern service channels compatible with the current way of doing business. Especially the IT vendors are tapping into the new business opportunities that arise with consumerization, when businesses are facing new needs for various kinds of technological solutions.

"(…) Already answering requests and questions, so it doesn't work like that anymore that if someone asks you something out there, you reply after two weeks and ask if we could send them some brochures by post. In that stage the deal is already done. And then these customers, they want to investigate themselves to a great extent, which means that the product information must be brought into the Internet, as well, or available one way or another. The fact that you need to respond to the questions right

away, so we are thinking about this kind of online chat and this customer service model, so if someone comes through the website and they have some questions, we could service them immediately (...) So the cycle is accelerating and at the same times the demands are increasing technically. "

*"We have developed these [enterprise] applications, so people can buy them in the application store. It not like that anymore that you call and make a ticket in the service desk, but instead I go with my phone and choose the applications and *click*, it is installed in there and can be used right away." IT*

Also, it provides an opportunity for creating new type of service models that can hopefully increase their sales or give the customer a better experience and image of the company. The consumers and customers can nowadays be reached in more diverse ways, and companies can utilize that to direct their purchasing behavior.

"(…) in this smartphone territory, of course, now when it has become available for everyone and everybody is beginning to have them, and it is nothing out of ordinary. It also enables using these QR-codes[5], so in that way it has and impact that we can think that if we print the QR-code to a bag of bread, that then tells about... or say, it directs us to a webpage, where you have an instruction, how you can prepare especially delicious sandwiches with it, for example."

Another interviewee had the view that it is still important to bear in mind that in the consumer business there are still people, who are not technically oriented and will never own a computer or a smartphone. This causes the demand for companies to build overlapping services for both kinds of audiences, which can be a significant cost factor.

"A certain segment of the consumers are very IT-capable, but it is only a certain segment. The impact is that we should have and we need to have services for those kinds of people as well, but this is one of those things, where it is many times easily forgotten, that then there are those users, who have never owned a computer and

[5] QR-code stands for Quick Response Code, which is a matrix barcode that can be scanned with a smartphone or a tablet and the code automatically guides the person to a specific website. The functionality is nowadays available in almost all smartphones.

never will, and they want the same services too. (...) And then the business units need to think to themselves, how much we can afford to develop own versions of the service for the technology oriented people."

In general, there is an increased requirement for flexibility and dynamics for the IT suppliers, which is reflected by shorter planning cycles and a need to get the services running in a very short period of time. The B-to-B customers expect to get their solutions ready-made and rapidly delivered, with a push of a button.

"Probably one thing is at least that we have to modify it all the time, so we can't make this five year plan anymore that now we buy two of these AS400 computers and build our ERP on those, and then after 10 years we update it. You don't do those anymore. It is constant iteration of where we are going, which direction and... something might turn from A to B overnight. We state that that is where we were going before and now it is not good anymore, so now we will go that way instead. So it requires this rapidity to it and reaction to change..." IT

"Our customers want to buy services. They don't want to buy hardware - they want to buy services. That is maybe one manifestation of consumerization. Then the next manifestation is the 'everything here and now'. So the idea that IT would have a delivery time of a couple of weeks or a couple of months, it sounds outrageous, I mean in the minds of the customers. And now we are developing this one service, where we are going to, the customer expectation, we will turn it upside down. It hasn't been published yet, but I can tell you that at the moment the average time is 35 days from the customer order. The new delivery time is 16 minutes from the customer order." IT

In addition to the obvious technical demands of enhanced security and support availability, consumerization is also affecting the expectation of functionality and agility of the enterprise systems. Six of the interviewees recognized a trend, where businesses are demanding better usability and less heavy systems for enterprise use.

"Well maybe usability is one thing. If we think about enterprise services, they're not... Engineers have always planned them with this certain logic, and if it is someone more

sophisticated, he might have put a nicer color to it, so this usability planning. And in all services that we implement and that we demand, has increased a lot. There is a lot of work to be done there, if you think about SAP, which is apparently quite a significant software company, all of their services are terrible to use. So there is a lot of work to be done there."

"(…) probably these massive services, like Webex or something else, will probably be replaced with these kind of lighter services in the future, like Lync and others. (…) it seems that these fast and simple things are gaining a foothold also on the business side."

Correspondingly, at least one of the IT companies are building solutions that have same the features as publicly used consumer services, but with better security and other demands that are emphasized in the enterprise context. In fact, there are already several social media and collaboration solutions available for enterprise use, and the number probably will not be decreasing.

Finally, there are some implications of the changing nature of the power-relationship between employees and the IT management. The employees are more and more demanding and companies have to adapt to their wishes.

"(…) the employees nowadays are more demanding, when it comes to access to the social media, for example. There are more of these people here, who say that they don't want to use these kinds of computers, but they want to use Apple. And if a person wants to use Apple, we need to let him. Then there is this other discipline, who think that the job of IT-management is to produce standard [solutions] that suit everyone. That is a mission impossible. In my view there will be continuously more freedom, and then we just need to figure out these company interests; security and such..."

"I don't know if it is this that if I don't give Apple's to these certain level people, they announce that they will hand over their mobile phones to me, so I guess that is the comment. The phenomenon of consumerization that the younger guys had a strong view, that they will nearly pack their bags if they don't get Apple phones."

Another view on the development was that in the future, the role of the IT unit might be completely different, and they would not be the ones providing the equipment and support any longer. Instead, the expectations would turn the other way around, and having the right devices and tools for the job, would be a condition for employment.

> *"But then of course it reflects in IT as well in the way that then our users and customers will probably know a lot more about it [technology] than our own experts. (…) In a way, I do believe in the Bring Your Own Device -approach in the future (...) that it is maybe more of a requirement that if you want to work for us, you need to have these [devices]. There are jobs nowadays too, where they require that you have a car. (...) I do believe that that is where we are headed and that is the effect. But it doesn't happen overnight. (...) And it will be, since the prices are constantly going down too, it [devices] will become so cheap as a result of consumerization that it is not a thing, where you even have to use your time. But rather the focus is in providing the interface, where people come."*

The biggest strategic thing, in addition to security and cost, where consumerization had a big impact were new service models, both for consumers and businesses. Almost a half of the interviewees informed that they either already had or were planning to build an enterprise AppStore for their employees to use. Correspondingly, one of the interviewees said they were planning for a web store for their business clients, since that is the way people are used to buying things nowadays. The technical development also opens a new field for services combined with traditional products, through the QRC-codes for example. At the same time, the old services need to be kept in place for people, who are less technologically oriented, which leads to expensive overlapping services.

The characteristics of consumer applications are also being adopted into enterprise systems, with companies having a growing preference for more flexible, lighter solutions that can be easily procured over the Internet. This is a trend supported by the cloud technologies and SaaS-based solutions, and provides great business opportunities for IT vendors. The need for increased flexibility is driving companies to shorten their strategic planning cycles and to buy more services, instead of hardware.

Furthermore, there are indications that consumerization is one implication of a shift in the power relationships between the employees and the IT management. Most of the companies had accepted the fact that employees nowadays make their own choices of technology and the role of IT is to adapt to that. If the idea is taken even further, one might speculate the role of the IT function to be changing totally, as three of the interviewees suspected.

In sum, the implications for IT strategy, when it comes to consumerization in total, were quite consistent with the answers in the other topics, especially the social media and mobile technology, and somewhat with cloud. This may be due to the fact that the interviewees combined consumerization with these trends more strongly than big data.

6. SUMMARY AND CONCLUSIONS

The aim of my research was to study consumerization as a phenomenon and its effect on businesses and more specifically the IT strategy. Consumerization is changing the power balance within firms and the way companies do business in general, making it a relevant subject for research in the field of management and strategy as well, and not only IT. Still, academic study about the topic is very scarce, even though it has raised a huge discussion in the world of business and IT.

I conducted the research by interviewing twelve experts on the fields of IT and strategy. Four of them were representatives of IT companies and eight were CIOs in large and mid-sized organizations in Finland. The results of the interviews were somewhat mixed, revealing some strategic factors, but a lot of things that the participants considered more tactical, and not really having to do with IT strategy so much.

I approached my research question "How does consumerization affect IT strategy?" through six sub-questions:

1. The nature of IT strategy and alignment with business strategy?
2. How does social computing affect the business and the IT strategy?
3. How does cloud computing affect the business and the IT strategy?
4. How does big data analytics affect the business and the IT strategy?
5. How does mobile technology affect the business and the IT strategy?
6. What does consumerization mean for the business and the IT strategy?

Next, I will go through the results of each of these questions, studying the topics using both of my chosen strategic frameworks; the market driven and the resource-based approach.

1. The nature of IT strategy and alignment with business strategy?

Three main determinants or influencers arose in the discussions for IT strategy; the business strategy, the business and IT environment and the role of IT in the organization. In terms of the business strategy, the responsibility of the IT strategy was to support

business units to execute the strategy in the best possible manner. Secondly, the business environment and the technological developments have an effect on the IT strategy, since the IT function needs to make sure they can respond to the external demands and keep up with the development. The role of IT varied in the organizations from being extremely central to the business, to having a supporter's role and enabling everyday processes and the aim was to run it with minimal cost. In other words, IT was seen as a strategic resource in some organizations, whereas a few had clearly taken a strong cost savings focus to it.

In the majority of cases the IT function had two separate lines of operation; the operational IT and the development (or business) IT. The operational IT was concentrated on keeping the everyday processes going, making sure everything ran smoothly and securely. The development IT, on the other hand, was closer to business, with the focus of supporting key projects and producing services for the customer interface This finding matches quite well with the separation of Tallon et al. (2000), who would probably name this a dual focus; combining operational effectiveness and market focus, in the market driven view. From a core competence or a resource-based view, it was an interesting notion that many of the businesses had outsourced the operational part of the IT or tried to manage it with minimal cost, since it was not central to the business. Porter and Millar (1985) would maybe call this the differentiation approach on the development IT side, and cost leadership aspirations on the operative IT side.

The strategy alignment discussion also seemed to be dual in nature. The interviewees separated the business driven IT from the IT that was managed and developed by the IT function. The business driven IT was related to the IT development taken forward by the demands of the business units and the key projects related to the business strategy. Then again, the IT units themselves were in control of updating and developing the IT infrastructure independently from the business strategy.

One notable thing from the discussions was the fact that many of the interviewees indicated an increasing need for agility and dynamism in IT strategy management. Even though the strategy formation models looked mostly quite traditional, some of the participants stated that the strategy planning cycles are growing shorter and that there is a

constant need for change and strategy adjustment. This was compatible with the dynamic capability approach (Teece et al. 1997), pointing out that the industry winners were the ones with the timely responsiveness to change and flexibility in resource allocation.

2. How does social computing affect the business and the IT strategy?

The social turn in IT is widely visible in businesses and eleven out of twelve interviewees informed the company to be actively involved in the social media. They mainly used the social platforms for sales and marketing related efforts, embracing the possibility for dialogue with the public. A lot of them also said they were building or already using internal communication and collaboration tools as well, to enhance the internal flow of information and discussion. The significance for IT strategy was quite obscure.

One big goal of the public social media activities was to build a positive company image both to increase sales and to appear more attractive to potential employees, especially from the younger generations. This might be considered a somewhat strategic goal, aiming to secure the future resources in the company, but basically, the focus seemed to be mostly in marketing and communications. There were also speculations that in the future the social collaboration and networking tools would be used in B-to-B communication as well, but it was not a particularly relevant trend at the moment.

The challenges and demands for the IT function had to do mostly with security problems and blocking external threats that might arise through the social media. Still, possibly the biggest threat for the company are the employees, who use social channels unaware of the risks involved in sharing information and material, or participating in public discussions. Nowadays, the public image of a company is not only the responsibility of the marketing and communications department, but everyone in the company. In fact, quite many stated that the ability of a firm to manage their public image nowadays is very small or non-existent, due to the social media. Therefore, many of the IT departments had an educator role, trying to spread social media awareness throughout the organization, and minimizing risks in that way.

When it comes to IT strategy, social media did not seem to be a very strategically important topic based on the discussions. The interviewees found it important to be involved in the social arena, but just for the purposes of the public image and visibility. This probably is due to the fact that none of the companies were in the business of marketing communications. Supposedly, if an organization decided to try and differentiate from the competitors through their social media presence, it might be considered a strategic move from that point of view.

Still, what social media does have a big influence on is the business environment. Due to the rapid changes and speed of spreading information, the social media influences the environment and the market movements. It can create sudden demand spikes overnight, or make a company reputation crash within hours. It is a big influencer, when it comes to the volatility of the business environment, and can cause problems for the IT units as well. This causes the demand for IT to be prepared for rapid responses to changes. Once more, the dynamic capabilities might help a company outperform its competitors.

3. How does cloud computing affect the business and the IT strategy?

Many of the interviewees agreed on the fact that cloud computing does not actually influence the IT strategy, but it is more of a tactical level issue and just a new alternative for producing a certain service. In fact, the IT strategy is the main determinant for whether the cloud services are a good alternative or not.

More than a half of the participants pointed out that it is actually more cost efficient to produce the same services internally, than to move them into cloud. The costs quickly cumulate due to the licensing terms and system integration efforts. Furthermore, the same problems occur with cloud services, as with outsourcing projects, and they do not remove the need for internal expertize. If the company has a strong cost focus in their IT strategy, like many do, cloud is probably not a very relevant option for them, unless the internal time and effort used in providing the service is considered a greater cost than the financial one.

On the other hand, if the firm has a focus on the optimal use of their IT resources, they might find cloud to be a very attractive alternative for outsourcing functions and services

that are not central for the strategy. Furthermore, cloud services provide transparency of licensing, ease of implementation, flexibility and the ability to respond quickly to changes. Basically, if the IT strategy focus is on dynamic capability and core competences, cloud is a natural choice for producing some of the IT services.

Finally, a less expected implication of cloud might be a change in the role of the CIO and the internal IT function in total. In the future, their role might not be about producing services at all, if the same services can be bought over the Internet with a cloud model. Like one interviewee pointed out, the IT unit might have to compete against cloud solutions or their role might change into a more strategic, outsourcing management related position.

4. How does big data analytics affect the business and the IT strategy?

Big data and advanced analytics raised strong opinions for and against the techniques, but the strategic significance of them remained slightly obscure. The biggest skeptics stated that it is just "hype" at the moment, not really having any significance in the real world. Their view was that even though there is a future for analytics, the systems are not developed enough yet and the benefits are overrated.

The interviewees who strongly believed in the possibilities of big data saw the biggest benefits of it coming from consumer information and deeper insight on their customers. Another big focus was on the maintenance and life-cycle management of machinery, where analytics could provide a big advantage. One of the interviewees mentioned their aspirations to move "into another value level" with implementing big data systems, which can be interpreted as willingness to change their strategic focus to differentiation (Porter, 1980). In sum, the value of advanced analytics were seen to come from better understanding of the market and the possible changes in it, to support more educated decision-making. In that sense, information and analytics could provide an opportunity for a core competence of superior market insight or maintenance management model.

Utilizing big data solutions is by no means an easy task, which became clear in the discussions. There is a need for deep insight and understanding of the business and the analytics systems to enable effective use of big data. Also, the data needs to be tightly

secured to avoid leakages of customer information. Furthermore, the applications are not yet very developed from a user perspective, and the big data projects often turn out to be long and difficult, due to problems with harmonizing data or technological readiness. A majority of the interviewees suspected that in the future the solutions will either be built right into the ERP-systems and databases, or would be acquirable through cloud within minutes. Interestingly enough, it seems that big data is consumerizing. At least, consumerization has had the effect that the solutions, which seem heavy and slow to implement, are not that attractive to companies, even if they see the output as very valuable.

5. How does mobile technology affect the business and the IT strategy?

Eleven out of twelve interviewees stated that their company has quite a free mobile policy, or at least there have been some adjustments to it, enabling a more allowing environment for different mobile platforms. The mobile technologies were used primarily for email and calendar, but all of them indicated that there are constantly wider possibilities for using the devices. Many also used social media and collaboration tools, as well as systems for accessing materials and documentary with phones and tablets.

The biggest befits of having a permissive mobile policy were productivity and flexibility related, enabling remote working from anywhere with a 3G-connection and regardless of the time. Employees can be reached faster due to the increased availability and they are more satisfied with their work, using the tools they like best. The logic from a business point of view is thus quite straightforward, with the emphasis on improved efficiency and flexibility.

The other side of mobile technology is once again increased security risks, higher costs of operation and maintenance. These were the reasons why one of the companies had decided to keep to their standardized mobile policy, holding on to the power of decision. On top of that, the increased mobility of employees makes it more difficult to organize face-to-face meetings, and the personal contact to people decreases. Also, the increased availability plays havoc with the work-life balance, threatening to increase stress levels and in the worst case leading to work exhaustion.

Based on this, the strategic advantages are formed through flexible work practices and more effective communication. Nowadays though, it is questionable whether it enables a company to differentiate any longer, since so many companies have already widely adopted the use of mobile technology. Still, if the employer seems like they are lagging behind development it can differentiate them from others in a negative sense. From a cost leadership perspective the adoption of mobile technology might not be the preferred choice, unless the efficiency benefits exceed the amount of costs.

From an IT perspective, the mobile technology means a greater need for heavy security investments and system support services. Also, the company applications have been made accessible with a mobile terminal, and there is an increased need for round the clock – availability of the systems.

6. What does consumerization mean for the business and the IT strategy?

The connection of consumerization and the IT trends was quite visible in the interviews since very similar themes kept coming up, when discussing consumerization as in the previous sections. It was evident in the discussions that many businesses are not satisfied with the old enterprise IT systems any more, and there are new expectations towards technologies and solutions also on the B-to-B –markets. Furthermore, the IT departments are not able or sometimes not willing to restrict the development, so most of them are choosing to adapt to the change, and are decontrolling their policies, giving more power of decision to the employees with the tools they use.

The biggest benefits of consumerization come from lighter systems that can be implemented quickly and do not need extensive training cycles, due to their simple usability. From an IT buyer perspective, the quality differences, or brand value, in enterprise IT solutions are basically non-existent. This means the IT vendors need to compete with price and more favorable terms of contracts, giving the buyers a strong position for negotiation. Due to this and the new technology available, the prices of IT are going down significantly, which is consistent with Porter's theory of market forces (1980). Also, staying on top of the development gives firms an advantage, when looking for new capable workforce, or at least prevents them from standing out in a negative sense.

The problems with consumerization are increased costs of security and support services, due to the diversity of equipment, which are also easily lost or stolen and the systems can have loopholes in security. Also the data ownership and licensing questions are something to be taken into consideration. Consumerization and technological development has also changed the demand for system and support availability, creating an assumption of having access to the applications and portals around the clock. The rapidly changing nature of the markets also creates a need for increased automation in the systems and processes of enterprise IT.

From a business perspective, many of the interviewees communicated the influence consumerization has on service models. The customer service channels in the business world are becoming very similar to the consumer solutions, like web stores. There might also develop entirely new kinds of service models supported by the IT development. On the other hand, depending on the customer basis, the non-technical customers are demanding the same services as well, leading to possible inefficiencies in the cost structure.

The representatives of the IT companies, on the other hand, said that their customers want to buy IT services instead of hardware. Many of the interviewees also said that the IT strategy planning cycles are shortening, which indicates an increased need for dynamics in strategy management (Teece et al. 1997). The businesses nowadays prefer faster, more agile solutions that they can easily get rid of, if needed. This creates new business opportunities in the IT markets.

Finally, the role of the IT function and the CIO in traditional organizations might be changing entirely due to the current development. There are more alternatives to produce the same services and the volatile markets cause a need for increased dynamic capability. Outsourcing and cloud computing might decrease the internal IT territory, leaving the coordination and strategic work for the old IT function. Furthermore, the devices and tools used in the internal enterprise networks seem to be increasingly the responsibility of the employees, which further takes away from the old IT territory. Since the role of IT was one of the main influencers of IT strategy, the development will probably influence the IT strategy as well. Admittedly, at the moment these statements might be regarded as

speculation, reaching far into the future, but there were indicators towards this in several of the interviews.

In sum, the effects of consumerization in IT are numerous, but its effect on the IT strategy is somewhat dependent on interpretation. There focus on security and support, as well as system agility seems to be increasing, and the prices of IT are going down, since the buyers of IT have a stronger negotiation position than before. Consumerization seems to have a big effect on services especially, with the increased service level assumptions and new kinds of services entering the IT market, which could lead to decreased need for IT infrastructure hardware. The mobile devices, on the other hand, increase the demand for cloud-based services even further.

All of this has a big effect on the IT department and their role in the organization, which might be changing toward more strategic role, focusing on IT coordination and service management. From a more theoretical perspective, the companies seem to be investing into a more dynamic IT resource model, where the systems are flexible and more service-based. On the other hand, the firms with a bigger cost efficiency focus might be making the changes with a slower pace, waiting the prices of IT services to decrease further.

6.1. Limitations and suggestions for future research

The aim of my study was to give light to a phenomenon that with very little previous research and to come up with some elements for theory making. Still, with the enormity and complexity of the topic, my study is not sufficient for definitive statements of the meaning of consumerization in the business world. There are many questions left unanswered and lots of room for more profound research.

A few interesting areas for future studies could be relationship of knowledge-worker management and consumerization or studying the phenomenon deeper from the strategic agility perspective. In general, the whole area of consumerization is relatively unsearched, so there are plenty of interesting questions left unanswered.

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Appendixes

Appendix 1

1. INTRODUCTION, BACKGROUND INFORMATION
2. IT STRATEGY
    a. How is IT strategy conducted in your company? Who is involved in the process?
    b. Alignment with business strategy?
    c. Infrastructure, procurement, management and maintenance
3. SOCIAL COMPUTING – effects on it strategy
    a. Which social platforms are being used in your company? How?
    b. What are the recognized challenges and possibilities of them?
    c. How do they affect the requirements for IT systems?
    d. Social media, information & data sharing services
4. CLOUD COMPUTING – Effects on IT strategy
    a. Which cloud computing systems are being used? Public/Private? Why?
    b. How will they affect the IT infrastructure in general? Future prospects?
    c. Virtualized servers and storage systems
5. INFORMATION/BIG DATA – Effects on IT strategy
    a. Do you use "big data" systems to collect and analyze information? In what way? Future prospects?
    b. Requirements for infrastructure, consumer information, usage of the information
6. MOBILE COMPUTING – Effects on IT strategy
    a. Are mobile devices used in the company? What kind of devices? For what are they being used?
    b. Benefits and downsides of increasing mobility?
    c. Smart phones, tablets, Bring Your Own Device (BYOD), demands on infrastructure, virtualization
7. CONSUMERIZATION
    a. Are you familiar with the term? What does it mean?
    b. How is this development managed?
    c. Characteristics of consumer goods, appliance on services and products for businesses
8. OTHER UPCOMING TOPICS