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Success factors in technology-push innovation process

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Symbols

IN – Innovation network

MP – Market-Pull

NPD – New product development

TP – Technology-Push

VOD – Voice of designer

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TIIVISTELMÄ

Teknologian työntövoiman ajama innovaatioprosessi käynnistyy yrityksen sisäisen toiminnan tuloksena. Yritys pyrkii luomaan innovaation ilman, että markkinoilla olisi kysyntää uutta tuotetta kohtaan.

Innovaatioiden ympärillä olevaa uuden luomiseen liittyvää prosessia on tutkittu laajasti kirjallisuudessa, mutta teknologian työntövoimaan vaikuttavia menestystekijöitä on silti vaikea listata. Tämän tutkielman on tarkoitus ensin määritellä innovaatio tyypit ja myöhemmin käsitellä teknologian työntövoiman menestystekijöitä jatkaen aiempaan kirjallisuuteen perustuvaa tutkimusta. Tutkimus vastaa kysymykseen, miten luoda menestyvä teknologinen työntö? Aineisto on kerätty aiemmasta kirjallisuudesta, kolmesta haastattelusta, sekä kahdesta case tutkimuksesta. Haastattelut tarjoavat käytännönläheisen näkökulman ja case tutkimukset käsittelevät aihetta kahden yrityksen, Nokian ja Applen avulla.

Tutkimustulokset jatkavat aiempaa tutkimusta luomalla kattavamman listan menestykseen vaikuttavista tekijöistä. Tutkimus osoittaa, että teknologisen työntövoiman innovaatioprosessin menestymiseen vaikuttavat yrityksen yhteistyökyky, organisaatiokulttuuri, riskien hallinta, sekä kyky hyödyntää aiemmin toteutettuja, toimivia ratkaisuja uusissa innovaatioissa.

AVAINSANAT: Innovaatio, teknologia, työntövoima, menestystekijä

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ABSTRACT

The fascinating process of creating something new through innovations has been studied widely from various perspectives. This thesis explains the innovations types and focuses on the technology-push innovation process, which refers to company´s innovation process being driven by internal efforts rather than creating solution for already existing need. The aim is to find out the factors affecting success in technology-push process.

The thesis approaches the research question, how to create successful technology-push, by combining information from previous literature related to the topic with conducted interviews and exemplary case studies. The academic background is formed by innovation related literature explaining the innovation types as well as the innovation network. The interviews offer a practical insight and the cases about Apple and Nokia handle the technology-push from successful and unsuccessful perspectives.

The results point out the meaning of organization´s culture and collaboration and management´s risk handling and ability to utilize the existing best practices as factors affecting the outcome of technology-push process.

KEYWORDS: Innovation, technology-push, success factor

1. INTRODUCTION

1.1 Research context

The concept of innovation is being widely used both in academic field and in media, with a strong positive understanding and association with the ideas of progress and improvement. To a certain extent, the strong positivity attached to this concept has made its use very broad and the term itself trendy, which makes it interesting as well as important to study how to reach success in this area. However the basic understanding of the term, innovation, itself appears often to be weak. Therefore it is necessary to first clarify the way in which the concept is understood in the thesis, and in turn to provide necessary background for the upcoming study. This understanding is provided by classifying the main innovation types based on previous literature, resulting seven different innovations; continuous- and discontinuous-, radical- and incremental-, disruptive-, modular- and architectural innovation. Each of these types explain possible outcomes of the innovation from different perspective in order to provide thorough understanding.

Whereas the whole thesis handles innovations, the main part of the research studies technology-push related success factors. Technology-push is a driver for the innovation rising from the company´s internal efforts to create something new what to sell to customers. Technology-push dominates radical innovations (Sarja, J. 2015) and is therefore more about inventing something completely new. The process misses the clear expected need from the customers and is covered with risks. Therefore the efforts of this thesis focus on finding more success factors related to technology push.

1.2 Research design

The research´s design follows the following pattern; theory and literature, methods and data, results and finally conclusion and discussion. The objective of the academic background is to provide necessary understanding of the innovation process´s literature including different classifications and relevant topics. The literature takes its content from the commonly recognized topics, such as the innovation types, as well as topics with less previous research such as the innovation network. The aim is to strengthen previous knowledge about innovations as well as provide new aspects to an average reader. Literature leads to the study and satisfies the necessity of understanding before exploring new.

The empirical study continues the research made by Jari Sarja in 2015. The aim is to recognize more success factors in the technology-push innovation process. The data for the study is collected from interviews, two case studies and previous literature. The results come from both inductive and deductive reasoning.

The main topic, innovation, has endless amount of information around it and needs clear limitations. This thesis will focus on giving the relevant information about innovations only to gain understanding of the meaning and possible outcomes of the innovation process. The point is to provide solid background for the success factor study. This study is limited to handle only technology-push related topics. The thesis focuses only briefly on some important topics such as product development process, just to underline that the study is not about innovation process itself but about success factors in technology-push. The main result is an extended checklist of the relevant factors affecting the success.

1.3 Research questions

The whole point of the research is to find out new factors affecting technology-push process´ success. The objective can be stated as below, and it can be seen as the main research question.

- How to create successful technology-push?

The structure around the questions is formed by explaining the relevant background to understand the whole question and the study is based on previous list about the topic. Therefore the main research question can be divided into two questions explaining the study more precisely. These questions are:

- 1. What are the possible innovations types resulting from innovation process?
- 2. What factors lead to success in technology-push innovation process?

The first one is answered based on previous literature and the second extended from Sarja´s (2015) study. The novelty and the value of the study is created by linking the previous studies into one informative package and comparing empirical and practical views with the previous literature based knowledge in order to produce new information.

2. THEORY & LITERATURE

2.1 Definition of innovation

"Innovation is generally defined as a new technology or combination of technologies that offer valuable benefits to the users." (Sarja, J. 2015)

"If you always do what you have always done, you will always get what you have always got." (Henry Ford)

Peter Drucker (2002) describes innovation as the actions which the entrepreneur uses in order to create new ways to produce additional value, or improve the existing behavior based on already owned resources.

2.2 Classification of innovations

2.2.1 Continuous and discontinuous innovation

Innovations can be studied and classified from the learning based perspective. This means examining the relation of the innovation to the already learned, existing knowledge in the company. Continuous innovation utilizes the learning process and continues operating in the existing knowledge based areas for today´s customers. In other words, delivers incremental additional value. Continuous incremental innovation is also called the evolutionary innovation. Discontinuous innovation means pushing the innovation to outside the comfort

zone into new areas where it is not possible rely on previously learned things, leading to radical, new products and technologies. (VTT, 2006)

One very essential classification for product innovation is the division into product capability and technological capability. An article by Veryzer (1998) describes these dimensions with continuous and discontinuous terms. He states that the technological capability is "…the degree to which the product involves expanding (technological) capabilities (the way product functions are performed) beyond existing boundaries". Discontinuous product with new technological advantages cannot be reached through improvements in existing technology. The other dimension, product capability, refers to customer´s opinion about the product´s benefits. In other words, the higher the product capability is, the more customers find it beneficial.

Veryzer (1998) states that enhancing the product capability leads to commercially discontinuous product, such as SONY Walkman, which did not utilize new technology, but provided completely newly experienced value. Therefore it is technologically continuous and commercially discontinuous. Technologically discontinuous product offers some advanced improvement to the technology. For example, improvement in an electronic device, which doesn´t change the user experience is technologically discontinuous but commercially continuous. The changes in both technology and benefits delivered lead to completely discontinuous change. The stronger the benefit or technological improvement, the more discontinuous the innovation is.

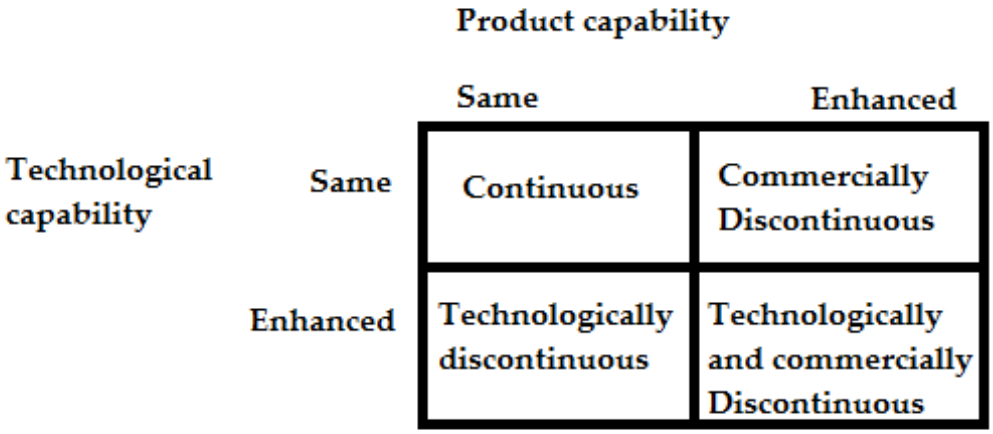


Figure 1. Product capability and technological capability (Veryzer 1998).

2.2.2 Incremental and radical innovation

Innovations can be classified into incremental and radical depending on their nature (Dewar & Dutton 1986). The difference is in the state of novelty. Incremental innovation refers to the improvement actions to an already existing product or service, where the improvement happens step-by-step among time. For example, product can be slightly modified to match the modern customers' needs by updating its´ features. Incremental innovation doesn´t have as big economical or technological potential compared to the radical one, but its´ benefits can be utilized faster and with less risk. (Sundaram & Yermack, 2007; Xu and Yan, 2014).

Radical innovation refers to a process, which requires company to adopt something completely new. This means making big changes compared to the

earlier behavior in order to implement the innovation. It has the potential to change the whole operating base of the company. Radical innovation comes with higher risk, but has great potential in return. For instance, successful new innovation can secure the competitive advantage for long time (Crawford, 1994; Urban & Hauser, 1993). However, gaining visible benefits might take time and is unsure (Manso, G. 2011). Apilo and Taskinen (VTT 2006) argue that the radical innovation is crucial for the company to be innovative. In other words, the company has to create radical innovation at some point to reach innovativeness. The breakthrough innovation is close when radical innovation includes technological leap forward. In this case the company opens doors from the existing markets with existing technology to new markets with new technology.

2.2.3. Disruptive innovation

In the book "The Innovator´s Dilemma", Clayton Christensen (2011) uses the term "disruptive innovation" in order to describe an innovation which opens new value propositions for already existing products and disrupts the existing markets. The disruption can be caused by new customer categories, new ways to exploit the old technology or through new business models. For example breakthrough into owning individual computers disrupted the whole computer markets by creating mass demand for previously rare item. (The Economist, 2015). Christensen (2011) explains the dilemma by stating it as a problem. The company can serve the existing customers by fighting in the own core business area by improving own performance, or begin to exploit the new disruptive opportunities and fight for new customers with new ways to operate. However,

since the existing business offers higher profits, it is rational for a company to keep on pushing in its own area. In fact, the disruptive innovation appears as an unprofitable low margin market, which doesn´t provide much to the big players. The danger comes among time when new adopters of the disruptive technology have found their customers and developed the technology further enough to move on to compete with customers of the other technology. At this point the new technology and its business models are giving an advantage to the companies, which have learned how to operate using the new business models with new customers. This leads to the disturbed market situation where new entrants nearly always beat the existing players. (Christensen, 2011).

The following case about excavation industry, presented by Christensen (2011) enables better understanding of the complicated concept of disruption. The excavation was traditionally executed by using big machines operating so that the cable moved the mechanic parts. The innovations performed in order to increase the volume of ground the machine was able to move were incremental before the disruptive technology, hydraulics, arrived. The companies were aware of the technology and tried with failure to utilize it in their operations. The hydraulics powered machines weren´t able to perform with the same efficiency than the cable powered machines, which had grown the volumes of, for example, ground moved, to very high amounts. The competition on the market was hard, so the companies had to answer to their own customers´ needs by creating more improvements to the existing, big machines which basically provided all the revenue. It was not logical to waste resources to the disruptive technology.

Meanwhile the hydraulics was adapted by new companies who started to search for markets which had demand for safer but low performing technology.

The early customers were searched from everywhere and the hydraulics got into use in little projects which required only tiny amount of ground to be moved. The technology was developed by the early adopters and later on, it started to challenge the dominating cable technology. It was not able to move as much ground, but with its development it reached a point when the volume was large enough to other features like safety to be considered. In other words, hydraulics had grown into excavation technology with satisfying capability to excavate offering safer alternative. The additional value provided by gigantic volume was run over by the safety measures and the hydraulics took over the markets. It is interesting that the big companies are aware of the new technology and perfectly capable of using it in the beginning, but still the early adopters nearly always win, because the whole company grows around the new technology.

2.2.4. Modular and architectural innovation

Modular and architectural innovations classify the term related to the innovations effect on the product´s structure (VTT, 2006). Clark and Henderson (1990) claim that the traditional classification to incremental and radical innovations is not broad enough, so they present the architectural innovation. The architecture of the product means its components and composition. The architectural innovation refers to the change in the products architecture while keeping its features. The change is unnecessary, complicating process. Apilo and Taskinen (VTT, 2006) state that the architectural innovation keeps the products core technologies while changing the architecture.

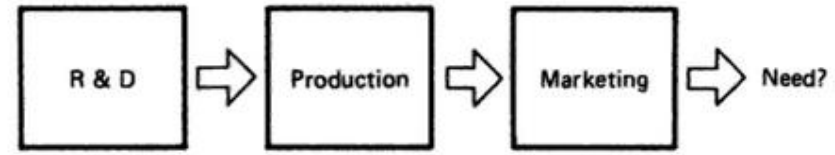
Modular innovation develops the product so that the structure remains the same but the technology changes within some part of the product. The challenge is that the company has to pay attention to that the new technology matches with the products structure so that the whole product and production are working as one. (Magnusson, Lindström and Berggren, 2003).

2.3 Sources for innovations

2.3.1. Technology push & Market pull

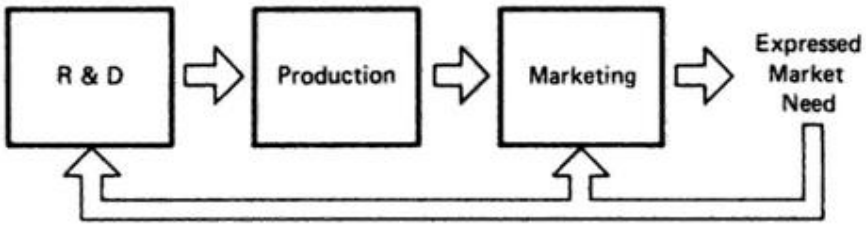
The source for the innovation can vary depending on whether an impulse for the innovation comes from the company, leading to technologically pushed product, or from customers´ demand, creating market pulled product. Radical innovations tend to be dominated by technology-push and incremental by market-pull. (Sarja, J. 2015).

Martin (1994) describes the technology-push as the R&D, production and sales operations without clear need for the product in mind. The market-pull is described as an answer to the need. The author argues that this way the revolutionary innovations are distinguished. The technology-push formed inside the company driven by the technological development leads to radical, breakthrough innovations. However also Martin agrees that the push innovation is more risky and success rate lower than market-pulls. The figure below clarifies his views about the differences.



(a)

Figure 2.8*a*. Technology-Push.



(b)

Figure 2.8*b*. Market-pull.

Figure 2. Technology-Push vs. Market-Pull (Martin, 1994)

In the article by Di Stefano, Gambardella and Verona (2012) the two approaches, push and pull, are argued to be tied together. Authors state that the technological development is the main driver for the innovation and the market demand gives the direction for the process. Based on the recent studies, it can be recognized that the firms approaching innovation from external environment matching the firms´ internal competencies use market demand as the source. Another approach, matching the internal competencies with external environment is using the firms´ technological development as a foundation for the innovation. The conclusion of the authors´ study points out that indeed technology, in this case considered as push, provides the means of innovation, while the demand, pull, is crucial directing the innovation into

wanted economic success (Dosi, 1982; Kline and Rosenberg, 1986; Di Stefano, Gambardella and Verona (2012).

The study by Di Stefano, Gambardella and Verona (2012) also points out that the push and pull approaches need other factors, resources, competencies and knowledge, to reach working entity. In order to successfully commercialize pushed technological innovation, the right market and complementary assets must exist (Teece,1986; Christensen and Bower, 1996; Gatignon and Xuereb, 1997) just like the technological capability must exist while performing market pulled, demand driven innovation (von Hippel, 1976, 1994; Di Stefano, Gambardella and Verona, 2012). The third finding of their study was that "… resources, competences, and knowledge can themselves be a source of innovation" (Di Stefano, Gambardella and Verona, (2012)).

2.3.2 Other

Another view of the sources is stated by Peter Drucker (2002). He explains that innovations are the results of the search for opportunities. These opportunities are occurring within the company in four cases; unexpected occurrences, incongruities, process needs and market changes. Also three sources for opportunities popping up from external sources can be identified. These are the demographic changes, changes in perception and opportunities made possible by new knowledge. (HBR, 2002).

2.4 Product development & technology-push

Product development process is formed by sequentially moving chain of activities. Strategic planning, generating the concept, pre-evaluation of the technology, technical development and finally commercialization form the basic, manageable structure for product development (Veryzer, 1998). Early in the process, the concept´s opportunities and customer needs are evaluated (MacAvoy, 1994). After this, the product itself is checked to match with the concept and the concept is refined. Later on, the technical feasibility is made clear and the design phase starts (Veryzer, 1998).

Ulrich and Peppinger (2008) clarify the product development process with the following figure.

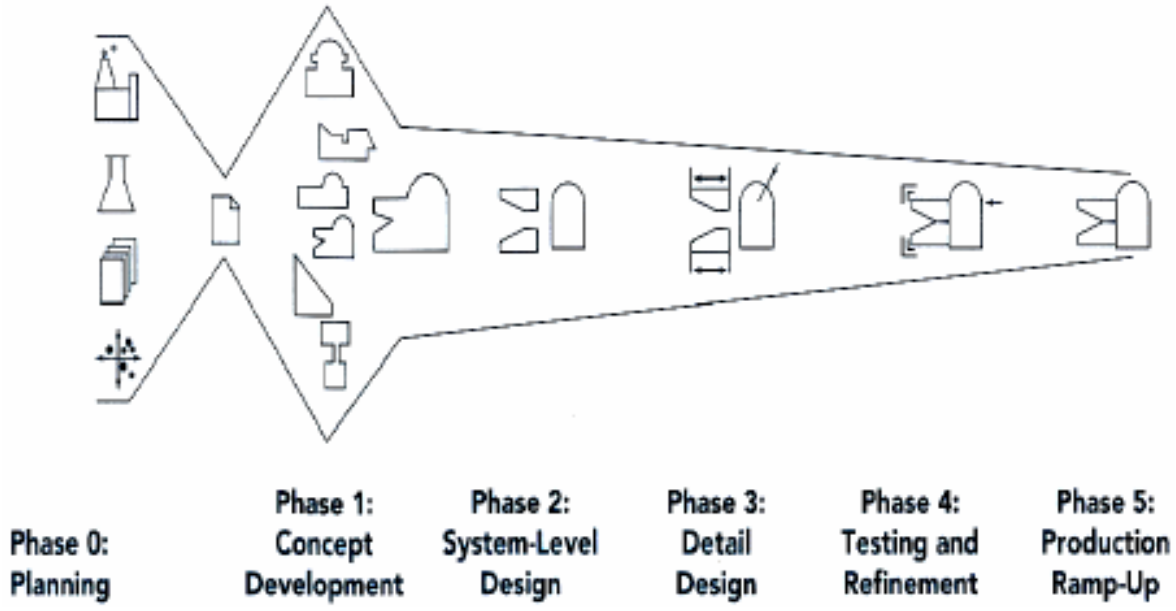


Figure 3. Product development (Ulrich and Peppinger, 2008).

The figure above covers the market pull approach when the company knows the demand and creates a product to match it. In order to get similar product pushed form, few things has to be taken into account. These are that completely new products are mainly technologically pushed. The generic product development form is usable, but cause of the unknown nature of new products, it can be slightly modified. Therefore the development process includes inventing the new technology and seeking markets for it (Ulrich and Eppinger, 1995). After doing so, the development process of the completely new product requires lots of additional efforts, such as identifying opportunities or establishing the new technologies. (Veryzer, 1998). In other words, the difference between market pull and technology push product development chains can be made by taking technology versus market aspect in to the planning phase. After the push approach has its direction, the generic form is usable (Sarja, J. 2015).

The creation of completely new technology-push products includes lots of uncertainties when previous information does not yet exist. This is why models to manage the process have been developed (Veryzer, 1998). Cooper (1990) proposes a stage gate system in order to improve efficiency and handle the risks better. Stage gate means dividing the process into different, predetermined stages consisting similar activities. The stages act as checkpoints for quality. In order to move from one stage to another, the quality criteria must be met.

2.5. From new product development towards innovation network

2.5.1 Collaboration

Song, Cao and Zheng (2014) state that new product development, NPD, is emphasized cause of its importance in remaining competitive. Kahn (2012) claims NPD to be critical to company´s business agenda. Harmancioglu (2007) explains that the NPD process is heading towards collaboration between companies, driven by growing complexity of new products and radical environment changes. The collaboration helps to reduce risks and costs, fasten time to market and create more potential for innovations while leading to better quality, also producing more knowledge. Romero and Molina (2011) underline the importance of external sourcing as a source of information in value co-creation process. The collaboration with relevant parties, such as suppliers, customers or partners, which potentially leads to increased sharing of knowledge, fasten the access to information with less cost and leading to success in NPD creates the Innovation network (IN) (Song, Ming, and Wang 2013).

2.5.2 Customer focus

Jiao and Chen (2006) claim that customer focus is an important component in NPD. Customers can provide valuable information about company from different customer groups in different markets collected with various ways, such as interviews or complaints. Laage-Hellman, Lind, and Perna (2014) remind that this information can be used in business in order to find out the

customer needs and development possibilities. Kujala (2008) states that using the users in an early stage of the development process helps to provide useful information about customers´ desires and therefore makes it easier to decide what to develop. Further on, understanding of users´ values gets bigger creating more accurately targeted products. Kaulio (1998) identifies three types of customer involvements in the context of product development. These types are the design for -, with -, and by customers particularly taking place in specification phase, concept development or prototyping.

Nowadays NPD process is internal as well as external process and collaboration helps in building advanced NPD system over time (Tan and Tracey 2007 ; Moreno et al. 2011). This leads to long term positive results, such as reduced costs and risks as well as better quality, as long as the collaboration works (Schiele 2006). According to Bunduchi (2013) the product development process time can be reduced by carefully chosen and well monitored strategic alliances among enabling technologies.

2.5.3 VOD & modularisation

In the article by Song, Cao and Zheng (2014) one step towards innovation network is claimed to be the transformation of the customer provided information into working functional set of requirements about the product. In other words the information from customers must be transformed into designers´ voice respecting these requirements. This voice is also called voice of designers or VoD. (Aguwa, Monplaisir, Turgut 2012).

Ericsson and Erixon (1999) claim that customisation often leads to more complex processes in manufacturing. They present modularisation, breaking the process into independent units in order to create more simple process, as a solution. Kong et al. (2009) agree with the modularisation by stating that it leads to advantages, such as smaller costs, more diverse products and increase the chance for product innovation. The modularisation can be divided into functional and physical way to decompose the process. Functional modularisation refers to modules in functions and physical modularisation to the ways the functions are presented physically.

2.5.4 Conclusion of NPD

As a conclusion, the new product development process is important for competitiveness and critical to the business agenda (Song, Cao and Zheng 2014; Kahn 2012). NPD process can be enhanced and more advantages obtained through collaboration between relevant parties, such as customers, partners and suppliers. This creates various benefits in reduced costs and time when access to additional information becomes available (Song, Ming, and Wang 2013). Customer focus gives the idea of customers´ expectations or desires, therefore helping the NPD process to focus on relevant things (Kujala 2008). The process moves forward into changing these desires into designers´ version of the product. This is also known as the voice of designers or VOD (Song, Cao and Zheng 2014; Aguwa, Monplaisir, Turgut 2012). Finally Ericsson and Erixon (1999) present modularisation as a process simplifying factor.

2.6 Innovation network

2.6.1 Definition

Innovation network refers to innovation process done with cooperation, when self-organized companies innovate by creating networks. These networks are constructed from different actors linked together by creating diverse information about the innovated subject, for example, new technology. In practice, the innovation network works so the relevant parties, such as company, government and university, study new topic and integrate the information in order to invent something new. (Rycroft and Kash, 2004)

Defined by Innosupport (2005), the innovation network can be organisations of any kind that exchange the relevant information, knowledge and resources. Also at least three partners utilize suitable learning and promote the innovation process. Confidential cooperation is crucial.

2.6.2 Concept

Innovation network has been commonly known term for long, but not before recently has the research focused on it properly (Eschenbächer, Seifert, and Thoben 2011). It can be seen broader from the earlier view of linear product innovation concept, which studies the subject within firms having the same goals. Innovation network is taking in the heterogeneous view and allows the study within companies with different goals (Song, Cao and Zheng 2014). According to Arranz and de Arroyabe (2012) one way to conceptualize

innovation networks is to study them "…as a multidimensional construct which yields three distinctly different subsystems in the form of technological process, network structure, and network governance".

2.6.3 Benefits

Benefits of the innovation network can be seen as better performance in the innovation process made possible by additional, external sources (Song, Cao and Zheng 2014). Networks make small and medium sized companies benefit from easier way to facilitate an open innovation (Lee et al. 2010) and open new possibilities for companies lacking proper innovation culture by providing valuable external information (Baker, Grinstein, and Harmancioglu 2016). Dittrich and Duysters (2007) argue that networking also helps in the changing technological environment offering "…flexibility, speed, innovation and the ability to adjust smoothly to changing market conditions and new strategic opportunities".

2.6.4 Innovation actors

Supplier

Supplier´s interaction with the buyer in the new product development phase helps the innovation process and is important, because of the supplier´s specific knowledge over the sold product, especially among increasingly complex products (Yeniyurt, Henke, and Yalcinkaya (2014); Johnsen (2009)). The supplier´s help in the design phase is beneficial to the new product

performance in both, incremental innovation and radical innovation (Menguc, Auh, and Yannopoulos 2014). Also, cooperation with the supplier can lead to competitive advantage enabled by supplier´s resources and contribution (Lindquist, Berglund, and Johannesson 2008).

Customer

Argued by Fuchs and Schreier (2011) customer participation in the innovation process is a source for competitive advantage. The customer provides valuable feedback, and it is beneficial to listen to customer opinions about the product design or need for the new product, or in other words, what to produce.

Intermediaries

Organizations that work for enabling innovation are called innovation intermediaries. These intermediaries work either directly in order to higher the innovativeness of a single company, or indirectly, when they strengthen the innovative capability within, for example, nations (Dalziel 2010). Intermediaries help the company to perform operative actions to link into some innovation network (Katzy et al. 2013). For example, Innocentive is an innovation intermediary. It helps its clients to find information about partners and helps to create links with experts the company needs (Diener and Piller 2009). In addition to the links Innocentive helps to create, it also helps the company with solutions providing new ideas and knowledge (Huston and Sakkab 2006). In other words, the intermediaries provide facilities for information exchange among companies (Song, Cao and Zheng 2014).

2.6.5 Conclusion

Innovation network is a tool for parties with different goals to innovate together by integrating their knowledge (Rycroft and Kash, 2004). Being part of the network is beneficial, because it allows companies to have access to external information sources and it allows little companies and companies without proper innovation culture to facilitate open innovation. (Song, Cao and Zheng 2014; Lee et al. 2010; Baker, Grinstein, and Harmancioglu 2016). Also the change in the technological environment is easier to handle with co-operation Dittrich and Duysters (2007). The relevant actors in the network are suppliers, customers and intermediaries, each possessing their own advantages over the product. Supplier has the specific knowledge over the supplied product, customer gives information about the market demand and intermediary acts as a link between the parties of the network (Yeniyurt, Henke, and Yalcinkaya (2014); Johnsen (2009); Fuchs and Schreier (2011); Katzy et al. 2013).

2.7 TP success factors in the innovation process

Jari Sarja (2015) studies success in the innovation process. He identifies relevant factors affecting the outcome of innovation process from the technology-push´s perspective. The author classifies the factors into four groups; market related, product related, management related and organization related.

2.7.1 Success factors related to market

Method

First of all, the generic form of the product development (Ulrich and Peppinger figure) naturally affects the outcome. The technology-push process is different from incremental development of products, but cannot completely ignore the actual development phase of the product. Therefore the method used to cope with the development has an effect on success. In other words, the basic driver, push or pull, effects on the whole innovation process. (Sarja 2015).

Customer needs & alternatives

Similarly to the article by Song, Cao and Zheng (2014), Sarja (2015) emphasizes the meaning of customer needs, stating it as one factor for market related success. He proposes the needs to be managed step by step starting from data gathering, data interpretation, data-hierarchy meaning classifying the data based on its importance, finding the important needs and finally taking the needs into the innovation process.

According to Ulrich and Eppinger (2008) the product development phase should include finding out an alternative option for the actual product. Sarja (2015) claims that the alternative study can be conducted simultaneously with the customer needs identification and the process to find the alternatives done in the same way as competitor analysis. Lewitt (1960) argues that the importance of the process is in customer needs satisfaction rather than in product types produced. In other words, studying the alternatives is all about finding out how the new product is positioned in the market. Sarja (2015) gives an example of an electric car competing with not only competitors selling

electric cars but also with alternatives such as fuel powered cars or public transportation.

Development of market

According to Sarja (2015) the development of market is one of the relevant factors. He uses "The Ansoff Model" to explain the possible market maturity situations, which can be used when choosing the growth strategy. However the model contains loads of irrelevant data to the innovation process itself. This is why in this context the development of market refers to the product development and diversification, the areas requiring new products. Also Bishop and Magleby (2014) claim that the development of the product needs the constant development of the markets. In other words, the new product needs to have market.

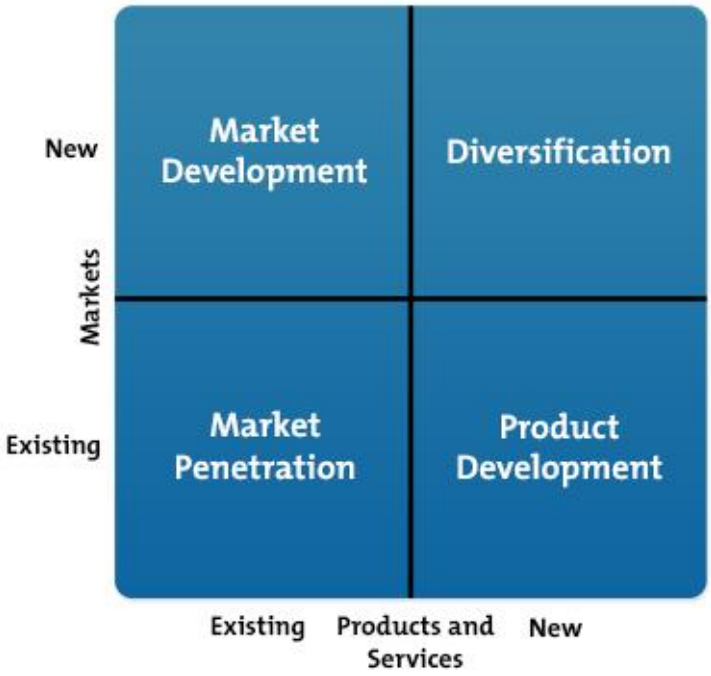


Figure 4. The Ansoff model (Ansoff 1957)

2.7.2 Success factors related to product

Adoption time

Completely new products driven by the technological push tend to take longer to be adopted, for example, because of lacking previous customer experience about the product. This is called technophobia, the negative attitude towards new technologies (Sarja 2015). Samli & Weber (2000) claim as well that the adoption time is longer for radically new products.

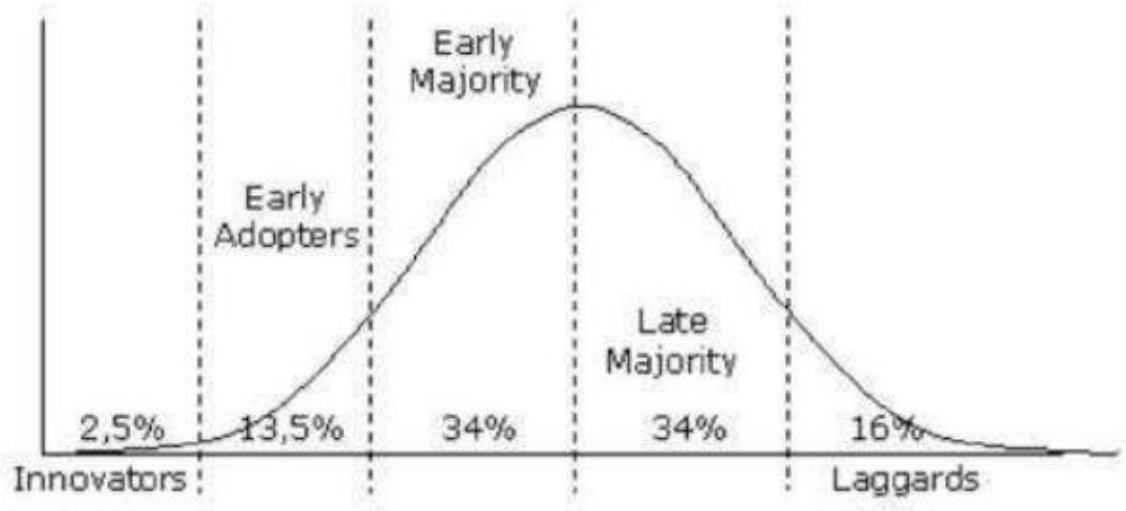


Figure 5. Innovation adoption s-curve (Rogers 2003)

The curve by Rogers (2003) points out that innovation is adopted within time differently among certain groups. The groups are divided into innovators, early adopters, majority, late majority and laggards based on the adoption time it takes for each group to adopt the innovation.

The factor affecting the innovation process is the company´s point of view. The longer the adaption time is, the longer the company has to invest in the process. This needs commitment from the company and naturally increases the risks. This is also one of the factors explaining why technologically pushed, radical innovations are more risky (Sarja 2015).

Life cycle

Griffin and Hauser (1996) state that firms seek for long term profits by developing new products. These long term profit providing successful technologically pushed products can also be called as breakthrough products. When studying life cycle as a success factor for innovation process, we consider it starting from the development phase and lasting all the way till the product gets discarded. The longer the profitable life cycle is the better. The success can be reached by right economic planning. (Sarja 2015).

Answering to a need

It is argued by many authors that the product requires a need in order to succeed. For example Calantone and Li (1998) claim that the lack of knowledge about the market needs seldom leads to success and Samli and Weber (2000) state that the product must satisfy some sort of a need. In his study Sarja (2015) argues that the ideal situation is when the new product satisfies previously unknown need, or in other words, when the new innovation creates the need.

Technological advantage

Sarja (2015) defines the technological advantage as a multilevel concept possibly handling country, firm or project level aspects. According to Samli and Weber (2000), the firm´s technological advantage refers to the company´s ability to create new, radical breakthrough products in addition to only incrementally answering to existing demand. Also, as mentioned before, Apilo and Taskinen (VTT 2006) claimed that the company has to perform radical innovation at some point in order to be innovative.

2.7.3 Success factors related to management

Resource support & funding

Ernst (2002) claims that ensuring the resources is the most important support the management can give, and vice versa, the lack of material support can be completely irrelevant. Samli and Weber (2000) agree by stating that the breakthrough products need proper resources, financial as well as human resources, in order to be generated. The funding must be continuous throughout the whole innovation process. Ulrich and Eppinger (2008) argue that the funding should affect the firms planning so that the firm only focuses on the innovations it is capable of executing.

2.7.4 Success factors related to organization

Cross-functional teamwork

Griffin and Hauser (1996) claim that cross-functional teamwork between research and development team and marketing section is essential. Cross-functionality is a factor leading to success in new product development process (Cooper & Kleinschmidt, 1995). Ulrich and Eppinger (2008) state that the expertise in marketing, design and manufacturing should be included to the product development team.

Networks

Similarly to the article by Song, Cao and Zheng (2016), also Sarja (2015) finds the networking beneficial, and names it as one of the success factors.

2.7.5 Conclusion of TP success factors

The success factors recognized in the study by Sarja (2015) are divided into market-, product-, management - and organization related. Market related factors are external and naturally strongly customer related, focusing on the questions about customers´ desires and growth opportunities in the market environment. From products perspective the success is achieved through preparation to possible adoption times, optimizing the life cycle and answering to an existing need. Also, technological advantage, the ability to create radically new innovations is recognized factor. Management´s and organisation´s roles are to secure the continuous funding and resources as well as to organize cross-functional teamwork and be part of the optimal innovation network.

3. METHODS AND DATA

3.1 Introduction

The research´s interviews were done deductively by interviewing relevant persons. Data was collected by asking questions from three different experts with different backgrounds. Data was collected and analyzed and the conclusions deducted. The topic itself is limited to handle success related topics, and the questions asked were designed to get the image of innovations´ meaning, importance and find the relevant information from where to make decisive conclusions. The researched topic is based on previous literature studies, especially Sarja´s (2015) study about comprised technology-push success factors. Therefore also the research focuses on technology-push related success factors aiming to recognize more relevant factors. Sarja´s study was comprised and explained that other factors would be nebulous in nature. The research of this thesis aims to give more information about additional factors, and avoid this problem. In other words, provide clear and understandable ways to increase the probability to succeed in the innovation process.

Empirical study of the thesis was done in order to gain deeper, more practical understanding of the topic as well as finding out more factors leading to success in the innovation process. The first part of the empirical study, interviews, provides three different views about innovations. The interviewed persons were chosen related to their working background aiming at covering the topic from different perspectives. Therefore the persons´ backgrounds are strategic consultant, CEO and specialist. The questions presented in the interview handle

the relations between technology-push and market-pull and radical versus incremental innovation as well as the benefits of innovations.

Other approach to the research was provided with two case studies, one about Apple´s iPad and one about Nokia. Case studies started from inductive reasoning by thinking, that the innovative companies, Apple being the one succeeding with technology-push and Nokia, who failed to remain successfully innovative, would offer interesting additional data. Afterwards the cases were studied individually and conclusions deducted. The research is has its limitations. It is relatively brief and consists only three points of views, however aiming to collect wide perspective about innovations from practical approach. It studies innovations´ nature, but focuses on deducting successful practices out of the data. The cases are meant to give an understanding via example, not study the companies, Apple and Nokia, in itself.

The first case is about commonly known product iPad, which was chosen due to its excellent exemplary characteristics. The iPad did not possess market demand nor did the customers know about possibility of tablets. Still the iPad was rapidly adopted and changed the media content consumption immediately (Murphy 2011). However the case study is relatively brief and is meant to just clarify the technology-push using very practical example.

Another case is about Nokia, Finnish company which was dominating the portable device markets, but suddenly fell badly. The case handles the reasons of the fall from exemplary view about complicity of creating what is required. Nokia was the best manufacturer and invested a lot in research and development, but failed to create desired innovations for customers. The case gives educational example and deducts factors for success from what was done wrong and should have been different.

3.2 Interviews

3.2.1 Specialist

Timo Hämäläinen - Sitra

Hämäläinen has an experienced career among innovations. In the beginning he argues that both, incremental and radical innovation may be driven by technology-push as well as market-pull. The difference is made by the origin of the idea. Market-pull comes from customers, technology-push from technological inventions.

1. What kind of situations drive companies to perform the technological push driven innovation? (If possible, tell about the situations when the company has to perform radical innovation).

Tech push innovations are typical in industries in which the technological frontier is moving rapidly and there is a lot of room for technological innovations – say electronics in the 1980s and 1990s. These are also situations which make radical innovation easier to achieve. On the other hand, once the advance of the technological frontier slows down innovations typically become more incremental as the great technological improvement opportunities have already been used.

2. Is it possible to say that one of the innovation types (radical push, incremental pull) is somehow better than the other? Why / why not?

Both tech push and demand pull can be incremental or radical. Usually, technological inventions have to be combined with consumer or user insight and understanding in order to create a successful innovation and product. Changes in consumer demand patterns, contexts and needs are situations that increase the importance of the demand side of innovation. On the other hand, major changes in technological paradigms – such as the rise of the information and communications technologies in the 1980s and the Internet in the 1990s – create great opportunities for technology driven innovations (tech push).

3. In your opinion, what are the main benefits of innovations? (eg. new markets, improved efficiency etc.)

Here, one could differentiate between different types of innovations: product, service, process, technological, organizational, market, institutional, social, systemic, etc. innovations. They may reduce the costs of production processes and products or improve their value. Moreover, the value can be appropriated by private firms or the general public (e.g. social and institutional innovations). Both lower costs and higher value of products and services improve firms' competitiveness and tax payers' happiness.

4. How mandatory it is to be innovative nowadays? Is it mandatory to move forward and search for new constantly? Or is it possible to be a successful follower (follow and mimic the behavior of others?)

Firms in a high-cost country with open and competitive markets typically need to be innovative in order to succeed in international competition. However, this does not mean that they would have to be innovative in all respects of their business. They only have to be able to differentiate themselves in a positive way from their competitors. In many aspects of their business they can imitate the best practices of their competitors. However, in low cost countries and environments, a follower and imitator strategy can be highly successful if the lower costs provide a sustainable competitive advantage while the other competitiveness factors can be imitated from competitors.

+ Define successful innovation. What things do you value in the (product) innovation? (eg. design, functionality)

Successful innovation is usually defined as an invention that has been successfully commercialized (i.e. brought to market). The value of a product depends on the reason for why it was bought. Consumers ultimately buy products in order to improve their own well-being or that of their close relatives or friends. Business-to-business customers typically value the contribution of the product or service in supporting achievement of their organization's goals and improving its competitiveness. The relevant contributions depend on the customers' situations and needs.

3.2.2 Consultant

Patrik Fingerroos - Talent Vectia

Patrik Fingerroos, a consultant in Talent Vectia Oy, has interesting, clear approach towards innovations. The following interview sums up his opinions.

1. What kind of situations drive companies to perform the technological push driven innovation? (If possible, tell about the situations when the company has to perform radical innovation).

Radical innovations are often pushed by factors pointing out some worries of the current state. This refers to situations such as new threat of competitors, slow revenue growth in current market or when the company´s business model requires updating. Also, the understanding of the radical innovations usability might take time and, even after a failure first, it might be very profitable to wait for the customers to understand the real value of the innovation. For example, some technologies have been misunderstood first and years later proven to be genius.

2. Is it possible to say that one of the innovation types (radical push, incremental pull) is somehow better than the other? Why / why not?

Both radical - and incremental innovation have their benefits and both are needed. When successful, radical push brings more. For instance greater profitability in competition free environment or higher growth in revenue. Markets explain a lot of firm´s performance, for example, growth in turnover. The radical innovation has a potential to change the markets very positively. This is also why the radical innovation push is attractive. However it is has its

downsides. The increased potential comes with greater risks and needs more investments.

3. In your opinion, what are the main benefits of innovations? (eg. new markets, improved efficiency etc.)

The greatest benefit is to get more revenue. The revenue increases through things such as new markets and new customers. Second benefit is internal process improvement, for example improved efficiency through automatization or digitalization of processes.

4. How mandatory it is to be innovative nowadays? Is it mandatory to move forward and search for new constantly? Or is it possible to be a successful follower (follow and mimic the behavior of others?)

Usually innovativeness is mandatory. Only a few companies manage successfully to follow and mimic others. For example, Samsung has succeeded to do so. However it requires excellent internal processes to rapidly respond to the original innovation and produce own alternative to markets.

What it comes to moving forward, companies should have two or three horizons. These horizons refer to point of focus. For example, horizon one focuses on current activity. It aims at improving the current business, processes and secures the company´s cash flow. Meanwhile the horizons two and three can search for new opportunities and possibilities, innovate and produce value in the longer term.

3.2.3 CEO

Niklas Lahti - Nord Software Oy

Niklas Lahti, the CEO of Nord Software Oy, owns fascinating background and work experience in nowadays business environment. Lahti is Aalto University graduate who has worked in various positions in Finland as well as abroad, for example Sweden.

1. What kind of situations drive companies to perform the technological push driven innovation? (If possible, tell about the situations when the company has to perform radical innovation).

The technology is pushed to the customers when company has invented something new and potentially profitable and wants to change customers´ habits into adapting the new innovation. The main reasons for the technology push are related to revenue. For example the push can be explained in the rapidly dynamic markets when some company develops an innovation in order to differ from competitors, or in other words, when the company wants to have the markets for itself. Also, if the company is a leader´s position in the market and wants to expand into new markets and grow. Of course any kind of innovation can be done when the company needs some sort of change.

2. Is it possible to say that one of the innovation types (radical push, incremental pull) is somehow better than the other? Why / why not?

Using the word better is bit misleading. The incremental innovation is necessary procedure in order to keep your existing activities up to the date. On the other hand, radical innovation has huge potential if it´s risk pays out. Brave companies with strong vision and technological capability can do anything.

3. In your opinion, what are the main benefits of innovations?

Innovations can change company´s direction totally. The main benefit is the path to something previously unexploited. For example company doing badly in some market can change the whole market environment by innovating something new leading to another markets. Of course this needs resources and dynamic capability. The innovation offers possibilities for new customers and markets as well as it can help the company to gain other benefits. For example, environmentally positive image can be achieved by innovating less polluting technology, leading to customers´ acceptance and therefore increases the revenue.

4. How mandatory it is to be innovative nowadays? Is it mandatory to move forward and search for new constantly? Or is it possible to be a successful follower (follow and mimic the behavior of others?)

Being innovative can provide remarkable competitive advantage and therefore is very useful and beneficial, almost mandatory. The company must not stay still or it will eventually go down. Today´s markets are rapidly changing environment and factors such as global competition have made it necessary to step up from the mass. Simply said, if you produce the same things as others

the same way as others but are not the cost-leader, you will not do well. This is another reason for rapidly developing new, searching new markets and customers and other oceans where to take your company. About being a follower, it is very hard on longer run. Some little start-up might be able to mimic some innovation, for instance, produce fashionable little items. Big company trying to grow by mimicking will face challenges for sure and rarely succeed, however the commonly known best practices are excellent source of information for the company when searching for new ideas.

3.2.4 Conclusion of the interviews

Interviews result loads of data about the practical approach towards innovations. The basic perspective seems to be affected by the working field. The specialist has more analytical approach than the consultant and CEO, who are thinking more profit oriented ways. Nevertheless, they all provide valuable additional information for the study. The following table points out the interviews´ ideas and underlines the meaning to the research.

Question	Specialist	CEO	Consultant
Radical TP´s reason	Advanced technology	Differ & grow	Improvement
Radical TP or incremental MP	Both TP and MP can be radical or incremental. However the tech push has high potential with increasing IT technologies.	**Radical TP has more risks but pays more**	**Radical push more appealing. Risky but high potential**
Benefits of innovations	Lower costs & improved competitiveness	Possibility to change and revenue	More revenues & improved internal processes
Move forward / mimic	**Innovativeness is important in order to differentiate from others. Best practice mimicking is otherwise very useful.**	**Innovate to differentiate. Whole innovation mimicking hard but previous ideas beneficial**	Mimicking needs excellent internal processes but can work. Innovativeness is a must.

Table 1. Interviews

The table comprises the information from the interviews. The basic information is written normally. The bold parts are underlining the importance of the part to the research. The first bold part is about radical technology-push vs.

incremental market-pull. The interviews support the literature by identifying the radical push more appealing and more risky. Since the TP dominates the radical innovations (Sarja 2015), the risks must be taken into account. The second bold question is about innovating and mimicking. It seems to be so, that innovating is mandatory, but only to differentiate from others. Otherwise success can be taken from previous things.

3.3 Case studies

3.3.1 Apple iPad, a successful technology-push

"Innovation is what distinguishes a leader from a follower" (Steve Jobs)

This case study focuses on Apple´s product iPad aiming at providing practical example and understanding of the successful technology push.

Apple released its new media tablet, iPad, in 2010. Even though the release was covered with hype and anticipation, loads of doubts about the usability of the product itself were in the air. Then it was not yet known whether iPad was a completely new technology providing new computing product category or whether it was just a marketing trick for attention by Apple. There was no

special demand for the tablet product, or in other words, the customers were not asking for it. However once Apple pushed the iPad out, it sold more than three million units in less than three months, and with its tablet technology, was about to change the previous media contents consumption. (Murphy 2011)

Nowadays it is easy to say that Apple´s iPad became a success. The astonishing success in its early life cycle phase can be illustrated by a chart comparing the cumulative sales on the market with another famous product iPhone. The figure above shows that the iPad generated 84.1 million against iPhone´s 33.8 million in cumulative sales during the nine first market quarters. (Richter, 2017)

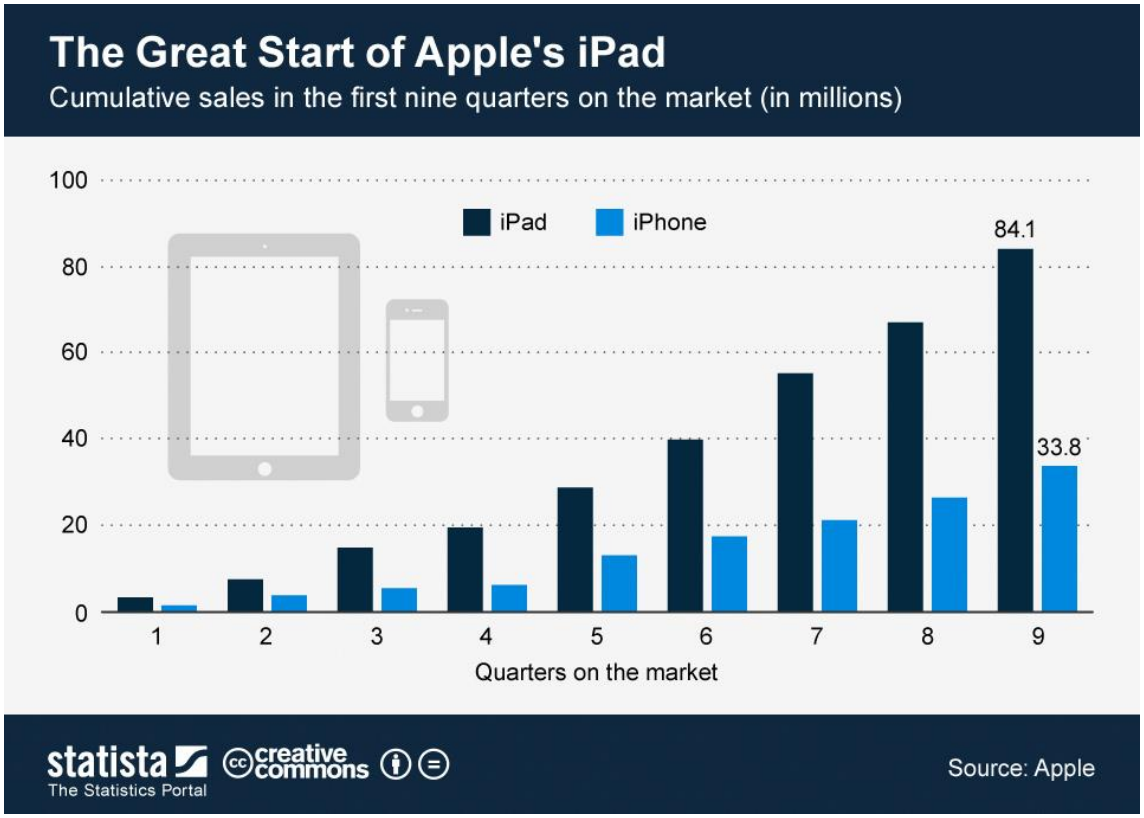


Figure 6. iPad vs iPhone cumulative sales. (Richter, 2017)

Apple´s iPad was technologically pushed product. It did not possess previous demand from markets therefore closing out market pull approach. It wasn´t either known existing product even if it did use the touchscreen and other operating system as some previous Apple products. IPad was an innovation offering customers completely new product designed to fill the gap between phones and computers and offering new way to consume media content. The success came from well managed selling of the technology, which lead to quick adoption and huge profits. (Statista 2017)

3.3.2 Nokia´s fall

Nokia is an excellent example of how tough, competitive and complex environment around innovations is. There is plenty of information how Nokia climbed to be the stunning manufacturer of phones. However this great success ended suddenly despite enormous investments on R&D. This case study explains how important it is for a company to be innovative, but also how meaningful it is to focus on the right things as well as delivering technically capable products.

In his book, "The decline and fall of Nokia", David Cord (2014) explains how Nokia was engineer minded technologically superb company. It used to dominate the markets with its phones and was the best in the world in producing portable mobile communication devices. The technological excellence was in the heart of the whole company and the products filled the needs of the customers with high technical quality. Still Nokia stumbled and fell badly.

There are several reasons for the fall, but this case will note only the ones relevant to the success of the innovations. These can be identified as problems to identify customer needs precisely as well as lacking the capability to compete with software which became important in smartphones. Nokia had the best technological product, which was enough in the beginning but the engineer driven mind lead to certain ignorance over customer complaints about products´ complicity, which lead to products which were not customer friendly. It is shocking how Nokia´s products were emphasized to be incredibly advanced technologically while the customer experience was poor.

The other problem was that Nokia did not have competitive enough software to challenge for example Apple´s iTunes. The problem of Nokia was that they were focused on hardware, not software, and the future needed software. Nokia failed with this and even with attempts to partner with others such as Sanyo did not pay out.

What did we learn from this? The innovation requires customer´s acceptance as well as culture to provide support for such innovations. Nokia had a culture of engineers and did not meet the customers´ needs as they should have. This lead to overly complicated products and neglecting what was important. The focus was on the technology, which was already more than satisfying. The problem was that Nokia got trapped with its drive for quality in terms of technology. The company´s culture was for manufacturing what was seen as technological improvement instead of what would give more to the customers. It increased the complicity of the product and the new capabilities were not adopted well enough among customers. Customer complaints were ignored. Another reason, the software of Nokia, was not good enough for increasingly complex smartphones. Competitors, such as Apple had its iTunes, were easier

to use and more customer friendly. Nokia was the best in producing the phone itself, but stumbled in software.

4. RESULTS

4.1 Main findings

Innovations are changing the world with their capability of discovering completely new technologies and therefore changing peoples´ lives constantly, offering huge possibilities and appealing opportunities. Therefore it is only logical that the topic is widely studied all around the globe and new ways to do old things as well as exploring completely new oceans take place constantly. The term, innovation, is part of numerous environments carrying positive image. The term has been classified and studied from various points of views, such as incremental versus radical or continuous versus discontinuous and disruptive. All the studies are aiming at making sense of this highly appealing process. The following chapter explains what makes the innovation successful. The previous studies are summed up together with the empirical observations in order to provide new, valuable information. The answer to the question about innovation types and what kind of innovations can be achieved through innovation process is explained in the literature part of the thesis. The results stated above handle the study about success factor and aim to provide a table of relevant information of the key success factors in technology-push.

4.2 Success factors affecting technology-pushed products

Jari Sarja (2015) made a study about success factors in the innovation process. The following table gathers his findings.

Market related:	**Product related:**	**Management related:**	**Organization related:**
Method (TP or MP)	Adoption time	Resource support and funding	Cross-functional teamwork
Customer needs /alternatives	Life cycle		Networks
Market development	Answering a need		
	Technological advantage		

Table 2. Literature based success factors of TP innovation process (Sarja 2015).

Sarja (2015) identified many success factors in technology-push innovation process. However he claimed this list of factors to be comprised because of the nebulous nature of possible other factors. The information gathered from literature as well as interviews and cases identify three clear factors more affecting the success. First of all, the culture of the company has an effect on what the company is able to produce. Secondly, the best practices are often recognized and in order to create new, it is possible to absorb good ingredients from already proven to work technologies. This leads to mimicking the best practices as a success factor, however noting that this is not necessary, only highly beneficial action. The third factor identified is risk management. The

innovation, especially radical one has a nature of success tied to the risks. Therefore the better the risks are being managed, the better the success is managed. Also, collaboration offers plenty of positive effects and therefore deserves to be emphasized as success factor.

4.2.1 Culture

Deducted from the information of the case studies, the success of the company is related to company´s culture. Apple has a strong marketing and design culture to push the desire into the customers, but also meeting the basic needs, such as user friendliness. Therefore it was able to push its iPad into huge success. The culture is affecting also as a deciding factor what and how the company does. Nokia case shows how the engineer minded culture lead to neglecting other important views in the product development. Both cases prove that the company´s culture affects very much on the whole company, but also on the innovations it is capable of to come up with. The ideas and visions are tied to the company´s mindset and when the culture is strongly rooted, it can trap the capability into certain chains and act as a hindrance for success as well as providing benefits. Therefore the organizational culture is identified as a success factor in this thesis.

4.2.2 Mimic the best practices, invent alternatives and new

Mimicking the products and launching alternatives for already existing products tends to be hard. However derived from the interviews of Hämäläinen and Lahti, and from case studies it is beneficial to imitate the

competitiveness from competitors. Taking this idea further leads to a conclusion that success of the innovation, even when it is technologically pushed and new, may origin from something already existing and proven to be successful. For example, iPad was highly successful technology-push driven innovation with plenty of similarity with iPhone. It utilizes the already proven to be great software, iTunes, and has similar technological solutions such as touchscreen.

4.2.3 Manage the risks

The riskier nature of radical innovation comes up in many cases, in interviews as well as academic studies. This is why it seems clear, that technology-push, which dominates the radical innovations, is strongly affected by risks. Based on this information, the thesis claims risk management to be a factor affecting innovations likeliness to succeed. The more the company prepares for hardships, the more likely the innovation succeeds. Especially when radical innovations take time to be adapted and sometimes the customers find the use much after the launch.

4.2.4 Collaboration

Also in addition to new factors proposed, the thesis emphasizes the meaning of collaboration. The academic research about NPD and innovation networks by Song, Cao and Zheng (2014) proves that with collaboration, it is possible to reach multiple benefits related to innovations. The collaboration between relevant parties, for example a company and a supplier of some specific part, is

beneficial especially among complex innovations. Also the external information about, for example, customer needs or partners´ views of the development process can turn out to be decisive in the creation of any kind of innovation.

Collaboration as a success factor is relatively close to networks, but is mentioned separately in order to emphasize the collaboration in individual cases and networking as an attempt to join some particular network where to belong in longer term.

The result is a new table of success factors classifying the added factors into categories. Culture is naturally linked to the organization and risk management to management. The mimicking strategy, to use it or not, is decided by the management. It affects the product or outcome and uses the information from the markets but still, the main decision classifies it into management category. Collaboration is strongly related to networking and organizations behavior.

Market related:	**Product related:**	**Management related:**	**Organization related:**
Method (TP or MP)	Adoption time	Resource support and funding	Cross-functional teamwork
Customer needs /alternatives	Life cycle	+Risk management	Networks
Market development	Answering a need	+Mimic the best practices	+Culture
	Technological advantage		+Collaboration

Table 3. The extended table of success factors

5. DISCUSSION AND CONCLUSION

5.1 In the end

The thesis is dealing with several dimensions of innovations and provides information about which kind of innovations might result from a certain innovation process and how to push towards them into one research. As a result, the thesis explains what can be achieved with innovation process and which factors affect the outcome. These results can be used as a checklist of what to take into account when pushing towards something new. The results are stated clearly and the list is easily understandable. The empirical study, meaning the interviews and practical case studies, is done in order to complete the information from academic research. The interviews provide three approaches towards innovations and give the practical idea when to pursue something new. The interview questions were designed to give broad informative package where to induct conclusions from together with the academic research´s deduction. Also the cases were chosen to support this specific thesis from exemplary point of view.

The thesis manages well to collect the commonly known definitions of different innovation types together and therefore creates a good background for the success factors study.

The base of the research comes strongly from previous academic researches and therefore naturally provides similar results. The interviews handle more common information than specifically answer straight to the research questions and the cases are supporting the thesis in hand. The topic is very broad and

therefore the thesis has its limitations. The further research about topics such as market-pull in incremental and radical innovations and technology-pushed incremental innovations can be done and is necessary in order to provide more deep understanding of the innovations in general. Also, the product development is studied only briefly and focuses on TP approach. This thesis is not about to be used as a general, all covering guide to innovate, but more as a easy to use checklist of what should be included in the successful innovation process.

Innovations can be divided according to their nature. Discontinuous and continuous, radical and incremental, disruptive, modular and architectural are all classifications of this complex term of creating new. Innovation itself refers to improvement through creation of something new or improving old. The research focuses on the new creation and technology-push driven innovation process, which is based on previous study about success factors. Resulting from the research the thesis identifies organizations culture and collaborative behavior, the management of risks and the best practice mimicking from proven to work solutions, as factors affecting the technology-push innovation process success.

Conclusively, the successful way to innovate requires the right method being used, need of any kind being answered as well as market where to position. Products adoption time and life cycle must be taken into account when planning the innovation. Technological advantage creates the means for the process. Management must be supportive and provide the resources for the process as well as prepare for risks. Using the best practices in new creation is a one usable solution for innovating. The organization must work together internally, collaborate and join networks as well as provide the supporting

culture for the innovations. With these things in mind, the technology-push innovation process can be successfully performed.

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