The failure of Garmin's Nüvifone series through the lens of absorptive capacity

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ABSTRACT

The last decade has yielded a new generation of mobile phones, which enable the user to not only call and send text messages but also connect to the internet and make use of GPS tracking for location functions. It has become easier, cheaper and handier to be navigated by using cheap and free navigation applications for the so-called 'smart phones'. At the same time it threatened and put pressure on navigation system producing companies, like Garmin. Exposed to decreasing sales and revenues in the navigation sector, Garmin decided to enter in a strategic alliance with ASUSTeK in order to create a smart phone ("Nüvifone") itself to compete in the market. After being two years in the market and poor market sales of the Nüvifone, Garmin decided to cease the collaboration with ASUSTeK and to focus on the development of navigation apps for Android and iOS devices instead of investing more money in the Nüvifone. This paper focuses on the reason behind the failure of Garmin's smart phone by making use of the theory of absorptive capacity. Absorptive capacity looks at a firm's capabilities to recognise external signals for a change and then use this information to develop a new product or service. This study found that in fact there was a lack in Garmin's absorptive capacity that lead to low market sales at the end.

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Keywords

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1. INTRODUCTION

Garmin is a public American company that produces GPS receivers for the consumer, aviation, and marine markets. It was founded in 1989 by Gary Burrel and Min Kao, and is one of the leading companies in the global navigation industry. Throughout the years, the company has developed and improved their navigation devices, with a major resulting success in the consumer market. Especially the automotive segment of Garmin with built-in and portable navigation devices have generated the most of Garmin's revenues for many years. Garmin was one of the fastest growing businesses in the world.

In 2007, however, Apple released its 'iPhone' and set the starting point to a new generation of mobile phones; the so-called 'smart phone'. Other manufacturers like Samsung and HTC followed the trend and also produced smart phones. Smart phones are not only a combination of regular phones and cameras, but they can also be used to listen to music and connect to the internet. In 2008, Apple introduced a newer version of its iPhone, the iPhone 3G, which also used the GPS technology for location purposes. The combination of internet access and GPS technology included in one device was a major threat to Garmin as it enabled owners of smart phones to use this gadget as a small navigation device with the help of applications ("apps") that could be downloaded onto the phones. Among those applications, users can find cheap and sometimes even free navigation software that do basically the same job as portable navigation devices. Consequently, sales of Garmin's GPS devices declined heavily because increasingly more people tended to use the cheap version for their mobile phones instead of buying Garmin's personal navigation devices (PNDs). This, in combination with the financial crisis in 2008, caused a massive drop in share prices. As can be seen in Figure 1 the drop started in the end of 2007. Prior to that, Garmin already announced that they were going to produce a mobile phone themselves that can also be used as a navigation device. The share price rose up to the point where the financial crisis caused the drop. The development of share prices between the time where Garmin first announced the Nüvifone and the actual release is interesting. It is questionable whether the announcement is the only reason for the rise but it surely had some impact. The economy and other smart phones releases made Garmin lose lots of value until they managed to release the first Nüvifone.

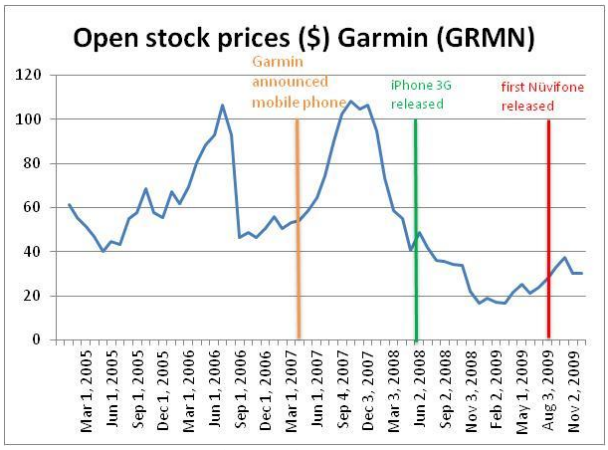


Figure 1: Open stock prices of Garmin from 2005 to 2009

It is striking though that mobile phone releases of Samsung and Nokia in the end of 2006 and beginning of 2007 did not have any negative effect on the share prices. A reason for that can be that those phones had GPS fitted to them but were no smart phones as we know them today. The iPhone was the first real smart phone which also made use of downloadable applications to equip one's phone with various programs.

Garmin, in 2009, launched, in corporation with the Taiwanese computer hardware and electronics company ASUSTeK, a mobile phone itself; the so-called 'Nüvifone'. The Nüvifone has the same functions as other smart phones like calling, sending text messages, surfing on the internet, etc. There however is a difference which is the navigation functionality of the phone. It was designed to function as a smart phone and as a navigation device. The firms introduced in total six versions of the Nüvifone to the market. However, that series of smart phones did not turn out to be a success. Recognised by Garmin, the company ceased the cooperation with ASUSTeK and instead started to focus on the application development which then could be sold in Apple's app store and Google's play store. Nevertheless, the consumer market segment of Garmin has not got back to its success of the time before 2007. Instead, as can be seen in figure 2, the outdoor/fitness segment and the aviation segment have gained more importance in Garmin's portfolio over the years. Especially the former one has become very important to Garmin. Since 2010 this segment is the main contributor to Garmin's operating income.

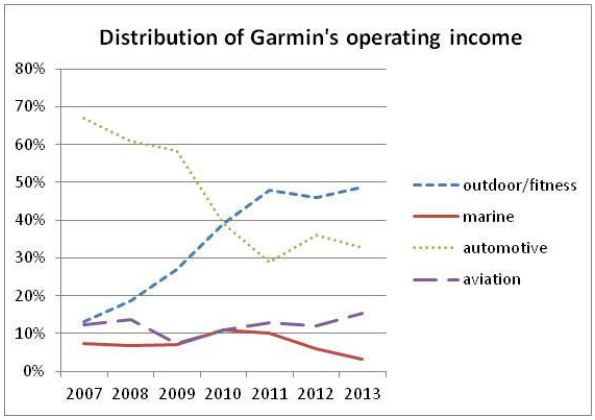


Figure 2: Development of Garmin's operating income, divided into the segments (2007 to 2013)

This research paper focuses on the mobile market threat to Garmin induced by the rise of smart phones. In particular, it deals with the failure of Garmin's and ASUSTeK's Nüvifone represented by low sales which represents a major cut in Garmin's history. To answer what the reason for that was, this paper takes the theory of Absorptive Capacity into account. In general, absorptive capacity (ACAP) is a firm competence and represents the ability to recognise changes in the market, acquire, assimilate, transform and exploit this information in a way that will be profitable for the business (Zahra & George, 2002). All these capabilities depend on each other and build the foundation for improved innovation and business performance (Chen, Lin, & Chang, 2009).

By comparing theory, which comprises the initial steps, from recognition of a potential innovation, over the decision to produce the product right up to the development of it, with what Garmin did over the years, it

can be analysed if Garmin behaved in the right way or if their capabilities in terms of ACAP were flawed at some point.

This research provides insight to a product launch in a high-tech industry through the lens of absorptive capacity. The goal is to identify where the lack(s) in capabilities of Garmin were, what it meant for the development process of the Nüvifone, and thus clear up that the failure was partly caused by Garmin's absorptive capacity. Garmin expectedly should have come up with a good product considering that Garmin was and is specialised in navigation devices as they have produced them for many years. Moreover, mobile phones became very popular and had been on the market for some years at the time Garmin decided to produce a mobile phone themselves. So, it should have been known what customers expect and desire from mobile phones. Following this reasoning, Garmin only had to bring both technologies together while collaborating with ASUSTeK and build one device including both technologies. This however was not as easy as it might sound as Garmin could not launch a competitive product.

This leads to the research problem and the research question of this paper: *"How did absorptive capacity of Garmin influence the failure of the 'Nüvifone' series?"*. Therefore, this paper first focuses on the theory of absorptive capacity, its capabilities and what is important to mention about it. The main focus will be put on the paper from Zahra and George (2002) because it is the most cited and acknowledged paper in this topic. They developed a model of absorptive capacity that is divided in different capabilities which will be elaborated later on. Afterwards, the paper continues with the methodology on how to gather information and how this paper draws a conclusion. The analysis part then focuses on Garmin and the Nüvifone including an analysis on how Garmin approached the change in technology and the development of its mobile phone. Therefore, first the different phones are put in the spotlight, followed by the situation Garmin found themselves in and the way the firm approached the mobile market threat.

The current literature mainly deals with the technological perspective when talking about absorptive capacity. So does this paper, due to the fact that the quality of the Nüvifone was not appropriate compared to the state-of-the-art at the time of the product launch, as elaborated later in the analysis part. This implies that technology was surely one of the reasons why the phone failed in the market. This does not automatically mean that a lack in marketing had no influence on the failure, but this paper puts this perspective aside and concentrates on the technology perspective of this topic. However, since market knowledge is equally important in the absorptive capacity process to recognise signals and know what the customers want as technology knowledge (Verona, 1999), it, to a certain degree, plays a role in this paper. The marketing process though that brings the product to the market is excluded from this analysis.

It is interesting to see in which element of ACAP the flaw arose and how it influenced the following development and quality of the phone with the assumption that all elements of ACAP are interrelated. Up to now there have not been so many empirical studies that looked into the four capabilities and the interrelationships. This study tries to find the exact point within the framework of ACAP where the failure was caused. It adds to the current body of knowledge by providing meaningful insight from a real-world case to a product innovation's requirement in terms of quality and development from an absorptive capacity point of view and is therefore highly valuable to future companies that find themselves in similar situation as Garmin. They will be more aware of what factors are important in the development process and which factors can influence the success heavily. The practical relevance here is 'learning from failures'.

2. THEORETICAL BACKGROUND

According to Zahra and George (2002) absorptive capacity is the process and routine of an organisation that enable companies to gain and sustain a competitive advantage by acquiring, assimilating, transforming, and exploiting new knowledge, which benefits organisational learning and a firm's R&D capabilities (Cohen & Levinthal, 1990). This is also found by Chen et al. (2009) who refer to Daghfous (2004). Chen et al. (2009) further found a positive relationship between absorptive capacity and a firm's innovation performance for which they found support in the paper from Daghfous (2004). The four capabilities, namely acquisition, assimilation, transformation and exploitation, are dependent on each other (Zahra & George, 2002) and build the foundation for an increase in a firm's innovation performance (Chen et al., 2009). Each of them will now shortly be discussed individually.

Acquisition is the ability to recognise external knowledge that can be critical to the firm's business and acquire it. Within this process three attributes are critical: intensity, speed, and direction (Zahra & George, 2002). It is said that the more intense and faster information can be acquired the better the quality of the firm's capability will be (Zahra & George, 2002) and the faster capabilities can be developed (Kim, 1997a,b). Contrary to that, Schmidt (2010) did not find a significant relationship between R&D intensity and ACAP, even though most literatures indicate such a relationship. Direction represents the way the company looks at the environment when trying to find external information. By taking different approaches the way will differ from one direction to another. Rocha (1997) therefore claims, based on these three attributes (intensity, speed, and direction), that a firm needs to have different areas of expertise in order to successfully acquire external knowledge.

Assimilation is the process by which firms analyse, process, interpret and understand the before gathered knowledge and information (Kim, 1997a,b; Szulanski, 1996), and comprehend it with the goal to internalise such knowledge (Zahra & George, 2002). This process gets increasingly complicated the less explicit and codified the information is as Zahra and George claim based on the work of Nelson and Winter (1982). They further refer to Kogut and Zander (1992) to define codification as the process by which knowledge is organised into a set of easy accessible and communicable rules and relationships. However, too much focus on customers when facing technological change can also be misleading (Christensen & Bower, 1996). This in fact can put too much focus only on the customer by which other important sets of information can easily be neglected.

Transformation is the process of bringing new knowledge and already existing knowledge together. This can be done by simply adding one to the other, interpreting the old knowledge differently or deleting obsolete knowledge and replacing it with the new one (Zahra & George, 2002). It is further claimed that "the ability of

firms to recognize two apparently incongruous sets of information and then combine them to arrive at a new schema represents a transformation capability" (Zahra & George, 2002, p. 190). This improves the entrepreneurial mindset and enhances entrepreneurial actions as Zahra and George (2002) state referring to McGrath and MacMillan (2000), and Smith and DeGregorio (2002).

Exploitation is the mechanism by which the new acquired knowledge and information are used to redefine the firm's competences and to create new ones (Zahra & George, 2002). This ability is based on the past related knowledge (Cohen & Levinthal, 1990) and deals with the integration of this prior gained knowledge into the operations (Zahra & George, 2002) and thus represents the implementation of the change process within the firm. Cohen and Levinthal (1990) include basic skills as well as technological and market expertise gained in a specific field in the definition of past knowledge. Spender (1996) adds that a systematic exploitation of new knowledge will create new goods, systems, processes and knowledge as well as new organisational forms on a constant basis. The process of exploitation to create the product or service that was determined as a need before (Szulanski, 1996).

Zahra and George (2002) moreover distinguish between potential absorptive capacity (PACAP) and realised absorptive capacity (RACAP). PACAP includes the first two capabilities that were discussed earlier, namely acquisition and assimilation, whereas RACAP includes the remaining two, transformation and exploitation. It is important to state that both potential and realised ACAP are crucial to have because they build on each other. It is not enough to only have the capabilities for the potential ACAP to acquire and assimilate new knowledge and then not being able to process them any further. Even though PACAP is important to build the foundation for further processing of new knowledge, RACAP is seen as the main contributor to improved performance (Zahra & George, 2002), because this capabilities create changes within the company and thus facilitates the enhancement of internal processes. Nevertheless, PACAP cannot be neglected in the process. Even though RACAP mainly determines the performance improvements and lead to a sustainable competitive advantage, PACAP provides the necessary input by renewing companies' knowledge and skills (Zahra & George, 2002) in order to constantly improve the operations so that the competitive advantage can be sustained by the capabilities of transformation and exploitation. Firms with higher capabilities of knowledge acquisition and assimilation (PACAP) through greater flexibility of resources and through lower costs , as well as with higher capabilities of knowledge transformation and exploitation (RACAP) are more likely to gain a sustainable competitive advantage through innovations and operation improvements (Zahra & George, 2002).

As far as PACAP is concerned, Cockburn, Henderson, and Stern (2000) stress as a result of their study in the area of pharmaceutics that timing is an important factor in order to build a competitive advantage. They claim that recognising changes well in advance will benefit companies at a later stage. This fact is supported by a study that found a direct effect of absorptive capacity on firm profitability (Narasimhan, Rajiv, & Dutta, 2006). Moreover, experience and a firm's access to diverse and complementary external sources are significant determinants of the capability development. Firms will build their capabilities around the experiences they made in the past and will use the external sources they interact with on a regular basis to develop the PACAP (Zahra & George, 2002). External sources are defined as a firm's interactions with other firms through acquisitions (Chaudhuri & Tabrizi, 1999), licensing and contractual agreements (Granstrand & Sjolander, 1990), and inter-organisational relationships (Vermeulen & Barkema, 2001). Organisational interactions at the same time speed up the absorption and application process of outside technologies (Lin, Tan, & Chang, 2002). Returning to the interactions with other companies, Chen et al. (2009) found in their study that relationships towards other companies have positive effects on innovation performance. Zahra and George (2002) refer to Nonaka and Takeuchi (1995), Garvin (1993), Stata (1989), Fahey (1999) and say that experience on the other hand is gained by interactions with customers and competitors, and alliances with companies, but also by environmental scanning and learning through experimenting (Levitt & March, 1988). This is supported by Baker and Sinkula (2007) as well as by Garcia-Morales, Ruiz-Moreno and Llorens-Montes (2007) who found a positive relationship between organisational learning and a firm's innovation performance.

Before a firm starts to acquire new information and knowledge though, something needs to initiate this process. Zahra and George (2002) name this initiator an 'activation trigger' and claim that those triggers on the one hand determine the locus where the firm will search for external knowledge and their intensity will on the other hand influence the amount of investments made in that specific area. Activation triggers are internal and external events that influence a firm's future in a way so that the firm sees the need to react upon the change (Walsh & Ungson, 1991; Winter, 2000). Internal and external events differ in their nature. Whereas internal triggers emerge within a firm like performance failures (Zahra & George, 2002), external events can influence the whole industry (Bower & Christensen, 1995), including changes in technology, radical innovations, and others (Zahra & George, 2002).

As a foundation for the learning process through absorptive capacity and for the identification of external knowledge, prior knowledge and prior learning is required (Cohen & Levinthal, 1990; Narasimhan et al., 2006; Schmidt, 2010). By having a basis of knowledge the new acquired knowledge build upon the already existing one and shape it. The process of linking new knowledge with the old one ("associative linking') enhances the learning process (Cohen & Levinthal, 1990).

Regarding the question how ACAP is developed Cohen and Levinthal suggest that absorptive capacity can be created in different ways. They rely on different studies that on the one hand show that ACAP is created by conducting one's own R&D. By doing so first-hand information can be gathered and the ability to acquire new knowledge is enhanced simultaneously as Cohen and Levinthal found by taking into account Tilton (1971), Allen (1977), and Mowery (1983). Based on that absorptive capacity is seen as a 'byproduct' of a firm's R&D (Cohen & Levinthal, 1990) due to the fact that the main purpose is Research and Development and not enhancing one's ACAP. On the other hand though, Zahra and George (2002) refer to Abernathy (1978) and Rosenberg (1982), and suggest that absorptive capacity can be improved by direct manufacturing. By being active in actual manufacturing and operations of products, a firm

will be more aware, alert, and in search for new information regarding that specific product market. It will be easier to recognise useful information for employees and the firm. Cohen and Levinthal (1990) clearly distinguish when absorptive capacity is a 'byproduct' and when it is not. If research is done in a field in which a firm is already active in and has developed its R&D for constant research, enhanced ACAP will be the side effect of the normal activity. This statement is supported by a study which found a significant and positive effect of continuous R&D activities on a firm's ACAP (Schmidt, 2010). If the company decides to conduct research in a new field though, developing the capability becomes an active process by dedicating the investments towards building the ACAP in the new field. It needs to be said that investing a lot in absorptive capacity in the early stages is crucial because not doing it, meaning investing only a little, will decrease a firm's willingness to invest more at later stages even if a firm recognises the possibilities of new available technological information later on (Cohen & Levinthal, 1990).

Only recognising relevant information is not enough to develop good capabilities though. In order to be able to make use of information companies need to interact with their environment and have good communication, internally as well as externally, which individuals within the firm are responsible for (Cohen & Levinthal, 1990). Employees need to have shared values, like language, background and expertise, to communicate information from the outside to the inside as well as within the firm effectively (Cohen & Levinthal, 1990). Collaboration within the firm though is less required when dealing with inter-industry knowledge compared to intra-related knowledge (Schmidt, 2010). In addition to shared language, expertise and background, Cohen and Levinthal (1990) claim by referring to Simon (1985) that different sets of knowledge can be beneficial in the innovation development and new knowledge gathering process. Different sets of knowledge among employees facilitates innovative behaviour by combining and associating various pieces of information which will generate new ideas (Cohen and Levinthal, 1990).

There are also possibilities to make use of R&D and marketing capabilities without having sufficient knowledge in one of them. Narasimhan et al. (2006) suggest that companies can build their capabilities by acquisitions and strategic alliances, in which the parties can share their capabilities and build a fuller portfolio of ACAP abilities. Alliances further benefit a firm's ACAP if they are made for collaboration of the R&D department. R&D alliances were found to have an enhancing impact on a firm's innovation performance if the technological distance between both parties is not too big (Lin, Wu, Chang, Wang, & Lee, 2012). Lin et al. (2012) state that innovation performance will increase the more distant the technologies of the parties are. This relationship becomes negative when the technological distance is too big. (Lin et al., 2012).

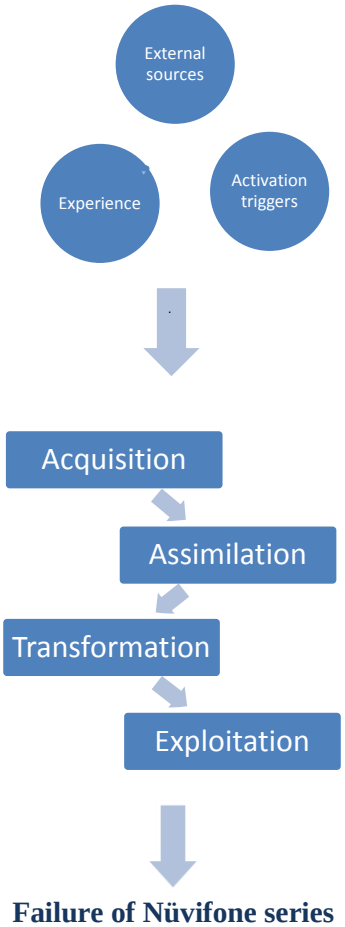
Current literature also takes the size of firms into account when talking about absorptive capacity and innovation performance. It is claimed that larger firms typically have a higher absorptive capacity (Nooteboom, 2000) due to the fact that they have the resources, like finances, to invest in their Research and Development departments (Nooteboom, Verbeke, Gilsing, & Van den Oord, 2007). They moreover are usually more diversified, take part in more innovation projects and put more effort in R&D activities from which they can get information and knowledge (Schmidt, 2010; Narula, & Hagedoorn, 1999). Those firms thus are able to exploit external knowledge better than smaller firms can do (Schmidt, 2010). Large companies however run the risk of investing too much in R&D without benefit from it proportionally. More investments do not necessarily lead to better innovations (Stock, Greis & Fischer, 2001). Possible reasons could be that firms miss out on information by not improving their capabilities and not looking at the entire environment and possible threats.

Lin et al. (2002) investigated in their paper the technology absorptive capacity, which "involves change in the organizational culture, interaction mechanisms, R&D resources investment, and technology diffusion channels" (Lin et al., 2002, p. 300). Their study revealed that intangible assets like experience, ambition and knowledge of the employees working in the R&D department are an important factor in improving a firm's technology absorptive capacity. At the same time the authors stress that tangible assets are not unimportant in the process, but that intangible ones are more important in building and improving a firm's technology absorptive capacity. Cohen and Levinthal (1990) even say that absorptive capacity is of intangible nature. Therefore, it is hard to see the real value of this theory which results in many companies being reluctant to invest in their ACAP abilities (Cohen & Levinthal, 1990). Basic research nevertheless is important for firms to conduct because of two reasons. It will provide useful information and knowledge to the company with which the company can work and create innovations to make profits, and it will provide necessary background of a specific area. This background enables a firm to respond much quicker to changes within the market and industry (Cohen & Levinthal, 1990). Companies who have conducted basic research will know what the current state of the technology is and what has changed. As discussed earlier, background information is crucial for capability building. This can be linked to the changes discussed here. By having built the capability to acquire, recognise and exploit information already in the past, the firm can make use of its ability and respond to the change quicker than a firm who is not up-to-date and thus needs to spend time and effort to get there. Garcia-Morales et al. (2007) support the importance of investments by stating that technology absorptive capacity needs constant investments, otherwise the ability of a technological company to acquire knowledge and learn from it will decrease. In contrast to Lin et al. (2002), Lichtenthaler (2009) not only focused on the technological side but also on market knowledge and emphasises it. He claims that past research has focused too much only on the technological knowledge and R&D of firms, and thereby neglected other, for absorptive capacity, relevant information. Lichtenthaler (2009) further found in his study that the intensity of R&D has no direct influence on absorptive capacity because non-technological information such as market information is simply overlooked, which then will lead to a lack of properly exploiting the acquired and assimilated knowledge.

Narasimhan et al. (2006) found a link between marketing capabilities and choosing the right technologies which represents a significant factor in a firm's absorptive capacity. It is moreover said that firms that are market oriented and seek to gather information from the market are more innovative (Narasimhan et al., 2006; Deshpande, Farley, & Webster, 1993; Han, Kim, & Srivastava, 1998).

Marketing capability furthermore enhances a firm's ability to make use of new gathered information to come up with new technologies and innovations (Narasimhan et al., 2006).

Cohen and Levinthal (1990) go a bit further in their paper and do not only restrict absorptive capacity to firms' operations. They add the step of bringing new acquired information to "commercial ends" (Cohen & Levinthal, 1990, p. 128). This implies that the process of absorptive capacity does not end with adjusting and changing a firm's operations, but with bringing the new knowledge and information in the form of an innovation to the customer. The better ACAP is developed the greater the chance of using new knowledge to get to successful commercial ends (Tsai, 2001). Bringing the new product to the market requires market knowledge, which is equally important as having technical knowledge (Verona, 1999). This implies that it is not sufficient to know how to build a new well functioning product, if there are no information about the market and customers. The product could turn out to be very useful but if there is no need for it in the market it will not bring any profit. A study revealed that within the topic of market knowledge, breadth is the most potent factor in terms of product innovation performance (De Luca & Atuahene-Gima, 2007). Knowledge breadth is defined as the range of knowledge a firm has got (Prabhu, Chandy, & Ellis, 2005). This implies that a big range of knowledge is beneficial to a firm's product innovation process.



Model: Garmin's ACAP regarding the Nüvifone series

Based on the current literature I come up with a model that will be used here to answer the research question. It is based on Zahra and George's (2002) model of absorptive capacity. It includes all components mentioned so far that can be a relevant contributor to the development process and thus to the failure of the Nüvifone series. Based on this model information will be ordered and analysed later on. The model starts with three factors that are important influencers of the implementation success of the ACAP process: external factors, experience and activation triggers. Experience and external sources provide valuable information and knowledge as a basis for ACAP and activation triggers induce the development process. The three factors influence the way the four capabilities can be used to benefit from new information and knowledge. With this basis the process of turning this new knowledge into profitable products can be started. Each capability depends on the previous one as suggested by Zahra and George (2002).

Having discussed the theory of absorptive capacity rather intensively based on current literature I will now turn to the way ACAP is used in this paper. As mentioned earlier all four elements are interrelated with each other. Zahra and George (2002) however split the elements into to subgroups, PACAP and RACAP. The question that arises now is whether absorptive capacity should be seen as a flow of new knowledge through all elements or if there are two groups that work rather separately from each other. This paper will use absorptive capacity as four interrelated elements, because the new knowledge which is gained in early stages will be and has to be used at elements later in the chain (RACAP). There, the new gained knowledge is required in order to adjust the operations to build the foundation for the output in the end. This implies that each element depends on the implementation and quality of the previous one, meaning that if you did a poor job at acquiring new knowledge the assimilation, transformation, and implementation will be poor as well. You cannot compensate a poor job in the beginning with a good job later on because there is no possibility for it since you cannot process information that you did not gather earlier on.

3. METHODOLOGY

This paper will make use of secondary data due to the fact that it was not possible to get an interview of a Garmin employee. By doing desk research and looking for public available information on Garmin and the Nüvifone, a bigger picture can be created. Secondary data is characterised by information that is public available and was not published for the purpose of this paper. Despite the fact that the purpose of this sort of information was a different one in the first place, it is valuable information for this paper. A big advantage of desk research is that it will provide objective information. Using data provided by Garmin is always associated with subjectivity due to the fact that Garmin wants to be seen as positive as possible to the public. It is however a challenge to find enough information on the process of Garmin because public information is restricted. Due to the lack of information that is public available this paper is based on public interviews, objective reviews of the phone and information on the market situation and Garmin. Reviews on the Nüvifones which were in the first place intended to help customers evaluate phones and make it easier to decide which phone to buy, give good indications if the quality

and functionalities were good. The reviews I used gave me information in form of texts. The authors tested the phones sometimes for a short period of time and sometimes over a period of a few days. With the experiences they wrote paragraphs on different functions like satellite navigation, internet use and so on, and explained what they came across and how it affected the use of the phones. Striking positive as well as negative findings were explicitly stated in each of the reviews. For each phone I looked at three different reviews from different websites and compared their findings. I found that they noticed similar issues independent from each other which was good as far as reliability is concerned. These sets of information can afterwards be processed further by combining it with other sets of information and referring back to the development process.

As mentioned earlier this paper excludes marketing theories because it is not seen as being the only factor that negatively influenced the success of Nüvifone. In fact it cannot be said at this point if the marketing techniques and the commercialisation process of Garmin had an influence, but this paper assumes that the development of the phone did have due to the quality of the Nüvifone series. The assumption to be tested is that Garmin's absorptive capacity was lacking which then influenced the quality of the Nüvifone series in a negative way.

4. ANALYSIS

Garmin in collaboration with ASUSTeK has launched six versions of the Nüvifone between 2009 and 2011. They all have in general the same features, but the later versions logically are improvements of the previous ones. The Nüvifone is not only a smart phone; it is a navigation device as well. This device contains normal features of a smart phone with the touch screen and its functionalities to surf on the internet, as well as the functionality to get you from one point to another as Garmin did with its previous pure navigation devices. The name of the phone is based on a previous series of navigation systems called 'Nüvi'. This similarity implies the navigation functionality of the phone. The upcoming sections will elaborate on each version of the phone individually by providing general information and objective critics as well as differences between the versions.

4.1 Nüvifone series

4.1.1 Nüvifone G60

The Nüvifone G60 was the first phone at first announced for 2008 and later was postponed to January 2009, but was released in July 2009 (GSM Arena; SlashGear, 2009). Its operating system is Linux and was only available in the US through the American telecommunication company AT&T. Online phones reviews found some difficulties using the G60 in everyday life. The missing light sensor makes it hard to use the phone during changing lighting conditions as the screen does not adjust its brightness by itself (PhoneArena). The low resolution camera does not support high quality pictures but considering that the phone's primary purpose is navigation, the camera is acceptable. It further requires time to surf on the internet due to slowly loading websites (Cnet, 2009). Nevertheless, navigation is the main functionality of the G60. Taking a look at this functionality it offers automobile and pedestrian mode navigation and comes with preloaded maps of North America with many Points of Interest ('POIs') (Cnet, 2009). Another drawback is the accelerator which does not run as smoothly as it should (Cnet, 2009). The accelerator is a sensor that recognises how the phone is held and switches the display from vertical to horizontal mode and vice versa accordingly. Combining that with the missing light sensor and the touch screen which is not sensitive enough, meaning that sometimes several tabs on the screen are required until the phone recognises it (PhoneArena), complicates the use of the phone significantly. The navigation with voice-guided directions splits the reviews. Whereas CNET says that the Nüvifone G60 is a good navigator WIRED stresses that it does not work in a way that would be appropriate for a navigation device. PCMAG however supports CNET by saying that the phone comes close to a standalone device from Garmin with some flaws in speed and speaker volume which was too low. The last thing to be mentioned is the battery that does not provide a lot of power, requiring a lot of charges (Cnet, 2009). When used constantly, the phone does not provide enough power for a whole day.

To sum up, the Nüvifone G60 is a navigating smart phone with obstacles in the usage. It will get you were you want to go but the quality in total lacks, which makes it a nerve-wrecking device to use.

4.1.2 Nüvifone M20

The Nüvifone M20 was the second phone announced by Garmin and ASUSTeK. The Windows operated phone was announced for February 2009. It however was released in August 2009 and was available in Asia and Europe (GSM Arena) Reviewed by several online phone review websites it got in general negative feedback on its quality. The single core processor slows the phone down and the camera has a low resolution compared to other smart phones available at that time. It takes some time to load websites and to use the phone in general. Data in contrast is average compared to other smart phones on the market by 2009 resulting in a proper performance and a light sensor is still missing (PhoneArena, n.d.). The navigation, the area Garmin is a specialist in, is of good quality (GSM Arena, 2009). The Nüvifone M20 directs you where you want to go in an appropriate way. Despite the fact that the navigation process gives proper results there are some other drawbacks that complicate the handling. It starts with the battery which is of low capacity resulting in a phone that has to be recharged more often than would be desirable (PhoneArena, n.d.). This is critical when using the navigation function without having a charger with you. In order to get navigated a GPS signal is required. Grabbing this signal takes approximately three minutes which is a long time in the navigation area (SlashGear, 2009). Even though the M20 enables car drivers as well as pedestrians to use the navigation function, the display does not react to ambient light resulting in no adjustment of the screen brightness during sunlight or changing lightning conditions. The screen further reflects the sunlight which mmakes it hard to use for pedestrians during sunny days (SlashGear, 2009). Taking additionally into account that the quality in terms of user friendliness lacks as well, owners of this phone have a hard time using it. The touch screen is not sensitive enough to react smoothly to finger tabs on the screen meaning that it can take several tabs until the phone recognises it (PhoneArena, n.d.).

Summing up the reviews, the Nüvifone M20 disappoints more than it delights. Even though the navigation process is good the general handling does not run smoothly.

4.1.3 Nüvifone M10

Like the Nüvifone M20, the M10 operates on Windows and was made available in Asia and Europe in March 2010 after being announced for February 2010 (GSM Arena). This smart phone was made for business use as Garmin claimed (GarminAsus, 2010) and comes with a stylus which is rather unusual for 2010 (TechRadar, 2010). The reason for it is easy: the screen reacts easier and faster to the stylus than it does to fingers. Furthermore, when using the phone the owner comes across situation in which it is hard to hit the intended links and icons with the finger. Instead the stylus is the tool to use in those kind of situations, which is not very handy. The smart phone basics however are covered with HDSPA data, Bluetooth, Wi-Fi, GPS, and a 5MP camera (TechRadar, 2010). Even though the M10 has got a single-core processor as the previous Nüvifones, this phone does not seem to struggle as much. Garmin learned from the previous Nüvifones and improved the battery. Now the phone lasts, when used normally, one day which is average for a smart phone (TechRadar, 2010). Garmin nevertheless did not integrate a light sensor that was already missing in the G60 and M20, giving no improvements concerning changing lightning conditions (PhoneArena).

The phone supports pedestrian and car mode, and the navigation functionality of it equals a normal navigation device produced by Garmin and is reliable and fast. It works well and comes with maps for much of Europe including many POIs (TechRadar, 2010).

With the M10 Garmin has come up with an improvement on the first Nüvifones. The navigation works just as a normal portable navigation device (PND). The smart phone functionalities had been improved as well making the M10 qualitative a proper smart phone with all basics covered.

4.1.4 Nüvifone A50

The A50 was announced for February 2010 and was released in June of the same year. It is the first Android based smart phone Garmin and ASUSTeK have released, and is available in the US through T-Mobile and in Europe (GSM Arena, n.d.). In terms of navigation it is a significant improvement compared to previous versions. It comes with preloaded maps including POIs as before and can be used by drivers as well as pedestrians The A50 offers voice navigation and turn-by-turn navigation. Tests have shown that this feature works very well making it a perfect navigation device (PhoneArena, n.d.; Gizmag, 2010). It even recognises when it is pulled out of the cradle for the car use and saves the location so that the owner knows where he parked the car which can be a very helpful feature (Gizmag, 2010).

However, the smart phone functionalities have not improved much. It is the same low-resolution camera which was already used in the G60 and Garmin still used a single core processor, which occasionally requires the user press buttons several times. The touch screen is still not the most responsive one and the battery still does not provide long phone usage without charging (PhoneArena; Gizmag, 2010). The A50 does have a light sensor though (PhoneArena, n.d.).

The A50 is navigation-wise a good improvement over the previous versions of Nüvifones what would have been expected by Garmin already by the first Nüvifone. Phone-wise it still lacks at some points that complicates the handling occasionally.

4.1.5 Nüvifone M10E

Unfortunately, I could not find any objective reviews on this phone. The problem with the few websites I have found so far is the language. It is all in Russian which I do not understand.

4.1.6 Nüvifone A10

The last phone of the Nüvifone series is the A10 which was released in June 2010 after an announcement for April 2010 (GSM Arena; PDAdb, 2010). It uses Android which was a good choice in regard to functionality and features of the phone (PC Advisor, 2010). It has a 5 megapixel camera which is an improvement over the previous version (PhoneArena, n.d.). Nevertheless, the processor has not changed. Garmin still uses a single core processor for the Nüvifone which also makes the A10 lag and slow in general use. So is the touch input that, as seen with other phones, is rather unresponsive and laggy. The processor also influences the smoothness of surfing the internet. Scrolling and zooming does not work smoothly. As already criticised at earlier version of the Nüvifone, the battery does not provide enough power to come through a whole day if the phone is used intensively (PC Advisor, 2010). As the A50, the A10 also has a light sensor (PhoneArena, n.d.)

The navigation supports driver as well as pedestrian navigation and comes with Navteq (American provider of navigation maps) maps with many POIs, Turn-by-turn navigation and voice navigation (PhoneArena; PC Advisor, 2010).

Summing up, the A10 technically does not provide any advantage over previous versions. It still provides the same features, quality and problems.

4.1.7 Conclusion Nüvifone series

A striking point to conclude is that the Nüvifones have not changed very much in terms of their technology and the quality. The navigation functionality has improved slightly with regard to the smoothness of the function. Garmin for instance noticed that they had to improve the speed of grabbing the GPS signal, and they did. Overall however the navigation is good and comes close to a standalone device of Garmin's portfolio. Nevertheless, the usability of the smart phones is problematic from time to time. Technical flaws like an unresponsive touch screen and an occasionally not working accelerator occur. The following table will give an overview of the flaws of the individual phones in order to see a trend in the development.

	G60	***M20***	***M10***	***A50***	***A10***
Light sensor	missing	missing	missing	existing	existing
Camera resolution	Low	low	appropriate	low	appropriate
processor	Slow	slow	satisfying	lagging	Slow. lagging
accelerator	Not smooth	*No information found*	*No information found*	*No information found*	*No information found*
Touch screen	Not very responsive	Not responsive enough	Not responsive enough	Not responsive enough	Not responsive enough
Navigation	Good with some minor flaws in speed	Good	good	good	good
Battery capacity	Low	low	low	low	low

Table 1: Summary of criticised Nüvifone technologies

By now, the reviews have made clear that there indeed was a lack of quality of the Nüvifone series which in turn did not support a possible success of these smart phones. The following sections will take a deeper look at Garmin and how they approached the mobile market. Therefore the aforementioned framework will be used to analyse the elements step by step.

4.2 Experience

Garmin has developed a knowledge base in the mapping and navigation industry that has been crucial for its business for a long time. With this knowledge they produce navigation devices not only for the car industry but also for the marine and aviation industry. The automotive sector however had been the most important sector since it brought the most revenue. By getting feedback, acquiring other navigation-related companies and improving their products it was possible to become one of the market leaders.

However, as the mobile phones became increasingly advanced and turned more into an all-in-one device rather than only a telephone. By the time where location-based services were included in the phone Garmin recognised the potential harm these smart phones can have on the business, they started to build the Nüvifone. As mentioned in the theoretical part of this paper, firms build the capabilities to acquire and assimilate new knowledge and information around the knowledge base the company has developed so far (Zahra & George, 2002). As we have seen Garmin only had knowledge in regard to navigation and mapping, but not in mobile phones. Following Zahra and George's (2002) reasoning Garmin could not build an appropriate PACAP for the mobile market. After the first Nüvifones were introduced to the market, third parties already questioned whether it was a smart idea of Garmin to build an own smart phone. They indicated that Garmin might have been better off designing apps for smart phones to build on their expertise in the mapping and navigation segment (Cnet, 2009).

There are however ways to gain experience. Zahra and George (2002) refer to several articles (Nonaka and Takeuchi, 1995; Garvin, 1993; Stata, 1989; Fahey, 1999) and conclude that firms are able to gain experience by interactions with customers and competitors, and alliances with companies. Garmin indeed built an alliance with a technology company that has experience in the mobile market: ASUSTeK. Being more known for other electronics like Laptops, ASUSTeK's portfolio also includes mobile phones. By the time of the collaboration between this firm and Garmin, ASUSTeK was, according to the joint website (www.garminasus.com), one of the top three Windows mobile brands in Russia and Eastern Europe. Thus, ASUSTeK was not one of the world market leaders. Firms tend to put themselves in a better light than they actually are. Even if ASUSTeK really was one of the three top Windows mobile brands in Russia and Eastern Europe it is still questionable why only in this areas and not in others. There may be different market requirement than in other markets. For sure is that the Taiwanese company was not the market leader in other cell phone markets. So, it is questionable why Garmin chose this company for an alliance when they were only one of the market leaders in specific areas. Since companies build their PACAP around the knowledge base they have, Garmin and ASUSTeK built theirs around one of the best knowledge bases in the navigation area and around a mobile phone knowledge base that was, for whatever reasons, suitable for specific areas.

4.3 Activation triggers

As discussed earlier, activation triggers are internal and external events that influence a firm's future in a way so that the firm sees the need to react upon the change (Walsh & Ungson, 1991; Winter, 2000). In April 2007, the first indication was found that Garmin planned to make a smart phone to compete in the market (Business Journal, 2007). This decision at first sounds slightly misleading taking into account that Garmin was to avoid this commodity, meaning that Garmin initially did not want to get active in the cell phone industry (AllThingsD, 2012). Thus, as the theory suggests there must have been some kind of activation trigger that made Garmin feel a threat to their business which they have to react to. There indeed were some events that seem to have influenced Garmin in their decision-making process. In the period of five months prior to the first indication that Garmin plans to make a smart phone, some phone manufacturers introduced new phones to the market; most of which had the global positioning system (GPS) built in. In November 2006, Samsung and provider Helio released a phone that enabled users to broadcast their location to others using GPS (Business Journal, 2007). In January 2007, Apple released the first iPhone which was one of the first smart phones as we know it nowadays (Apple, 2007). It has not got GPS though. Nokia released their N95 in March 2007 which did have GPS built-in (The Telegraph, n.d.; Wikipedia, 2014).

We can see from that that these releases removed every doubt that Garmin had about mobile phone manufacturers. Garmin realised at that point that they had to get active soon as phone manufacturers indeed managed to threat Garmin's navigation segment. So the company needed to do something in order to be competitive in the market and take this market as a opportunity to grow.

4.4 External sources

When talking about external sources, it means every party the company interacts with on a regular basis. Garmin interacts with ASUSTeK on a regular basis due to the alliance they agreed on in 2009. In Garmin's annual report of 2009 the reason for the alliance is given. It says: "By leveraging and combining Garmin and ASUS respective industry-leading areas of expertise, we are able to expand our Nüvifone product line and shorten product development time". Garmin says that ASUSTeK is a

market leader in their industry. This industry however is not the industry that should be of interest to Garmin. ASUSTeK is one of the leading companies in the computer area, but not in the mobile phone area (Wired, 2009). Nevertheless, the alliance does make sense because this company has got expertise in the mobile phone market as they have manufactured phones for other companies and also have launched some of their own ones in Asia as well as in Eastern Europe as mentioned earlier (Wired, 2009).

For Garmin's PACAP in the mobile phone market though, it was not a strategically good decision. Given that external sources are big contributors to the development of a firms' PACAP (Zahra & George, 2002), Garmin developed the capabilities of acquiring and assimilating knowledge on the expertise of ASUSTeK which was not good either as far as cell phones are concerned.

4.5 Capabilities

4.5.1 Acquisition

The acquisition capability is a very important one since this enables firms to recognise signals from the environment that can be an indication for the future. Therefore timing is a crucial factor in this process. The earlier signals are recognised and taken into consideration, the greater is the chance of building a competitive advantage (Cockburn et al., 2000). Garmin as a contrast did not recognise the earliest signals of an upcoming mobile market threat to their business. That gets clear when looking at Min Kao's (Co-founder of Garmin) statement in 2003 when he was interviewed and asked whether Apple could be a threat to Garmin in the next years. Kao denied it and added that phone manufacturers would never be competitors of Garmin because they could never gain the knowledge about navigation and mapping that Garmin had acquired over the years (AllThingsD, 2012). He said that "the GPS market is sizable, but it is made if niches, and the barriers to entry are rather high. Getting into these markets takes specialized marketing knowledge and a combination of technology like software and cartography that those companies don't have", referring to big electronic houses (Forbes, 2003). Phone manufacturers like Nokia and Motorola however had started to put GPS chipsets into mobile phones at that time (Forbes, 2003). Kao nevertheless determinedly said that it was not going to be a threat and that mobile phones "is the type of commodity business we want to avoid" (Forbes, 2003). This statement is a clear indication that some signals were ignored by 2003. The Forbes Magazine already recognised a trend in the mobile market that could be a threat to Garmin in the future. The fact that Garmin in person of the co-founder denied anything like that can represent a lack in the acquisition capability. Min Kao moreover claimed that phones were a low-margin commodity market (AllThingsD, 2012), which technology markets are not once you created a brand name in the market (SmallBusiness Chron, n.d.). We know now that the mobile phone market is a very fast-growing market. Kao therefore missed out the trend and the potential of this industry.

A striking finding is that Ted Gartner, the spokesman of Garmin said six years later that standalone navigation devices, that Garmin had produced during that time will still be an important way for consumers to get directions and that Garmin is not going anywhere (The Wichita Eagle, 2009). Meaning that Garmin will still focus on PNDs for the consumer market it was figured out that Garmin has to convince their customers to still buy and use those devices and not switch to mobile phones entirely by adding some kind of service to their standalone devices (The Wichita Eagle, 2009). The technology was getting increasingly more complex, including more features into single devices. Therefore, intelligent devices are needed according to InformationWeek (2008) that do more jobs than just one. By that time, Garmin still seemed to not have realised what smart phones are and will be able to offer. On the one hand officials of Garmin acknowledged the increased competition by mobile phones but they were convinced that Garmin's satellite navigations still have benefits over mobile phones as maps were built in, the screen is bigger and include more information than smart phones do (The Wichita Eagle, 2009). This may be true at that time but as mentioned earlier the mobile phone market is a fast growing industry that has shown over the years that changes and improvement occur quickly. Remembering that and looking again at the benefits of the PNDs that were stated it gets clear those features can easily be added to the phones. This emphasises that Garmin did not pick up all the signals about mobile phones and its development that were available in the market. If they had done so they would have known that the aforementioned benefits will not make the difference in the consumers decision to pay, in the long-term, for the PNDs if they can get navigation less costly in a much more intelligent device.

Nevertheless, Garmin noticed that they have to get active in the mobile phone industry. They cannot just treat it as a separate industry that will not have influences on Garmin's business; and they did not. It was however a late reaction to the threat as they could have taken a closer look at it years ago as the first GPS chipsets were built into mobile phones.

Looking at later points in time where the first phones were already on the market, Garmin and ASUSTeK for some reason did not take feedback on the phones into consideration when developing the later ones. There was criticism about some features and quality of the phones. The two companies expectedly should have tried to improve the phones and address the negatively striking points mentioned in reviews which are publicly available. As can be seen in the summary of the Nüvifones things like the slow processor, the touch screen and the battery capacity have not been improved much from the beginning to the end of production. From here, some conclusions to the acquisition capability of Garmin can be drawn. It is questionable why things that were already bad in the first version were not improved. Even though phone reviews are publicly available and easy to access, it might be the case that Garmin did not spend time to get any feedback on their products. This would also mean that the relationship to the customer is not good. Customer relation is an important factor of the acquisition process in order to know what customers want and what should be improved. When looking at another reason why the two companies stuck to some negatively evaluated things, it does not seem reasonable. If Garmin did know about the negative feedback, why would they not improve those things to satisfy customer needs? The only reasonable answer to this question is that Garmin indeed did not know about the negative feedback which in turn speaks for a lack of acquiring new knowledge and information. I will further address this question in subsequent sections.

4.5.2 Assimilation

Referring back to the interview of 2003 where Kao denied any possible threats of mobile phone makers, it has to be said that it was not only a lack of acquiring the signal but also of assimilating it. The statement implies that Kao must have thought about mobile phones in order to come to the conclusion that they will not be a threat. So he did not see the trend coming and misinterpreted the future development of this industry, which clearly speaks for a lack in this capability. He did not only misinterpret the mobile phones but also the industry where Garmin is active in. The barriers of entry later turned out to not be as high as Kao promised in 2003. It was actually much easier to gain the expertise of mapping and navigation than he thought it would be.

However, there was a point in time where Garmin noticed that they have to deal with mobile phones to some extent. This point will be addressed later on in another section. Garmin understood that mobile phones indeed will be a threat and create new competition in the market. Deciding to make a mobile phone, Garmin responded to what they thought customers wanted; a smart phone and satellite navigation in one device. This was obtained from a statement by the president and COO of Garmin, Cliff Pemble, in 2008 where he clearly states that customers had been looking for exactly such a product that combines the functionalities (InformationWeek, 2008). Later in the same year, Garmin's CFO Kevin Rauckman supported this statement by adding results of industry analysts who found out that the smart phone market is increasing rapidly and that consumers indeed want to have an all-in-one device. This was the reason why Garmin decided to enter the market and produce a smart phone themselves (Kansas City Business Journal, 2008). This shows that Garmin was able to understand the signals that were provided in the market but there is a timing issue to address here. Garmin could have understood the market development already earlier on but they did not. They waited until the signals were analysed by others and got clear in the market. There are two perspectives to consider at this point. It can either be that Garmin did not want to take risk too early or that they really did not see the development coming. The latter is more likely due to the fact that it was clearly stated by Kao that Garmin expected not to be faced with any risk by phone makers in the future (Forbes, 2003). Garmin moreover is a large company. Large companies can cope with risks much better than smaller companies can. They are able to run more projects at the same time by which the overall risk is reduced, implying that the risk-taking does not play the prevailing role in this situation.

4.5.3 Transformation

The transformation capability enables Garmin to bring all the past knowledge and information about their navigation devices and the new acquired knowledge regarding mobile phones in a creative way together. The new knowledge base could then be used in two plausible ways. Garmin either could have waited for the releases of smart phones by Apple, Samsung and other smart phone makers in order to provide navigation apps for them with the expertise Garmin has got about navigation and mapping, or they could make a smart phone themselves, which they did. Frank Dickson, vice president of research at In-Stat (a provider of analyses), said that it was a mistake to enter the smart phone market directly with an own smart phone. Firms like Garmin should rather use their knowledge to provide mapping and navigation software (The Wichita Eagle, 2009). Nevertheless, Garmin decided to make a smart phone that combines the functionalities of a mobile phone and a navigation device. The reason for it was the fact that it should be the breakthrough product which users of cell phones and GPS waited for. In the beginning of 2008 Cliff Pemble claimed that those users wanted to have all those functionalities in one device (InformationWeek, 2008), which indeed was true. Many people use their phones for occasional navigation purposes rather than buying a standalone device, because it is cheaper and handier. Pemble moreover said that "location is relevant to everything you do" (Garmin, 2010), implying the increasing importance of knowing where you are, where you want to go and what is nearby. This is a customer perspective that was taking into consideration here.

At this point though, two types of transformation capabilities have to be examined due to the fact that Garmin initially tried to build a smart phone only on their own. At the time where Garmin announced a phone but had not decided yet to build it with another company, Garmin logically had to transform the knowledge they have acquired and assimilated by then on their own in order to build the basis to create a new product. Based on the lack of acquisition mentioned earlier, Garmin had little information on phones. This is also due to the missing experience in the mobile phone market. Anyway, the idea of combining a cell phone and a navigation device was the right decision to make since the need for mobility and the ease of having only one device have increased. This means that the company actually knew how to create a new knowledge base using old and new knowledge.

Turning to the time where Garmin and ASUSTeK were working together, I could not find much evidence that the transformation capability of Garmin had changed due to the alliance. ASUSTeK did not influence or change the general idea of building an all-in-one device. The only thing to mention is that Garmin had more information to process but the general capability has not changed.

Coming back to the question raised earlier on concerning the reasons why Garmin and ASUSTeK did not improve on negative feedback. Assuming that they knew about it and wanted to improve the phones, the conclusion should be that they were not able to do so. This seems reasonable when you take other things than the touch screen, the battery and the processor into account. The missing light sensor and the camera resolution, two things that were criticised in the beginning of the Nüvifone series, were addressed. It took a while until these issues were solved though. This finding reduces the validity of the conclusion made earlier, that Garmin's capability of acquiring new information was lacking, to a certain degree. It adds that Garmin also had a lack in transforming new knowledge and combine it with the old one, and supports the lack of acquisition as well. If Garmin did not know how to address the phone issues they missed out on information on how to cope with it which then represents the capability of acquiring.

4.5.4 Exploitation

The exploitation process was different from what could be expected. The usual way is that companies use their new knowledge base and use this knowledge to build a new product. At first this is what Garmin did. They used the new knowledge about mobile phones, combined it with the

	Key findings		
Experience	Excellent in navigation sector	No experience in mobile phone sector (→ lack of PACAP)	Alliance with ASUSTeK to gain experience
Activation triggers	Smart phone releases by phone manufacturers		
External sources	Alliance with ASUSTeK	Strategically wrong decision due to limited experience in the worldwide market	Garmin's PACAP suffered from limited experience
Acquisition	Misinterpretation of signals → timing issue in recognising need to get active in cell phone industry	Garmin initially wanted to avoid cell phone market	No improvement of some features of first Nüvifones
Assimilation	Misinterpretation of mobile phone and navigation market	Garmin understood customers in their need of having an all-in-one device	Garmin could have understood the need earlier (referring to the timing issue)
Transformation	Not much new knowledge to add (effect of timing issue and little experience)	Garmin did not know how to improve the technologies of the Nüvifone	
Exploitation	Garmin was not able to produce a good smart phone on their own	Exploitation process not as successful as expected when looking at the product	Garmin not able to provide information to ASUSTeK to produce a good phone

Table 2: Summary of key findings

old knowledge about the navigation segment, and planned to build a smart phone themselves (Gigaom, 2009). At a later stage of the process though where the phone was announced already, Garmin built an alliance with ASUSTeK and re-announced the phone as a co-branded version (CyberSurge, 2009). This alliance was announced one year after the first Nüvifone was announced, which had not been released up to then though. Garmin apparently felt that the product they have produced was not good enough to bring to the market for whatever reason. Due to a lack of information I could not find a precise reason for the late decision to enter an alliance. Based on the decision to choose an electronic manufacturer, whose portfolio includes mobile phones, it can be concluded that Garmin was missing experience with cell phones and maybe even technological knowledge about them. This assumption is supported by the fact that ASUSTeK provided the hardware for the phones and Garmin concentrated on the satellite navigation side (TechRadar, 2010).

As examined earlier on, the Nüvifone series was as far as the phone technology is concerned not satisfying. It is easy to reduce this only to ASUSTeK's capabilities to produce mobile phones since they provided the hardware but here is a closer look required. Of course, ASUSTeK was responsible for that to a certain degree, but the question is to what degree Garmin was responsible for it in regard to the Nüvifones. Garmin knew that they needed someone else to provide valuable knowledge and information to deliver a good product. The question arises why Garmin chose ASUSTeK and not another mobile phone company, maybe one who has already launched smart phones like Apple or Samsung. By choosing ASUSTeK, Garmin decided to compete against Apple, Samsung and other big companies rather than working with one of the market leaders to reduce competition and increase profitability.

It is easy though to judge this decision from today's point of view five years after the announcement of the alliance. From Garmin's point of view it seemed to be a reasonable and good decision as Min Kao stressed: "This alliance is advantageous to both companies because it allows us to combine our resources and establish a strong foundation from which we will innovate and introduce the world to the benefits of LBS (location based service) - centric mobile phones." (Business Journal, 2009).

We know now that it did not end up well, which let doubts of the correctness of the decision arise. I nonetheless would not call it a lack of exploitation capability; it was rather a wrong strategic decision that was taken at that time. ASUSTeK was not able to provide the quality which was needed for the Nüvifone series to be a success in the market. At the same time Garmin was not able to provide the partner with useful information and knowledge either. The table on the left side sums up the most important findings of the analysis part.

5. DISCUSSION

By now, all for Garmin relevant factors in the development process have been addressed and analysed using publicly available information. But it is still not clear where exactly Garmin's ACAP was lacking. Throughout the analysis it gets clear that it was not only one single flaw in the whole system that caused the failure; it was rather a chaining of several things.

It started with the decision to make a smart phone themselves, which seemed like a desperate reaction to phone manufacturers introducing phones that made use of a GPS functionality. Garmin did not expect any phone manufacturer to be able to compete in the navigation market due to a lack of knowledge. So, Garmin apparently did not follow what they were doing and planning to do. As the first phones with GPS were launched Garmin realised that those companies indeed could be a threat to their navigation devices and decided to react on it. By adding devices that contain two different devices, a mobile phone and a navigation device, Garmin admitted the declining automotive industry towards an industry of mobile phones and the need to react on the rising mobile phone market.

Here, the three critical factors of the acquisition capability, which were stressed by Zahra and George (2002) come into life: intensity, speed and direction. It is said that the more intense and faster information can be acquired the better the capability of the firm will be. The direction is the way a firm scans its environment in search for new information. Since Garmin denied that phone manufacturers could live up to the knowledge of Garmin concerning navigation and mapping knowledge, it is likely that the company did not spend much time on searching information in this area, meaning that the three factors are not present to an extent that would have been appropriate. The direction was limited because Garmin did not look at phone manufacturers when looking for information in the market. Therefore, intensity and speed did not live up to their possibilities either. As a result Garmin could not build their capabilities as fast and well as they could have

if followed the mobile market too. Garmin would have noticed earlier that cell phones indeed will be competitive and thus would have had more time to develop the Nüvifone. Another perspective adds to the finding of a lacking acquisition capability. The decision of Garmin to enter a partnership with ASUSTeK to co-develop the Nüvifone series can also be seen as acquiring knowledge. In this case this knowledge was provided by another company but the result at the end is the same. Taking into account that the decision to choose ASUSTeK, and not any other company that might have had more experience in the cell phone market, was probably not the right one, leads to the conclusion that Garmin acquisition capability was indeed lacking as figured out earlier. Garmin did not acquire the right knowledge and information to work with in the development process.

Due to the initial attitude towards phone manufacturers Garmin missed the opportunity to gather much more information about those companies, the mobile phone market and the devices. This resulted in a limited amount of time and consequently a limited amount of information which Garmin could work with. It gets clear that Garmin had a lack of acquisition capability as the cause for the aforementioned scenario was the disregard of the first signals of the cell phone development. In 2003 already, as indicated by Arik Hesseldahl who interviewed Garmin's co-founder Min Kao, signals of the possible development were in the market. Hesseldahl put it like this: "It was four years before the iPhone, though speculative rumors of an Apple-made phone were already in the air." (AllThingsD, 2012).

Nevertheless, Garmin did a good job in terms of assimilating the knowledge. It was understood at a certain point that Garmin needs to do something about the threat and decided to develop the phone series which was in general a good idea. The thoughts of putting navigation and a cell phone together in one device raised attention and interest in the product. This capability suffered from the first one, the acquisition, though. Since there was not as much input gathered in the beginning as what was desirable, only this information could be processed and understood. There is one more thing to name here. According to the information gathered, the tasks between Garmin and ASUSTeK were mainly separated from each other. Whereas Garmin only provided the navigation software and knowledge, ASUSTeK focused on the phone itself. Looking back at one result of the analysis which was that the touch screen was not as responsive and qualitative as desired, Garmin apparently did not know what ASUSTeK was able to do and what they needed due to the fact that Garmin had worked with touch screens in their navigation devices for many years. This knowledge about touch screens could have helped ASUSTeK in building the phones, but Garmin presumably did not provide such knowledge to ASUSTeK. This controversy shows that Garmin did not understand ASUSTeK's capabilities completely.

The transformation and exploitation capabilities however were lacking as well. Garmin first tried to build a Nüvifone themselves, but for a particular unknown reason they needed a partner who assisted Garmin with the phone. It was most likely because of the missing experience and knowledge in the mobile phone market, which ASUSTeK had. This decision was an effect of a chaining of things that required such a move in the end. Due to the missing knowledge and the fact that Garmin did not have experience in the cell phone market, they needed to get those information from somewhere else. Garmin decided, once the alliance was entered, to let ASUSTeK take care of the phone itself. This shows that Garmin presumably trusted ASUSTeK's capabilities and knowledge completely. Garmin apparently did not know too much about them as the product produced did not turn out to be of high quality. Unfortunately, information on this issue is missing in order to be able to conclude that with high certainty. It is still questionable why Garmin chose ASUSTeK as an alliance partner. Other phone manufacturers that were more experienced and had access to the worldwide market could have been a better choice. This is supported by the fact that those firms already had launched their first phones with GPS at the time where Garmin announced the alliance with ASUSTeK. Garmin probably thought that they could do a better job with another company. Garmin moreover had already developed a phone before others launched theirs. It might had been more costly and less promising to adjust the production to Samsung, Apple or similar companies. Regardless what the reason for the decision was, the choice for an alliance was of a strategic nature anyway. The process of getting information from the partner can also be seen as a form of ACAP since the cooperating company is also a source of information from which new knowledge can be gathered. So, it is still unclear whether ASUSTeK was the right choice considering that this company was only one of the three market leaders in Russia and Eastern Europe. It could be the case that there are different market requirements compared to other areas that suit ASUSTeK's expertise. To judge it though, more information is needed.

This section will deal with Garmin's capabilities after the first Nüvifone was launched. A striking finding is that it seemed that Garmin and ASUSTeK either did not look at customer's and general feedback on their phones or were not able to fix the flaws. As discussed earlier, only a few things, that were criticised as the first Nüvifone was introduced to the market, were improved at later versions of the phone. This is another supporting fact that Garmin was lacking absorptive capacity at that time. It however cannot be figured out what exactly was lacking because of missing information. What can be said is that it is one of two or even both of the following things. If both companies did not look at feedback on their phone series and did not take customers opinion completely into account, it speaks for a lack in acquiring new information. If though they did look for information but could not implement changes due to missing knowledge and expertise, is results in a lack of exploitation capability. At this point it cannot be determined which of the reasons was true, but it is very likely that at least one of them indeed caused that some functionalities were not improved. It does not make sense to keep them if customers criticise exactly those functionalities.

Throughout the discussion it gets clear that Garmin indeed suffered from a lack of absorptive capacity in regard to the mobile phone market. The main cause is the acquisition capability that was lacking. This set a disadvantageous starting point for Garmin as a lot of information was not gathered due to the wrong attitude towards the mobile phone industry. By that, Garmin gathered too little information, which resulted in a relatively small knowledge base, that could be processed at later stages in the development process.

As mentioned at several points in the paper, different ACAPs can be separated in the development process of the Nüvifone. It began with Garmin's ACAP in recognising the trend of the cell phone market and their navigation devices. They focused only on their capabilities and the things they have noticed and acquired. Later on, the alliance was set up with which a new ACAP perspective can be taken. By then all four capabilities of absorptive capacity were reconsidered. The third ACAP was taken into account once the first Nüvifone was released and new information could be acquired for further developments. This is in fact an interesting finding that within one development process more than one set of ACAP capabilities can be found. It shows that a firm undergoes the process of ACAP not necessarily only once but maybe several times.

This paper further proved that the four capabilities indeed depend on each other and that it is not that easy to look at them separately; you always have to take the others into account when judging one particular. The capabilities function as a process, supporting Zahra and George's (2002) theory. It, at the same time, disproves other studies and theories that do not see a strong relationship between individual capabilities.

The current literature consists of two views on absorptive capacity. Some researcher claim that there is no direct link between the first two capabilities (acquisition & assimilation) and the last two (transformation & exploitation), saying that each set can be analysed separately. Others, like Zahra and George (2002), state the opposite that there indeed is a direct link between all four capabilities, implying that an underperformance in the first capability will have effects on the following capabilities. This paper supports the latter view as this study clearly found this scenario. The underperformance (lack) of acquiring information and knowledge properly had direct effects on the whole process and thus on every capability. This shows the interrelationships of the capabilities and the importance that no capability can be looked at alone. Thus, this paper adds to the current body of knowledge by confirming one side of the theory supported by a real-life case.

One of the biggest limitations to this study is the amount of information. This study relies on public available information that was not gathered for this study in the first place. With more information an exacter conclusion could be drawn. Nevertheless, with the help of the available information I was able to come to a proper conclusion on the research question.

6. CONCLUSION

This paper ends with the conclusion that Garmin indeed had a lack of absorptive capacity that was one reason for the failing Nüvifone series. It was mainly caused by the lack of acquiring knowledge and information which also includes recognising the right signals in the market and the environment of Garmin as a whole. This underperformance in the beginning caused insufficient performances and capabilities later on. The timing of recognising that mobile phones indeed will be a threat played a vital role. If this had been noticed earlier, Garmin would have had more time to develop a smart phone that could have been better in terms of quality and functionalities. This lack influences the following capabilities and the following processes negatively, which then ended up with a product which was not competitive in the market.

7. MANAGEMENT IMPLICATIONS

It can be learnt from this paper that it is very important to continuously look for any information and signals that can be found. Even if some signals at first seem very useless and indicate things that are not very likely to happen, it is crucial to consider and keep an eye on the development. Neglecting and ignoring information can cause bad consequences and surprises in the future. This is especially true in a fast-changing industry like the mobile phone industry that has been and still is growing rapidly. Every kind of information can give hints and can be valuable in whatever way. Scanning the environment is key to react on possible changes early in order to sustain or get a competitive advantage in the market.

This implies that firms should spend more time on their Research & Development either by conducting research themselves or outsourcing it and acquiring relevant information from other companies and institutes. If then indications for a possible significant change in one's industry are found it is recommended to analyse those indication and think about possible scenarios. This will make companies to be able to react quickly if changes occur.

8. SUGGESTION FOR FURTHER RESEARCH

This paper focuses on the technology side of the Nüvifone failure. Marketing is another side of it that could be analysed by focusing on marketing literature instead of ACAP literature. This means that the failure can be investigated from a different point of view by examining if Garmin and ASUSTeK may took a wrong approach when launching the phones.

Unfortunately, it was not possible to interview a representative from Garmin to get insight information directly from the company. Further research could focus on this gap and add more information to this paper that support or maybe contradict the conclusion to a certain degree.

The finding of several sets of ACAP in one process can be investigated deeper with this case and also with other cases. Then differences and similarities could be found that have not been looked at before. This might also provide the basis for new theoretical input if similar results can be found.

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