



**Copenhagen
Business School**
HANDELSHØJSKOLEN

Open Innovation in High Tech Industries

The case of Microsoft Kinect

Master's thesis within MSc in Economics and Business Administration

Author: Gustav von Platen,

Supervisor: Jörg Claussen

Master programme: Management of Innovation and Business Development

Number of characters: 118,783

Number of Pages: 70

Hand-in date: July 17, 2014

Copenhagen Business School - 2014

Abstract

New technology novel enough to advance whole industries does not occur on a regular basis, technology like the touch screen that makes it easier to communicate with phones, tablets, and even computers are one of them. In this study you will find the next step in evolution of user interaction that was originally developed for the mass market in interactive entertainment, the Kinect. This technology was so advanced in relation to its price for consumers compared to existing technology that it has spread beyond its core market into several non related industries and taken them years ahead in research. This study sets out trying to explain how the Kinect device can expand into non related industries through a case study of the Kinect and its creators Microsoft. Using open innovation theory directed towards processes and methods of practice integrating users in the innovation process the study reveals that in this case, the lead users took control of the technology using reverse engineering and showed the world and Microsoft what the possibilities were with the device. Furthermore this triggered Microsoft to capitalized on the possibilities by ratifying it, building a network around it using open innovation principles and working with the lead users. Due to the support of Microsoft the technology could grow and by supporting open innovation the creation of firms focusing on the development of applications using the Kinect in non related industries they set a new standard for the use of natural user interfaces in many industries, for example, the robotics, medical and fashion industries. To reach this conclusion the theory was applied to three separate phases to measure the application of open innovation principles in the evolution of the ecosystem, by doing that the study could identify the lead users as initiators and Microsoft as enablers.

Acknowledgments

I would like to take this opportunity to show me gratitude to everyone that have contributed to this thesis. Without the information, feedback and support this thesis would not have been possible.

Firstly I would like to thank my guidance counselor Jörg that have helped me to keep focus on the price and supported me in discussions and given me feedback on the direction of the thesis.

Secondly I would like to thank Anup and Dan for contributing with their deep knowledge into the field and sharing their stories.

Last but not least I would like to thank my family and friends that have been supporting me through the process with loads of coffee and encouraging remarks

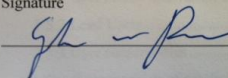
Thank you
Signature


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1. INTRODUCTION

This chapter aims to introduce the reader to the subject at hand and the focus of the study, it will describe the outline of the study in a disposition part, the disposition part will be followed by a problem statement where the research question will be presented and the reason why this is the focus of the study, the introduction part will finish with a delimitation of theory where the use of theory will be discussed.

Since early 21st century the interactive entertainment industry has enjoyed tremendous growth. The demand for more computational power to boost the graphical experience for gamers has seen a rising interest from other industries that can benefit from stronger and better graphical video cards. The airline industry has for long been using flight simulators originating from video games to train their pilots which is both cost effective and risk free, the US army have been using FPS (first person shooters) games to train their soldiers in urban warfare and tactical movement. More recent the medical industry have started using graphics cards designed for gaming to aid them in their diagnosis and with 3d sensing technology they also have been able to render 3d models of human body parts which they can view in layers and move in 360 degree angles opposed to looking solely on x-ray pictures. Robotics industry have had a huge leap in development using 3d sensing technology to render and navigate closes spaces, while rendering environments like rooms and empty spaces they have taken it further by programming robots to recognize single objects like books, balls etc. Even getting robots to perform easy children's tasks like putting wooden pieces shaped like rectangles, triangles into a box with the corresponding shapes. All these developments stems from the interactive gaming industry hunger for development and innovation.

My thesis will focus on the development of a 3d sensing and Natural user interface device, how the pinnacle of innovation in the field came from a global software company that had the aim of taking

a big chunk out of Nintendo's market share in a fairly new part of interactive entertainment, the casual players. How this device spilled over to non related industries and how a focal firm, in this case Microsoft has capitalized on that spillover.

1.2 Disposition

For a structured approach to an unstructured problem I think it helps to set the steps of disposition to more closely follow the development.

The thesis will be outlined with the start of a problem statement, stating the research question and why this is an interesting study. Secondly the thesis will move into a methodology, followed by a theoretical delimitation to narrow the possibilities of solutions to the problem and also briefly discuss the theory used and why. The thesis will then present the literature review that will pyramid down the theory from a wide perspective into the core theories used. This will be followed by the empirical data to show the reader the subject at hand and the development of the subject, following the empirical data will be an analysis part where the author combines the theory with the empirical data. The author have divided the empirical data into phases to better show the reader the evolution of technology and the difference in the application of theory to better understand the outcome of the analysis. The next part will take the analysis into consideration in a discussion regarding the results of the analysis, Furthermore the discussion part will end with conclusive remarks were the author answers the research question. Ending the thesis the author will briefly discuss possibilities of future research into the field.

1.3 Problem statement

My research question is "*How can technology advance non related industries through open innovation? :The Case of Microsoft Kinect*".

The thesis takes its start in open innovation theory where I am interested in how open innovation theory and models can help technology developed for a single industry to be adapted in industries not related to the focal one. I have chosen Microsoft as a case company as they have a strong presence in the gaming industry and their hardware Kinect is considered the hardware to use in 3d depth sensing and human skeleton tracking both within gaming and outside of the gaming industry. The interesting part of this is to evaluate how Open innovation theory can be applied to the case of Microsoft Kinect, what a multibillion dollar company has done if they have done anything to foster this new development and how the "Kinect effect" has created a new ecosystem and perhaps a new future business pillar for Microsoft.

1.4 Delimitation of theory

Due to the theory I have chosen is so vast and still argued between scholars, I needed to start from the basics and then gradually steer the theory towards the models that I feel best can explain the observation in the case study. Therefore limitation is key in order to create a red line through the thesis theory to create a comprehensible analysis and discussion. As the direction of my master studies aims at innovation it is also there the thesis begins, as Innovation being such a loose expression with many possible fields of interest I have chosen to focus on open innovation theory and the processes of an open innovation model with the integration of users in the innovation process to explain the creation of the Kinect ecosystems outside of the intended market interactive

entertainment. Furthermore in order to use the integration theories of the users in open innovation I had to pyramid down also through user innovation theory in open innovation to give the reader an understanding of these concepts when looking at the integration methods. These concepts are *User driven innovation* which details down to *Lead users theory* and the use of *User communities*.

Due to the direction taken with this thesis and the limitation of space I will not go into network effects theory in open innovation (Chesbrough, 2007) or Platform strategy (Cusomano, 2010). I will not look at the organizational structure for collaboration in open innovation (Pisano & Verganti, 2008). All of these theories could have been a basis for a thesis answering a similar research question from a different angle. A substitute for the open Innovation theory could be platform theory and more specifically two-sided market theory or multi-leveled models, or a full focus on cross-industry knowledge spillovers and take up the point on how knowledge transfers between industries and how that knowledge is tacit for the firm in a cross industry to interpret and use, and how these cross industries are related, for example how closely linked robotics are with the gaming industry in terms of focal knowledge. However I feel that open innovation would be better to further strengthen the empirical application of the theory in a highly innovative technological field where I want to focus on the technological improvements and its impact on non related industries.

As pointed out in the method part I divided the empirical data into three phases without supporting theory of why I did this. The disadvantage of doing this is that I can only support this through my own observations and not through theory. I could not find any theory that supported how I should divide the phases in a better way than I did for the purposes of this case study. I could have used Product life cycle theory (Vernon, 1966) I could have use the diffusion of innovation theory (Rogers, 1962), to divide the phases and also measure the success rate based on adoption criteria,

but as I had no information of how many Kinect devices that were sold for the purpose of using it with Windows and not the xbox360 there was a data problem. Furthermore I chose to discard these theories due to limited space in the thesis and in the interest of looking at the research question through the adoption of processes and methods of practice in open innovation user integration.

In the article by Gassman & Enkel they identified open innovation through a processes, capability and determinant perspective on a high level. From these I have only used the process perspective as I believe that this is the most measurable part that can explain what Microsoft did and not if they had the capability or the firm product structure to do it. The focus lies in the users, with Microsoft as a case company to show how they interacted not if they had the capability or the product structure as that would go outside the frame of this case study. In exchange for this and more focused on what happened I have applied methods of practice by Diener & Piller to drive an open innovation agenda to measure what occurred and how.

To end the delimitation chapter I would like to present some criticism against the open innovation principles coined by Henry Chesbrough. The main criticism towards open innovation is that it is not a new research area. "*Open innovation is old whine in new bottles*" (Trott & Hartmann, 2009, p.715). Many of the components for open innovation have been present in the North American industrial research model since the beginning of the 20th century (Mowery, 2009). Terms like *Disintegrated innovation*, *modular innovation* (Brusoni & Prencipe, 2001) and *Distributed innovation* (Kogut, 2008; Mckelvey, 1998) touches upon innovations that covers larger units than the firm. To connect these concepts with the open innovation theory these activities can be viewed as part of the *outside-in* process of open innovation. The *inside-out* part of open innovation is the one that is unique for open innovation, which points out that external inflow of ideas is not the whole concept of open innovation, the development have moved to that firms more and more takes use of the internal innovations that they do not use for the sale to the external market for a possible

better use than being scrapped internally in order to create revenue (Arora, Fosfuri, Gambardella, 2001; Arora et al, 2002). This phenomenon will be explained deeper in the literature review.

2. METHODOLOGY

This chapter aims to describe and outline the research methodology in the thesis. The first section will describe what the thesis is trying to achieve followed by the presentation of the case company and the focus product. Then the methodological approach is discussed and the reasons for choosing that approach and the advantages and disadvantages in answering my research question.

When deciding on the approach of this thesis there are several variables that need to be discussed and analyzed in order to choose the correct approach to be able to answer the research question. In this thesis I want to apply theory to explain an observation. In this case being to explain how open innovation can be used to foster development in a non related industry, to explain the observation I have used a case company to better show a real life example to support the theory. The case company I have selected is Microsoft, more specifically their hardware component Microsoft Kinect.

When thinking about how to approach this case study I needed to decide on a qualitative or a quantitative approach. Quantitative being a collection of data using variables, qualitative being a holistic approach with complex problems and discussion arising from theory articulated with words and not variables. Given the complex nature of the research question where information is gathered from different persons with different perspectives and from secondary sources I believe that the research question together with the case company contains too many intangible factors to be

answered with a quantitative approach. Instead it needs a hands on approach where you can critically view the different perspectives and angles to then draw conclusions based on theory and interviews as well as forum discussions from field experts.

When conducting the research I collected both primary and secondary data to form an as accurate information position as possible. I have conducted semi structured interviews with two firms, I had a set number of questions, but did not adhere to them strictly when conducting the interviews. I did not adhere to them because I wanted to leave room for new information that I might not have covered in my set questions. In that sense I got more material than if I would have had conducted more strictly structured interviews. In the selection of firms to interview I wanted to collect as much information as possible and from different standpoints but within my boundaries of Microsoft, therefore I selected two separate firms that operate very close and are partners with Microsoft with the Kinect device but operating in different industries. The advantages were that I got primary data from within the partner network of the accelerator program and their story of the Kinect life cycle. The disadvantages were that the information has a risk of being biased as they are partners with Microsoft. Therefore I tried to find secondary data in the form of official interviews from both Microsoft executives and leading people in the development community. Also finding information in the developer's discussion forums to support the information collected from the interviews. In that way I could compare primary and secondary data and discard information that did not adhere to the general perception of what occurred and lacked relevance.

The advantages of using a case study as basis for my empirical data is that I have set boundaries of which to work within, focusing on Microsoft and Its partners to form an opinion of what happened. The disadvantages of using this form are that the findings cannot be generalized or applied to other observations of events because of its narrow boundaries.

In order to best answer my research question I collected empirical data and theory separately and combined these in an analysis part to measure how and if the theory could explain the phenomenon. Because I was measuring a development in time I divide the empirical data into phases to more accurately measure what transcribed. I believe that by dividing the empirical data into three stages that were clearly separated by events in the life cycle I could better apply the theory and measure the degree of Microsoft's conformant to theory in each phase and being able to more closely answer my research question.

3. LITERATURE REVIEW

This chapter aims to describe existing literature within the field of Innovation, more specifically the development of open innovation theory and its differences versus classical innovation. The chapter will continue into the user perspective of open innovation and present processes and methods of practice in open innovation in integrating the users for a more effective innovation process. The process theory and the methods of practice will later be used together with empirical data to answer the research question.

3.1 Characterization of innovation

We may very well think of an innovation being a new product, however innovation can also be other phenomena for example; A new process of production, a substitute of material newly developed in a other unaltered product, The reorganization of production, internal functions, or distribution changes leading to increased efficiency, better support for a product, or lower costs or an improvement in equipment or methods of doing innovation (Kline et al 1986).

3.2 Classic model of innovation

Until a few years back innovation was considered to be a process which only existed internally for most companies. The company's internal resources and research was the only capability utilized for innovation, and a protective barrier was build around their intellectual property with patent strategies (Chesbrough H, 2003). It was a generally accepted idea that in order for a company to be successful in innovation it needed to have total control over its research and development and it should be kept a well guarded secret internally. Chesbrough chooses to name this classical

paradigm of innovation “closed innovation” which in the essence means that a company’s ideas and innovation would be created and shaped within the company’s boundaries. This philosophy can be characterized as ”If you want something done right, you’ve got to do it yourself” (Chesbrough H. , 2003, p. 36).

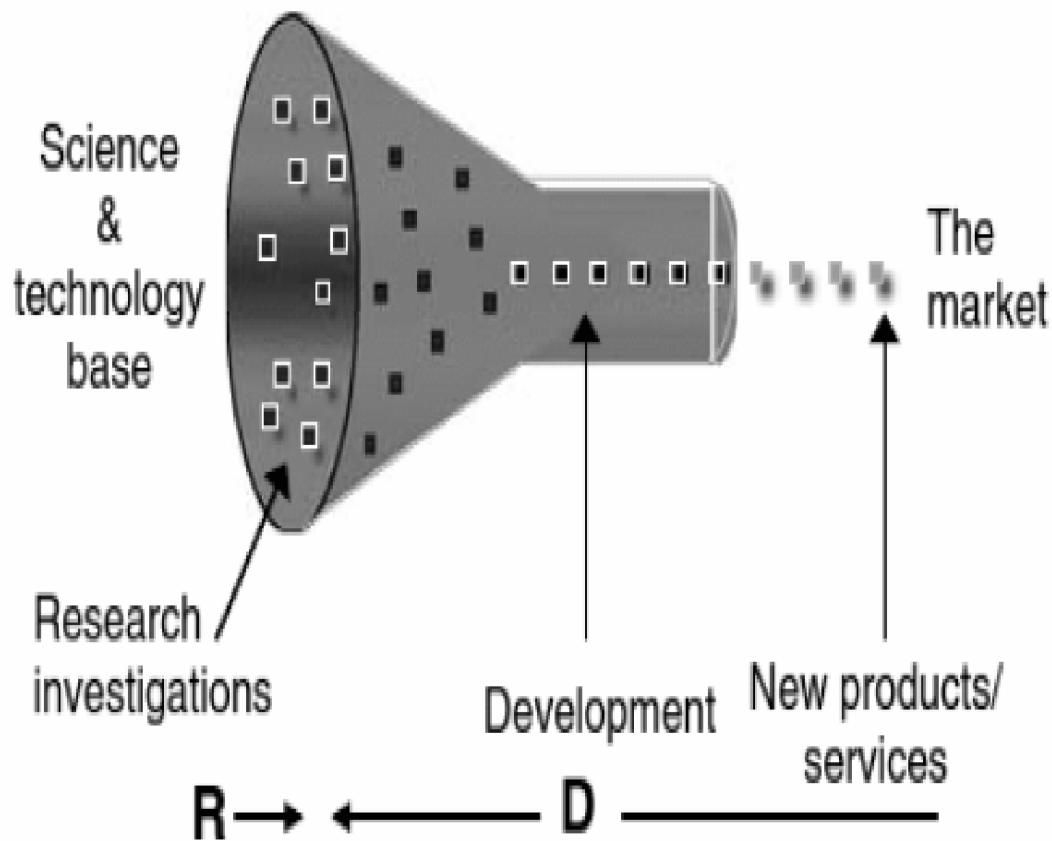


Exhibit 3. Closed innovation Paradigm (Chesbrough 2006)

Exhibit 3 illustrates the flow of innovation in a closed system where research and development interacts with a large amount of research ideas that a company finds interesting. These ideas are filtered into fewer ideas that more closely fits the companies capabilities, market and strategy. After a few of the ideas have been filtered the company decides on which to pursue and develop them into new products or services that are then introduced to the market (Chesbrough 2006).

The closed aspect of this illustration is characterized as closed due to the fact that there is only one way a project can enter and only one way a project can exit the innovation process. Entering being through a science and technology base and exit being entering the market according to Henry's description. This model has been the bread and butter of innovation theory for a number of years with many success stories throughout the history (Chesbrough 2006).

3.3 Open Innovation

The theory of open innovation coined by Henry Chesbrough and cited multiple times (Elmqvist, Fredberg, & Ollila, 2009; Dahlander & Gann, 2010) adds a new perspective on innovation. Henry's model which adds an external perspective is manifested in several different ways. In one way it is about sharing much of the company's internal goals and strategies towards suppliers and end-consumers on a regular basis. In many ways it is about acting in symbiosis with their external environment, which makes it possible for the company to have a much more systematic usage of innovative ideas from the external actors. It also makes it possible for consumers and suppliers to plan their activities in accordance with the innovative activities that the company has (Chesbrough, 2006, p. 121).

“Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. Open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model.”

(Chesbrough H. W., 2003b, p. xxiv).

The ideas around open Innovation stems originally from the use of Open Source that was used in the development of new software programs called “Open Source Software”. In that process new principles were discovered and identified for how innovation is run during the development process (Gruber & Henkel, 2006, p. 360; West & Gallagher, 2006, p. 328).

Open innovation also entails that companies can lose potential rents if they close themselves out from their surrounding environment. The goal to acquire competencies and competitive advantages in the market demands that the company engages with external partners. These could be suppliers, consumers, Universities, specific field experts, research institutions or even their competitors (Chesbrough 2003).

These partnerships would include giving and taking ideas and share technologies and resources that would generate capabilities that the firm could not compete with internally. These capabilities could include access to unique external knowledge that gives new perspectives to the organization, increased efficiency in the value chain, decreased capital risk in product development projects by sharing the risk with their partners, the development of customer adapted products and services, commercialization of knowledge and technologies outside of the firm boundaries, and an improved innovation process which is the foundation to creating new value that satisfies the market demand.

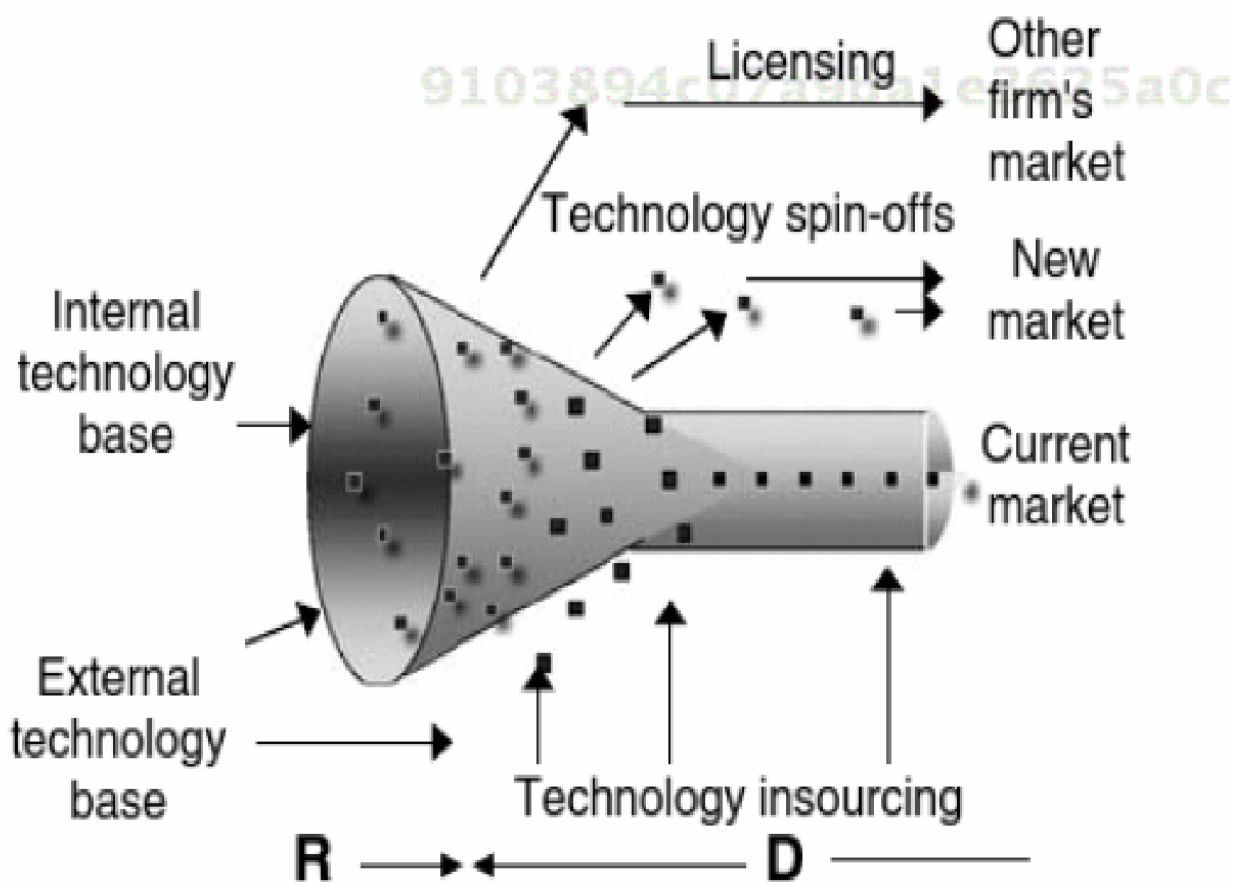


Exhibit 4 . Open innovation paradigm (Chesbrough 2006)

The model of open innovation illustrated in *Exhibit 4* has grown in acceptance mainly through the ability to explain phenomena that the closed model could not. Instead of having a one way in and one way out perspective, the open model have several modes of ways into the model and also out of the model. For example ideas that might not be of the core competencies of the firm can be licensed to another company and generate royalties, a way in could be the opposite, a small start-up firm have developed a new technology that performs better than the internal technology it can then be licensed or bought to be included into the parent company. Technology spin offs can trigger progress in a non related market which then the parent company can enter with a competitive advantage even though the technology were developed for a different purpose.

Already in 1998 Dyer and Singh started to elaborate on the capabilities outside of the firm, by proposing an alternate view on Barney's resource based view (RBV) through relational theory of partnerships, relation-specific assets, knowledge-sharing routines, complementary resource endowments, and effective governance (Dyer and Singh, 1998 p. 676). Research based view focuses on how internal firms can reach supernormal returns through internal resources, assets, and capabilities. Thus in the resource based view an individual firm should try to protect internal proprietary knowledge rather than share it to prevent knowledge spillovers that might grind down their competitive advantage. However Dyer and Singh shows how relationships can enjoy rents that are jointly generated and owned by partnering firms (Dyer and Singh ,1998 p. 675). Achieved through close knowledge sharing with their alliance partners they gain access to knowledge they would not have if no partnership existed.

According to von Hippel (1988) there are two categories that can incentivize a company to accept spillovers. In the first case, the innovation benefits the innovator and there is no downside to sharing that benefit, for example sharing an improved blueprint of an innovation to the vendor if it means there is a chance of an improved product in the future. The other case is that a firm improves an innovation to sell more products, for example Intel builds improved microprocessors which it then sells to Dell.

Closed innovation Principles	Open innovation Principles
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from research and development (R&D), we must discover it, develop it and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our innovation process, so that our competitors don't profit from our ideas.	We should profit from others' use of our innovation process, and we should buy others' intellectual property (IP) whenever it advances our own business model.

Exhibit 5: Chesbrough, H.W. (2003) “The era of Open Innovation”, p. 38.

As a last remark on general open innovation theory, in *exhibit 5* Chesbrough points out the difference in a firms internal view of innovation by contrasting closed versus open innovation principles to further show the difference in thinking.

3.4 Open innovation Processes

In order to characterize open innovation to a more tangible view of how open innovation can be applied Gassmann & Enkel (2004) identifies three types of open innovation process archetypes. The three processes derived are used to indentify how a firm is handling knowledge internally and externally. They research identifies open innovation from a process, capability and determinant approach (Gassman & Enkel, 2004, p 15). As mentioned in the delimitation only the process part will be used, as investigating the industry determinants or the capabilities of Microsoft is outside of the scope of this study.

3.4.1 Outside-in/inbound open innovation

A firm's innovative capability increases when external knowledge is integrated with internal R&D projects. Also when they cooperate with customers and suppliers. Participation of suppliers during the product development phase leads to different advantages. For example early identification of technical issues, better usages of internal resources, access to new and complement products, decreased technical and financial risks, product improvements etc.. The customers role in the innovations process have strongly increased in later time

“Consumers can now initiate the dialogue; they have moved out of the audience and into the stage”
(Prahalad & Ramaswamy, 2000)

Firms must see that the customers are co-creators of value when they contribute with unique competencies that are a valuable source for knowledge necessary for a successful innovation process. There are other external sources that can be used during the ideation (Creation) phase of the product development through for example buying of Intellectual property rights (IP Rights) in the form of patents, licenses or technological specific knowledge that is created through joining the firm to an innovation cluster for example silicon valley (for software). The typical characteristics of firms using the outside-in/inbound open innovation process are according to Chesman & Enkel, active in low-tech industries when it comes to the acquisition of similar technology, act as knowledge brokers or knowledge creators. They have highly modular products and high knowledge intensity (Chesman & Enkel, 2004, p.10).

3.4.2 Inside-out/outbound open innovation

The firm takes advantage of the knowledge they own in order to create rents. By transferring the firm's internal knowledge to the market in the form of a business transaction, for example a sale of IP, patent, licenses or the creation of tradeoffs etc. Philips electronics have rents that comes from licensing that amounts to millions in revenue each year (Alexy, Criscuolo, & Salter, 2009). The firm that uses the out-bound process directs its activities towards commercialization of the internal ideas into other areas and in that way enjoy rents from the sale, whereas the buying firm can enjoy new solutions or products that they can introduce to their market. For example Botox was developed as a nerve toxin for medical use, and then moved into the beauty industry and increase the usage exponentially. To outsource idea's brings certain advantages according to Haour (1992), these can include access to new knowledge areas (Complement knowledge), better problem solving skills through greater flexibility, a better focus of core competencies, lower costs through cost-sharing and time-to-market speed. Apart from outsourcing there are other reasons for a firm to choose an outbound innovation process, for example Gassmann & Enkel (2004) proposes that *“branding can be a reason to focus on the inside-out process when there are core competencies for development and commercialization but no brand for products in the intended market”* (Gassmann & Enkel, 2004).

Other firms chooses the outbound process in order to establish technological standards or to support their partners with new knowledge and technology. The firm that commercializes technologies through licenses and or the sales of patents after they themselves have used them contributes to the creation of new innovations or areas of usage outside of their own industry. The typical characteristics of firms using the inside-out/outbound open innovation process are according to Gassman & Enkel; Research driven firms with the aim of reducing internal R&D costs, branding

and using spillovers of the internal development to create rents by licensing or selling IP (Gassman & Enkel, 2004, p.12).

3.4.3 Coupled process

A coupled process means that the firms *outside-in* and *inside-out* processes are connected in a strategic network or cooperation's between specific partners (other firms, Universities, research institutions) where the goal becomes a continuous exchange and development of knowledge based on a learning process that benefits both parties with an improved market position, increased competitive advantage and a sharing of the risks. (Gassmann & Enkel, 2004) points out that the goals for most firm's that focuses on a coupled process are to establish standards or a dominant construction for their products or services. The typical characteristics of firms using the Coupled process for open innovation are according to Gassman & Enkel; Standard setting firms aiming for a dominant design, firms that multiplies technology for increasing returns (like the mobile phone industry), have alliances with complementary partners (Gassman & Enkel, 2004, p.13).

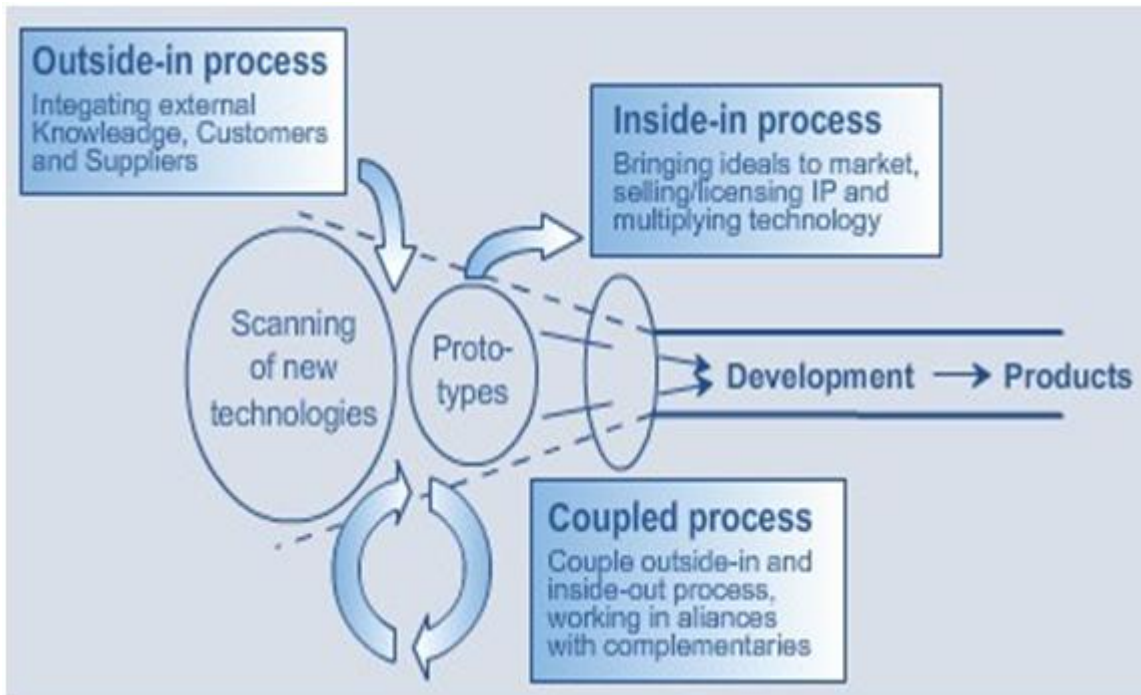


Exhibit 6: Gasmann & Enkel (2004) “Three archetypes of open innovation processes” s. 7.

3.5 Working methods within open innovation

In order to further focus the aim of the theory this chapter will connected the initial notion of open innovation processes into the user oriented field of open innovation principles.

3.5.1 User driven innovation

Due to the change in how you view innovation from the 1st generation (something new) to the second generation processes (open innovation) a larger recognition towards the users role in the innovation process have taken shape. They have the role of participants and test subjects but also as developers and entrepreneurs (Almirall 2008). In contrast to the earlier view where they identified a typical user or allowed the user to take the role as evaluator or test subject the user now has a

central role, and more often than not being the driving force in the innovation process. This paradigm shift has grown for many years and increased slowly in importance to its current stage. Even though new development recognizes users as a central part of innovation, the concept have grown from an infant stage in the late 80s where users was viewed as a passive source for innovation, to the enterprises realization that users innovate because they aim to benefit by using what they create themselves (von hippel 1988). The development was noticed by the enterprise community that there were obvious advantages with the users innovating themselves. Instead of the firms creating and producing new products which in essence can be viewed as a coin toss whether the end consumers would find a product or service attractive or not. The firms could now look at the community and see what their consumers wanted. The users saw a hole in what was currently available in the market and created it themselves. This development was driven by something von Hippel called lead users. A widely used example of lead users innovating is the windsurfing example, where the users build straps on the board to keep their feet in place while in the air, which then became standard in the production of windsurfing boards (Shah, 2000).

This development in innovation processes have driven that von hippel (2005) coined the concept democratic innovation where the focus lies on interpreting the innovation as a social process that cannot be achieved without openness (von Hippel & de Jong, 2010, p.7-8). The users were no longer viewed as passive receivers for new technology, but an active participant all the way to the level of them being the creators of innovation with their contribution (Almirall, 2008, p. 24).

Furthermore innovation was seen as something that everybody could contribute to. The development towards a “democratic” view on innovation was partly made possible through the development of ICT (Information and Communications Technology), that greatly enhanced the access and availability to information and faster ways of communicating. This development are also

supported in empirical studies that shows that users are now deeply embedded in the product modification and product development in many industrial fields (von Hippel 2005).

3.5.2 Lead Users

Lead users are characterized as the most innovative users (von Hippel 1986) this is because they are ahead of the majority of the population in the sense of possible market trends and openings, and consequently the most embedded and knowledgeable users in their respective field of interest. Hence many of the products that lead users have developed appeal to the rest of their market as well, many of the products and services developed by lead users are seen as commercially attractive for manufactures (von Hippel 2005).

Furthermore, lead users found in markets not directly linked to the market the firm want to innovate in have higher probability of coming up with true novel innovation. The explanation are that the lead users have a fresh mindset on the new market and are not bound by its rules that one might have after several years of working in that field (Lilien et al, 2002, p. 1055).

3.5.3 User communities

A user community can be described as a number of user coming together to discuss general practices or problems of a product or service. According to theory user communities can be divided into two major parts. first one being a network formed by the users that are directly connected to a product or service which is available in the market. A formation like this is characterized as a “brand community” (Muniz, O’guinn, 2001) where the users are tied to specific brand through loyalty towards the brand and its products. The users in this constellation work together with the company to create value together through different activities (Schau et al, 2009). the activities they undertake together varies from demand identification, idea generation, concept modification and

product testing. The members of this sort of community also take on the roles like final inspectors or co-creators (Nambisan, 2002).

The second major way of viewing a user community is that the network formed by users are not connected to a specific product or brand. Instead it is the notion that the users are in the same field of interest and are involved in organized cooperation of structures and methods of interacting and distributing of inventions (von Hippel, 2005). This view is more in line with the windsurfing example of lead users, where users modify existing products or build completely new solutions that they themselves see as something they need and use. The speed and effectiveness of development and the testing and diffusion of their idea can be increased through the cooperation within the community (von Hippel 2005). A relevant example of user community practice is the development of open source software (OSS). Open source is a term used to describe the type of license under which the software code is made available. The difference to traditional commercial software is that open source software's source code is freely available to all. Good examples of large user communities in the realm of open source is Linux which is an operating system developed and maintained by the users.

3.6 The three methods of practice in open innovation

With the explanation of how the users are integrated into the innovation process the next step is to identify methods in practice to best incorporate internal and external users into the innovation process. Diener & Piller (2010) Describes three different Methods to make the new innovation process work in practice.

3.6.1 Making use of lead users

First, make use of lead users. There are two methods a firm can use in order to draw benefits from *lead users*. First, look for leading users and integrate them into the firm; the lead user motivation to find solutions to their problems leads to that they create innovative ideas that the firm can make into concrete solutions for their products, services or other offerings. Secondly, look for lead users and involve them in workshops that looks to solve specific problems.

3.6.2 The toolbox for open innovation

The second approach looks at a toolbox for open innovation: The focus of the method lies within the integration of the consumers contributions to the firm's innovation process. The toolbox are introduced during the development stage, when the consumers contribution needs to be worked through and as a consequence more valuable for the firm. The toolbox is an interactive development platform that the firm makes available to users and encourage them to share their development needs and also work together on solutions for their needs based on the elements the development require. There are five requirements that the toolbox must contain; 1) *Trial and error learning*, which means that the firm gives feedback to the users solutions with the aim of evaluation and improve them. 2) *solution space*, includes all variations and combinations of solutions with the exception of those that contain technical limitations for the firm. can be measured in large of small solution spaces relating to the access variations and combinations they are given access to. 3) *User friendliness*, this requirement are devoted to the toolbox functionality and interface, it is measured through variables as *ease of use* and *quality of service* and that the learning required to operate in the toolbox is limited so that the user easily can use the platform. 4) *Modules and components library*, allows the users to chose among predefined solutions or settings; Language settings, fonts etc. 5) *Transferring customer solutions*, basically how you transfer the product between the user and

the firm, the firm should not need internal employees to rewrite code or alter the product to incorporate it into the firm (von Hippel & Katz, 2002, p.9-12).

3.6.3 Innovation competitions and broadcast search

The third approach looks at innovation competitions and “Broadcast search” platforms, this approach aims at the firm to offer all users or a small specialized group to compete in competitions with their ideas, or improve upon the firm’s products or give solutions to specific problems in exchange of a reward. The aim of this approach is to increase the knowledge base in the firm as well as encourage creativity. The innovation competitions are often used in the early stages of the innovation process. The structure of the competition are divided in eight parts; selection of organizer, competition focus, target groups, platform for transferring of knowledge and ideas, time horizon, board of judges and method for evaluation, definition of rewards and identification of innovative users.

4. EMPIRICAL FINDINGS

This chapter describes the empirical findings, both in terms of interviews conducted and secondary sources. The chapter starts with an introduction of the case company and the Kinect device. That section is followed by more detailed descriptions of the developments following the release of the Kinect, the next section looks at initiatives within Microsoft to foster entrepreneurial activities and the interviews with Microsoft partner companies.

4.1 Introduction to Microsoft

Microsoft was founded in 1975 in Albuquerque, New Mexico. The company sees it as its mission to create technology that changes the way people work and communicate. This mission is made accessible through development of hardware and software as well as services that adds new possibilities and adds value to people's lives. At Microsoft they develop several software products internally with the vision of acquiring competitive advantages as a result of close technical control over products and services. The company's primary income comes from licensing, internally developed software products, Hardware products and internet marketing that all are directed towards the global market. The company have through its wide supply of products a well diversified portfolio. The company have partnerships with many multinational firms. For example Acer, Dell, Fujitsu, HTC, Hewlett-Packard, Nokia and Samsung (Microsoft annual report statement 2012).

Microsoft started to take market shares early in the firm's existence by offering its operating system to all computer manufacturers that showed interest. The more market shares Microsoft acquired the more third-party developers started using their operating system. Microsoft succeeded in creating a dominant computer platform by offering an operating system that was compatible with personal

computers that were attractive to the majority of the market due to its low cost (business insider, 2012).

However in the recent years, Microsoft software offers have gotten serious competition from Apple, and Google. From Apple in terms of operating system and other firms like Google in their web browser offering internet explorer which comes as standard in their operating system. In recent years Microsoft has gone through several lawsuits against their dominant position in web browsers (<http://law.justia.com>).

Microsoft have had a growing reputation of being narrow minded and very protective and not at all open towards the more user oriented development (<http://www.zdnet.com>). However that is not saying that Microsoft has not tried to change that reputation into a more open one which will be detailed in the next part.

4.2 Microsoft move towards a more open company

Microsoft have struggled a long time to change the direction of the company to follow the changing market conditions of the industry towards a more open and collaborative market. It has not been easy for them coming from the position they had at the turn of the century, however they realized that the changing condition of the industry could not be neglected or they would be left behind. Already in 2001 they started a process to improve their collaboration with their customers. This was the first step, and has been developed for several years. However the most media covered change came in 2008 when Microsoft announced to everybody's surprise that they would offer free and open access to their products.

“ REDMOND, Wash. — Feb. 21, 2008 — Microsoft Corp. today announced a set of broad-reaching changes to its technology and business practices to increase the openness of its products and drive greater interoperability, opportunity and choice for developers, partners, customers and competitors. Specifically, Microsoft is implementing four new interoperability principles and corresponding actions across its high-volume business products: (1) ensuring open connections; (2) promoting data portability; (3) enhancing support for industry standards; and (4) fostering more open engagement with customers and the industry, including open source communities. ”

(www.microsoft.com)

This announcement stirred up quite a response from the community, both positive and negative. The positive side are that they really are making a change and releasing their code, however it was not for public access as linux but a collaboration initiative. It is not the first time that Microsoft has promised interoperability. First time was in 2003 then again in 2005, 2006, 2007 spread around the years Microsoft have communicated that they will incorporate more interoperability ten times (www.groklaw.net). A response to the news from Microsoft from ECIS (European committee for interoperable systems) puts the news in perspective.

“Microsoft promises not to sue open source developers for "non-commercial distribution". That's presumably great news for hobbyists, but completely excludes some of Microsoft's most threatening potential competitors. We don't think that is what the European Commission and the European Court have in mind.

Regarding the commitment to "enhancing support for industry standards": Whose standards? For years now, Microsoft has either failed to implement or has actively corrupted a range of truly open

standards adopted and implemented by the rest of the industry. Unless and until that behaviour stops, today's words mean nothing." (<http://europa.eu>)

Given that Microsoft are trying to implement better interoperability, the public is still somewhat skeptical, but maybe when looking at the Kinect they see something which is more open than previously at Microsoft.

4.3 What is the Kinect

In 2001 Microsoft entered a new market previously unknown to them, the video console market which at the point was dominated by Nintendo. The Kinect or project Natal as it was initially called at the announcement the 1st of June 2009 at E3 in Los Angeles (IGN.com) is a add-on technology to the second generation of video consoles released by Microsoft, the Xbox360. The Kinect was marketed as a controller free experience which makes use of motion and voice control. Alex Kipman the Director of incubation at Microsoft was quoted saying that

“Computers, as a whole, are transitioning from this world where all of us had to understand technology, into this world where technology fundamentally understands us. But I see Kinect as the peak of that journey, of that transitioning moment, of the catalyst that brings us from this old world, to this new world that will be.”

(Alex Kipman, Nov 2012)

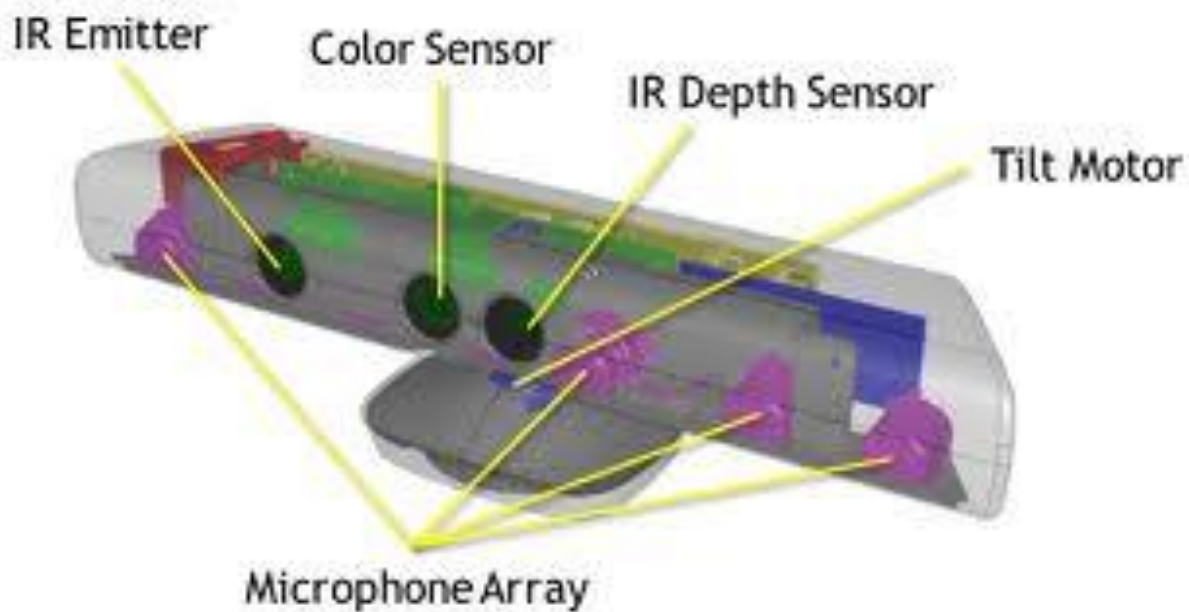


Exhibit 1: Illustration of the Kinect hardware sensor

The innovative pieces of the Kinect was twofold, first and foremost the mathematical algorithm in the software that could track human movement developed by Primesense and further developed by Microsoft was seen as a huge leap in human tracking as the algorithm could identify more moving points in the human body than anything seen before (www.csmonitor.com). Secondly maybe not so innovative but something that showed that the hardware technology inside the Kinect had matured was the price of the Kinect for the end consumers. As shown in *Exhibit 1* the Kinect contains three cameras which all have different functions, one depth seeing camera, one color identifying camera and one IR camera and also microphones to take in sound. Looking at all that hardware together with the development cost of the whole product, it is astonishing that Microsoft priced it so low, furthermore being able to price it to match consumers price level made it a good selling point to hobbyist to start to use the device as it was relatively cheap to purchase.

The strategy with the Kinect was to take a piece of the market from Nintendo's Wii which had created a market that previously was untapped. This market was characterized by "casual gamers".

The preference of a casual gamer is that the game is simple and does not require a learning curve and does not necessarily require saving. However this market have gone from a blue ocean to a red ocean with the introduction of smartphone's and all gaming consoles present in the market. In the smartphone gaming library there are many games that can be viewed as causal, for example angry birds or candy crush saga which is aimed at a very wide audience. The player should be able to pick up the game and play for a couple of minutes and not be forced to commit to the game in any way (Casual games Association, 2007). Another aim of the Kinect was to further enforce their gaming system as a social platform, involving the whole family instead of one person playing and the rest sitting and watching.

4.4 The release of the Kinect for Xbox360

The first commercial release of the Kinect took place November 4th 2010 in the US (gizmodo.com), Nov 10th in Europe (www.bbc.co.uk) and other major markets the 18th Nov 2010.

The technology in Kinect far superseded what was currently in the market and was seen as a huge step in home entertainment and interactive game play, the interest of this new technology can be reflected in the first 60 days of sales. In the first 60 days of Kinect's lifecycle it sold 8million units and got a space in Guinness world record as the fastest selling consumer electronic device ever (<http://www.guinnessworldrecords.com/>). The success of the Kinect continued and the sales grew steadily through 2012 which can be seen In *exhibit 2*. As of February 2013 Microsoft have sold 24million units of the Kinect device (bgr.com).

Xbox 360 System & Kinect Sensor Shipments



Exhibit 2: Kinect and Xbox360 hardware sales over time

4.5 The beginning of something special

Leaving the sales and the success of the Kinect device we move on to something quite interesting and crucial part of the Kinect story. In November 2010 the company AdaFruit industries set up a bounty challenge for programmers around the globe to create an open source driver for the Kinect in order to open up the Kinect technology so that everyone that wanted could benefit from the technology leap in their respective area of interest. This bounty was later found to originate from within Microsoft, by a programmer named Johnny Chung He disclosed this information on his blog and also why he initiated the bounty.

“I actually have a secret to share on this topic. Back in the late Summer of 2010, trying to argue for the most basic level of PC support for Kinect from within Microsoft, to my immense disappointment,

turned out to be really grinding against the corporate grain at the time (for many reasons I won't enumerate here). When my frustration peaked, I decided to approach AdaFruit to put on the Open Kinect contest..." (procrastineering.blogspot.se)

AdaFruit also confirmed that Johnny Chung was behind the bounty in their blog in Feb 2011 when Microsoft finally announced that they would release a SDK (software development kit) of their own to support the Kinect device outside of the Xbox360 (www.adafruit.com).

The solution came from a Spanish programmer that wrote code to make the Kinect connect with to a personal computer. The winner of the challenge and three thousand American dollars was Hector Martin from Spain (www.adafruit.com).

4.6 First statement from Microsoft when the Kinect was "hacked"

What can only be interpreted as a hostile response came initially from a spokesman at Microsoft.

"Microsoft does not condone the modification of its products ... With Kinect, Microsoft built in numerous hardware and software safeguards designed to reduce the chances of product tampering. Microsoft will continue to make advances in these types of safeguards and work closely with law enforcement and product safety groups to keep Kinect tamper-resistant" (news.cnet.com)

4.7 Second statement from Microsoft when the Kinect was "hacked"

Shortly after the first hostile statement a rephrased statement was released with a slightly more positive tone towards the Kinect "hack" completed by the Spanish programmer, it is a broadcast

from national public radio daily show science where Alex Kipman director of incubation for Xbox said the following

"Kinect was not actually hacked. Hacking would mean that someone got to our algorithms that sit inside of the Xbox and was able to actually use them. Which hasn't happened. Or, it means that you put a device between the sensor and the Xbox for means of cheating, which also has not happened. That's what we call hacking, and that's what we put a ton of work and effort in to make sure doesn't actually occur... What has happened is someone wrote a open source driver for PCs, which essentially opens the USB connection, which we didn't protect by design, and reads the inputs from the sensor."

(news.techeye.net)

Alex Kipman also stated that fans "hacking" Kinect would not lead to any legal action. On February 21st 2011 Todd Bishop a journalist from Techflash news service got an interview with Don Mattrick Microsoft's video-game chief about the first statement that came out from Microsoft after AdaFruit hack challenge, below is a excerpt of the interview.

"the initial reaction opposing the hacks was the result of a misunderstanding inside the company, which he corrected once he found out about it. The SDK was planned all along, he said. The company just needed to put a priority on shipping the device first."

(www.bizjournals.com)

The two statements have raised a lot of discussion around whether Microsoft really initially planned to give the community access to its software for further development or not. Through my interviews and also through developers forums where the discussions are running hot. The consensus is that the Kinect was developed for the use with Xbox360 and nothing else. Also that The functionality of the SDK for windows is a step in the right direction but Microsoft seems to lack vision of what the Kinect technology can do outside of the xbox360.

4.8 Kinect and OpenNI

During the time after release and the successful “hack” of the Kinect thousands of individual developers used the code to create their own projects and possibilities with the Kinect. The next block in the development came from the Israeli company Primesense, the partner and developer of the camera reference design used by Microsoft to create the Kinect. They decided that they would support the community and open up their own software which lead to the OpenNI movement with the aim of nonprofit development of the technology to foster innovation in natural user interfaces (NUI) technology (openkinect.org). The OpenNI SDK was the first robust open source SDK for the Kinect and Primesense own device Carmine. However as pointed out above it was a nonprofit initiative and the commercial applications were nonexistent but purely for researchers and hobbyist. The projects that came out from the individual developers and the OpenNI community was quite simple and ranged from making a bird open and close its mouth on screen steered by a hand, to rendering a star wars light saber in the hands of the person in front of the Kinect on screen or rendering the person in front of the Kinect to master chief (video game title Halo's lead character) on the screen. The look of the projects could be called simple as they were experimenting with what the Kinect could do. (www.wired.com).

This step from Primesense along with the “Hacks” triggered Microsoft to think of the possibilities of the Kinect having a commercial application. Microsoft announced in February 2011 the release of their own SDK for the Kinect working on PC with windows installed during a session with journalist at Microsoft Redmond campus Don Mattrick, Microsoft's video-game chief announced the plans for Microsoft to release its own SDK (Software Development Kit) for PC users (www.bizjournals.com).

4.9 The beta version SDK and Code camp

The SDK was released in June 2011 and was a beta version with a noncommercial user agreement along with the promise that a commercial version would come next. The definition of a beta version or beta test according to webopedia

“A test for a computer product prior to commercial release. Beta testing is the last stage of testing, and normally can involve sending the product to beta test sites outside the company for real-world exposure or offering the product for a free trial download over the Internet. “

(www.webopedia.com)

The release of the beta SDK triggered a spread of the development of Kinect applications for windows also into the corporate sphere and windows stated that more than 300 companies were working on Kinect applications after the release of the beta SDK (www.cnet.com), with the improved development kit more individual developers also joined the fray. During the time between the beta release and the commercial release of version 1.0 Microsoft together with both 3rd party

developers and corporate developers started to improve the interface as well as compatibility and development applications contained in the SDK both using Microsoft official developers forum and OpenNI and a loosely set knowledge transfer loop began. Microsoft invited developers to a competition named “Code camp” where the participants had 24 hours to develop programs for the Kinect using the beta SDK, Microsoft had invited people that had different skill sets and backgrounds. Spanning from tech universities in the educational field, to the founder of the open community OpenNI Joshua Blake (openkinect.org), they also invited two persons that previously had never coded software on windows machines before and they managed to learn the coding language and develop a simple pong game within 24hours. At the end of the “Code camp” the results were published at the release conference of the beta SDK (blogs.technet.com). As previously mentioned this was an un-commercial release of the SDK and in order to download and use the beta SDK there was a requirement to accept a user agreement which is stated in *exhibit 3* below which is an exempt from the user agreement from the Microsoft homepage.

The legal rights in the Beta version

- e. access or use, or attempt to access or use, features of the Kinect device that are not exposed or enabled by the Software;
- f. reverse engineer, decompile, or disassemble any part of the Software not provided in source code form, except and only to the extent that applicable law expressly permits, despite this limitation;

By downloading, installing, accessing, or using the software, you accept all terms in this EULA. If you do not accept them, you have no right to download, install, access, or use the software.

1. RIGHTS. The software is licensed, not sold. You may distribute and use the software, in source and binary forms, with or without modification, but only if the following conditions are met:
 - a. Distributions of source code must retain the above copyright notice, this list of conditions and the disclaimer below;
 - b. Distributions in binary form must reproduce the above copyright notice, this list of conditions and the disclaimer below in the documentation or other materials provided with the distribution;
 - c. Neither the name of [Software Provider] nor the names of its licensors may be used to endorse or promote products derived from this software without specific prior written permission;
 - d. The software may not be used or run on any software platform other than Microsoft Windows;
 - e. The software may not be used for any commercial purpose;
 - f. If you provide feedback, input, or suggestions ("Feedback") on the software, you grant to [Software Provider] and its licensors, under all intellectual property rights, the right to make, use, modify, distribute, and otherwise commercialize your Feedback in any way and for any purpose; and
 - g. You may not do anything with or to the software in any way that would subject it to the terms of an Excluded License. An Excluded License is a license that requires, as a condition of use, modification, or distribution of code subject to that license, that: (i) the code be disclosed or distributed in source code form; or (ii) others have the right to modify the code. "

Exhibit 3; Exempt from Microsoft user agreement Kinect for windows beta SDK

Spelled out in the document there are several clauses that prevent developers to really experiment with the technology and use it in commercial purposes. This of course made the later release of the commercial SDK a big leap forward in terms of usability and development possibilities, as many of the initial bugs and flaws were fixed during the beta phase.

After the 1.0 version release Microsoft have released 1.5, 1.6, and 1.7 in the old generation of Kinect, all of them improvements to possibilities and removal of bugs and updated usability and application packages provided by feedback from the community (www.microsoft.com). Internally Microsoft worked hard to improved the software working to translate the gestures and sounds that the consumers were doing into rendered movement on the screen. In October 2012 Microsoft started to visit the homes of Microsoft employees that had signed up for participation of tests to improve the software. Three times a day a team of three visited homes and performed software tests, in June 2014 they have made more than 1000 visits to collect data requested by the developers on facial recognition, color calibration, expressions, controllers, gestures, speech etc (www.microsoft.com).

One especially big change requested was done in the 1.5 version when for the first time the Microsoft SDK and the OpenNI drivers could be used at the same time but it was not Microsoft that made it happen, but actually OpenNI updated their own SDK drivers to be compatible with the Windows SDK, meaning that you could develop an application using both SDK's tools (channel9.msdn.com). The projects with the Kinect for Windows grew in numbers and complexity with the commercial release and further more with every update of SDK versions due to that the developers were given more room to innovate.

Phillip Torrone from AdaFruit commented on the change in Microsoft tune and the SDK release in an interview with Tim Carmody from Wired in January 2012.

“It was the hackers and gamers, the designers and artists, the doctors and scientists who opened up the device's possibilities. That was the revolution. Microsoft only ratified it, to claim it as their own.” (arstechnica.com)

Comparing the OpenNI and the “hacked” projects with the beta stage projects there was a big leap in what could be done, of course greatly helped with the new applications available with the Microsoft SDK. Looking at what the developers did in the “code camp” they had moved beyond rendering master chief and was now using the Kinect for quadcopters to recognize the environment they were in by rendering their surroundings in 3d (www.youtube.com).

Looking at the commercial release projects, there is an even bigger change. For example the quadcopter project was developed further with the identifying objects in its surroundings opposed to just knowing there was an object, the application is somewhat scary if you think about it (www.youtube.com). Other projects looked at the fashion industry where you could render a clothing object on your body instead of going into the dressing room and trying it on (www.youtube.com).

4.10 Microsoft view on the Kinect

With the “hacked” Kinect and Primsense's OpenNI SDK Microsoft almost lost control over the device, with the release of their own SDK, the competitions and the marketing, Microsoft have turned it around and retaken the control. However it is a very long step from what Microsoft is doing, they are a software company, which now turned hardware company and giving the software

away for free. However advanced the projects coming out with the Kinect is, there is still a reluctance from Microsoft in a corporate sense. Microsoft has not once in its annual reports mentioned Kinect for windows but has consistently referred to it as Kinect for xbox360 when mentioning the product (Microsoft annual report, 2011, 2012, 2013). Furthermore even though they have not mentioned the Kinect for windows in their annual reports, they have frequently talked about it during press conferences (www.businessinsider.com) which shows some kind of commitment.

As mentioned above Microsoft has longed tried to transform their company into a more entrepreneur friendly environment, and in the next section are some of the actions Microsoft has taken to integrate the company with entrepreneurs.

4.11 Innovation with entrepreneurs in Microsoft

4.11.1 Microsoft Emerging Business Team

in 1999 a team was formed at Microsoft to partner with start-ups and work with venture capitalist to foster innovation and grow and nurture software ecosystems. As a second step in their long term strategy towards more interoperability the Microsoft Emerging Business Team created “Microsoft start-up accelerator program“ in October 2007. The accelerator program is a partnership between Microsoft Bizspark and the seed investor firm Techstars and gives high potential software start-ups access to guidance and Microsoft's platform technology. This program is now among other endeavors a channel for Kinect for Windows based start-up companies.

4.11.2 Bizspark

Bizspark was created in November 2008 and is a program that any company can join as long as they fulfill the three requirements; Be a privately owned software development company, less than five years old and generate below one million dollars in revenue annually. The program gives the participants free access to Microsoft development tools, marketing visibility and access to the Bizspark ecosystem (www.microsoft.com).

4.11.3 Microsoft Accelerator program

Together with the commercial releases of the SDK Microsoft kicked off the accelerator program for Kinect based companies as a venture to further push the ecosystem (www.microsoft.com). The companies selected into the accelerator program were granted \$20,000 in funding from Techstars along with free hosting and services. They also have the benefits of mentorships from senior employees at Microsoft along with the opportunity to pitch to angel investors, venture capitalist when they present their applications at the end of the program that stretches for three intense months. However there is no such thing as a free lunch and Techstars the co creators of the accelerator program receives 6% equity in the form of common stock. This form of stock will not give them voting rights or board seats but still a ownership of the company.

The creation of Entrepreneurial programs specifically directed towards Kinect at Microsoft is according to Craig Eisler the general Manager for Kinect for Windows a strategy to push the Kinect further into previously untapped markets and industries for the Kinect technology.

“We wanted to put some topspin on the entrepreneurial energy we’ve seen since the launch of Kinect for Windows. This was a way for us to help young companies push the envelope faster.”

(www.microsoft.com)

4.12 Inside view on the Kinect development from Ubi and Jintronix

To understand the impact and the importance of the Kinect technology into non related industries as well as getting a glimpse on the inside of the Kinect ecosystem and its development, interviews with two of the companies that attended Microsoft's accelerator program were conducted.

These companies were selected because of their breadth of the market and their different stories on how they came to be, Ubi Interactive and Jintronix.

Jintronix are operating in the medical rehabilitation industry and using the Kinect to enhance physical rehabilitation, where the patient does not need to be at a hospital or rehabilitation center but can perform their exercises anywhere with a TV and the Kinect (www.jintronix.com/).

Ubi Interactive are in the business and communication industry using the Kinect to turn any surface into a touch screen, an example could be a business presentation where the presenter wants it to be interactive and use hands and arm movements to switch pictures or zoom in or zoom out or click links by touching the wall where the picture is projected, and this could be on the wall of a build site to show off the plans or schematics of the building as long as you have some electricity, a pocket projector and the Kinect (www.ubi-interactive.com).

4.12.1 Jintronix Interview

Dan Schacter the CEO and CO-founder of Jintronix explains the reaction from one of their customers in the medical industry when they first come in contact with their product, they explained it as the "Jetsons come alive", with that they meant it is technology that they don't see two three years into the future but decades in the future and had no idea it existed (Interview Dan Schacter, 2014). Jintronix were already internally building a similar technology to the Kinect in 2010, which used a glove and two cameras. However early in 2011 they were approached by Microsoft that told them about the Kinect technology and wanted them to apply for the accelerator program, Microsoft specifically wanted to apply the Kinect technology to the medical field but according to Dan they did not know what it would look like, and looking at the participants in the program Jintronix was alone from the medical industry with 500 applicants for the program (Dan Schacter, Interview, 2014). What made Jintronix to chose the Kinect as their go to technology instead of the competitor was according to Dan business security, Microsoft had the capital the hardware and the backing to make them choose the Kinect as their go to hardware. Talking about the support that Microsoft has given them Dan says that they are satisfied and think they have gained a lot from being partners with Microsoft, mainly from a brand awareness perspective. However according to Dan Ubi are the only company that has truly commercialized the Kinect device with sales of \$250k in 2013, and Dan believes that until the partner companies are starting to show greater sales, Microsoft will not treat the technology as more than a side project or a toy (Dan Schacter, Interview, 2014). Following up on that notion Dan was asked to evaluate their partnership in terms of how effective and fast moving Microsoft has been, he states "so and so" basically explaining that one of the problems with Microsoft is their size, they have several divisions and they often does not know what goes on in the other divisions. Looking at the future they are not bound by Microsoft and Dan says that optional

technology are surfacing, both with Primesense being bought by Apple with the possibilities for NUI pre installed in a TV and other affordable hardware.

Dan was also asked to comment on the two statements from Microsoft, the first condemning “hacking” and the second encouraging it. Dan’s Hypothesis was that Because of the size of Microsoft and the different departments are not internally communicating with each other, for example Kinect for Xbox and Kinect for Windows are two completely separate entities at Microsoft. The statements could have come from different departments that had different visions of what the Kinect should be. The second part of Dan’s hypotheses are looking more on the origin of Microsoft being in general very closed minded, but he thinks they are starting to learn that open source might actually be a more fruitful endeavor (Dan Schacter, Interview, 2014).

4.12.2 Ubi Interactive interview

Anup Chathoth the CEO and CO-Founder of Ubi Interactive explains their history with the Kinect and Microsoft. Opposed to Jintronix Ubi was not approached by Microsoft but applied among the other 500 applicants for the Accelerator program. They first came in contact with the Kinect at the university research facility three months after the Kinect for Xbox was released, in that period the researchers used the hacked code and the OpenNI SDK to play around with the technology.

However when asked the question when they decided to start a business around their project with the Kinect Anup says that it was first when Microsoft released the official SDK. He further explains that they did not use the Beta SDK when it was first released as it did not offer the applications or the user friendliness they needed so they instead they used the OpenNI to work on their project to prepare when Microsoft eventually offered the same applications with the commercial SDK. When they joined the accelerator program it was the first time they started to bridge their project based on the OpenNI SDK with the Microsoft SDK. The reason Ubi chose Kinect as their technology was the

notion that they wanted the technology they used to be around for enough time that they can capitalize on it. The choices they had in terms of hardware was either the Kinect or Primesense own hardware Carmine, simple because they needed it to support many languages and be easy to purchase in as many countries as possible and with that requirement it left them with those two choices. Anup's view of the partnership with Microsoft is in general good, he liked that they are giving the partners a very good brand platform for their marketing and brand awareness as well as getting support in sales, also from a technical point of view they get early access to all new SDK versions and new hardware. The development of Kinect for windows is according to Anup lacking in vision, they are taking the first steps to open up but they have a long way to go to get closer to companies like Google, a general consumer have no interest in buying a Kinect from the shelf as there are no application they easily can use without programming knowledge. For the future Anup think that Microsoft needs to upgrade their hardware making it better in order to further build the ecosystem around NUI, because in their point of view Kinect could be so much better in terms of technology but they are the only ones out there that is affordable and working. However he does not think that Microsoft will build something outside of Xbox, the Kinect is first and foremost going to be an Xbox device and not self sustaining (Anup Chathoth, interview, 2014).

4.13 Other Kinect partner programs

Microsoft is not only having the competition were only eleven companies could participate they have more initiatives. For example Microsoft long standing cooperation with universities have a separate development initiative with the Kinect. Microsoft Education which is a pillar at Microsoft are partnering with an initiative called Kinect education which supports projects that aims at helping and developing educational tools using the Kinect (www.kinecteducation.com).

Aside for the Educational program, Microsoft now also have a Kinect for windows partner network that specializes in developing applications for the Kinect. Basically if a person have an idea they want to bring to life they could contact one of Microsoft partners that suits their needs in terms of Industry or specialty and regions served. There are at the moment 22 partner firms that can develop applications for the Kinect for Windows (www.microsoft.com).

5. ANALYSIS

In this chapter, theory and empirical data will be combined to analyze the Kinect lifecycle and the part Microsoft has played if any to the development of Kinect's own ecosystem in non related industries. To understand the dynamics and the changes of behavior of the actors in the Kinect's life cycle the empirical data has been divided into three stages, and each stage will be analyzed using Gassmann & Enkel's (2004) open innovation process archetypes and Diener & Piller's (2010) three methods of practice respectively. This is done to measure more clearly if application of open innovation principles has affected the evolvement of a Kinect ecosystem and the expansion into non related industries and if and how according to the theory there is any support that Microsoft has been involved in driving this change through applying open innovation principles.

5.1 The different stages

5.1.1 Stage One; Launch of the Kinect for Xbox360

This stage is confined between the initial release of the Kinect by Microsoft to the release of the first beta SDK which stretches from Nov 2010 - June 2011. The market dynamic is constituted by a few thousand projects coming from hobbyist and lead users and to some extent educational institutions using the “hacked” Kinect code from the AdaFruit competition and also the OpenNI SDK from Primesense.

5.1.2 Stage Two; Release of un-commercial beta SDK for windows by Microsoft

This stage is confined between the release of the beta SDK for Kinect by Microsoft and the commercial release of version one of the SDK by Microsoft which stretches from June 2011 - Feb 2012. In this stage the dynamic of the Kinect market changes dramatically with a steep increase in the number of projects and the involvement of corporate firms and more research institutions. Which marks a change from non commercial development for fun into more testing of boundaries and the technology to help development towards a commercial release of the SDK. In this stage Microsoft really are getting into the game and are also attracting individual developers from the OpenNI community as the SDK is easier to use as a development tool than the hacked version.

5.1.3 Stage Three; The Commercial release of Kinect SDK for windows by Microsoft

This is the last stage in the lifecycle that I find relevant for the analysis and it stretches from the commercial release of the SDK in Feb 2012 to Nov 2013 with the release of the next generation console and Kinect 2 which is not covered in this thesis. The dynamics of the Kinect development market are further developed by Microsoft in the third stage by involving their entrepreneurial internal support to help push the non related market. The nonprofit Kinect SDK from OpenNI are updated so that it work with Microsoft's official SDK making it possible for developers to use both in the creation of applications, which is greatly appreciated by the community and pushes boundaries in the development possibilities. Now real companies with viable business ideas around the applications with the use of the Kinect are starting to grow.

5.2 Application of theory to the three stages

The analysis will begin with analyzing the three stages based on the process theory by Gassman & Enkel (2004) and secondly analyzed based on working methods in open innovation by Diener & Piller (2010) applied to the three stages. This is done to give the reader a compressible picture of the development of each of the theories over the stages, instead of applying all theory directly to each stage.

5.2.1 Three archetypes processes of open innovation applied to the three stages

First stage; Launch of the Kinect for xbox360 The initial release of Kinect were a highly anticipated release both from the gaming community and the rest of the technology early adopters.

5.2.1.1 Outside-in/Inbound open innovation, first stage

The process of outside-in/inbound open innovation is focused on the external knowledge flowing into the focal firm. Looking at the market at the release date the product was highly anticipated both from the gaming community and the technology driven early adopters. The early “hacking” of the product and Microsoft's initial response showed that Microsoft was not ready to accept the users as innovators, but as Pralahad & Ramaswamy, 2000 so simple puts it, “*Consumers can now initiate the dialogue; they have moved out of the audience and into the stage*”. The community with the lead users in front took charge over the direction and the boundaries of the Kinect, Microsoft stumbled at first but quite fast released a second statement stating that “hacking” the Kinect would not lead to any legal action. However they did not support the community in the first stage but merely watched what the users came up with, and probably absorbing knowledge themselves on

what the lead users and early adopters did with the product. But there is no indication that they used any of the “hacked” code to start and prepare for the second stage; the release of their own SDK.

5.2.1.2 Inside-out/Outbound open innovation, first stage

The process of inside-out/outbound open innovation are opposed to outside in focused on the internal knowledge flowing outside the focal company. In the first stage there were no intentional knowledge flowing outside of the company to support the independent developers, they mainly worked as bystanders and watched the independent community with interest.

5.2.1.3 Coupled process, first stage

In the first stage of the Kinect product life cycle there were no coupled process as Microsoft did not intentionally transfer any knowledge outside of the company and did not officially transfer any knowledge into the firm either and they did not create any partnerships with any developers.

Second Stage: Release of un-commercial beta SDK for windows by Microsoft, The second stage of the Kinect life cycle starts from the release of an un-commercial beta version of the SDK from Microsoft.

5.2.1.4 Outside-in/Inbound open innovation, second stage

In the second stage of the Kinect life cycle Microsoft changed its tune, with the release of the beta version of their SDK, they seriously started to support the community in the development of new ways to use the Kinect technology. In this stage Microsoft started to work closely with both the individual developers also known as the lead users. Furthermore with an SDK, companies started to show interest in the technology with the promise from Microsoft that a commercial version of the

SDK would be released in the future, companies had incentives for experimenting with the technology. Therefore in the second stage Microsoft can be viewed as partly using outside-in/Inbound open innovation as they started to work collectively with customers. Furthermore as the Legal agreement states they only have access to sample code of which if altered and published can be used by Microsoft in the way they see fit. However they are not completely open and the license agreement that everybody needs to agree to when downloading the Beta SDK it states that it is not permitted to access or use any features of the Kinect that is not enabled by the software, which leaves users limited to the sample code. It is also not permitted to reverse engineer, decompile or disassemble any part of the software or the source code. Microsoft therefore only gives the community a pieces of the pie, but moves more closely to using outside-in/inbound open innovation with the release of the beta SDK and are now at least working together with the community to improve the SDK for future releases.

5.2.1.5 Inside-out/Outbound open innovation, second stage

Inside-out/Outbound open innovation in the second stage is also a step forward for Microsoft towards a more open innovation approach. However not yet as a commercial rent creating strategy but surely in preparation for it. The license agreement that users agree to when downloading the SDK states that users are not obligated to send feedback or altered sample code to Microsoft but if they do, Microsoft holds the rights to redistribute it to their partners and third-party entities. Even though users of the SDK are not obligated to send in altered sample code, in the same sense as the Kinect was “hacked” in the first place and the code shared across the OpenNI community the likelihood that users publish their sample code is quite large as well as giving suggestions to Microsoft support team of new features or changes in the interface to allow for a easier and more effective software development tool, Microsoft enjoyed both greater flexibility and lower costs of

the development of the Beta SDK through the feedback option which in essence is the value of a Beta test.

5.2.1.6 Coupled process, second stage

Microsoft is starting to move towards a coupled process with more and more entities, firms, research institutions, universities and individual developers embracing the SDK to drive development of new innovations with the Kinect, and cooperation with Microsoft for the greater good of the community and the core technology. As Microsoft is collecting results of the external knowledge to improve their SDK the external entities are absorbing the knowledge distributed by Microsoft and develops it further by publishing results, the result is that the codification are becoming more and more homogeneous as it stems from the original developer source code even though it is used and further developed by external entities that stems from several completely different industries.

Third Stage: Commercial release of Kinect SDK for windows by Microsoft, The third and last stage that will be covered of the Kinect life cycle starts from the release of the commercial version of the SDK from Microsoft.

5.2.1.7 Outside-in/Inbound open innovation, third stage

In the final stage of the Kinect life cycle there is a noticeable difference to the way Microsoft is interacting with the community. They are absorbing the work that the external developers have done and are transforming it into a marketing campaign of the boundless possibilities of the Kinect technology. During this life cycle they release several updates to the SDK from the 1.0 release following the beta phase in stage two, this is an indication that they listens to the communities

wishes of features and capabilities as well as interface they want with the SDK for Kinect. This shows that Microsoft are able to codify that knowledge internally and turn it around in an update that support the community wishes in an updated version. However there are no indication that Microsoft themselves make use of the outside knowledge to create their own innovations with the Kinect device. Hence even if the capability to develop something of their own for a non related industry exists there is no proof that this is actually happening.

5.2.1.8 Inside-out/Outbound open innovation, third stage

In the third stage Microsoft really accelerated their internal clock and moved forward on several fronts. With the introduction of the marketing video “The Kinect effect” to spread awareness of the Kinect device possibilities with the use of already created projects during the second stage of the life cycle. Furthermore the use of internal knowledge lead to the creation of the accelerator program for innovative Kinect start-ups to foster “The Kinect effect“. By licensing the use of the SDK for commercial purposes Microsoft enjoyed rents by helping and supporting external start-ups with their development into a business using the Kinect device. When external companies develop software applications that use the Kinect device their customers need to acquire a Kinect device to make use of the applications. Hence Microsoft enjoyed rents by selling Kinect devices not for the purpose of use with the xbox360. Instead with non related industries such as the medical industry and Robotic hardware industry and even the fashion industry through their development partners.

5.2.1.9 Coupled process, third stage

Looking at both inside and outside flows of knowledge both existed in the third stage, where Microsoft both developed their SDK with several new versions of the software with the help of the external developers input. The aim of developers and Microsoft is to increase the market for Kinect

for windows and they are doing a lot to achieve this. Both in terms of marketing where Microsoft had a Youtube video that went viral, secondly the accelerator program that Microsoft created to help start-ups using the Kinect as a product, and to find funding and mentorships to push the development into a more mature stage, the developers were also granted access to Microsoft vast network of partners and the Microsoft brand. In the last stage of the Kinect life cycle it is clear that Microsoft had developed a coupled process for the development of the Kinect for windows, as the requirements for a coupled process according to Gassman & Enkel; the firms *outside-in* and *inside-out* processes are connected in a strategic network or cooperation's between specific partners (other firms, Universities, research institutions) where the goal becomes a continuous exchange and development of knowledge based on a learning process that benefits both parties with an improved market position, increased competitive advantage and a sharing of the risks. The theory also points out that the goals for most firms that focuses on a coupled process are to establish standards or a dominant construction for their products or services (Gassmann & Enkel, 2004).

5.2.2 The Three methods of practice applied to the three stages

5.2.2.1 Using lead users, first stage

The first method according to Diener & Piller (2010) is to make use of lead users. In the case of Microsoft Kinect and the first stage of the product life cycle Microsoft did not make any official use of the lead users, they even threatened the lead users of legal actions if they tampered with the original idea of the Kinect (first statement), however they quickly withdrew the threats and told the community to do what they wanted and that Microsoft would not pursue them legally (Second statement). The lead users then created several projects with the Kinect during the first cycle and

Microsoft did not take any actions towards either integration or the set-up of workshops for the users “hacking” the Kinect and creating their own projects.

5.2.2.2 Using a toolbox, first stage

The second Method that Diener & Piller presents is characterized as a tool box and involves five elements to foster open innovation, the first one is Trial & Error in the development phase, in the instance of the “hacking” Microsoft did not support Trial & Error behavior or any development of the Kinect device technology. After Microsoft withdrew the first statement and issued the second one they allowed individual developers Trial & Error behavior with the unsupported code created by Hector Martin, no actions were taken from Microsoft side to help or foster the Trial & Error. The second element of the toolbox method is a solution space, Microsoft did not produce a solution space for the individual developers that they could work in. However indirectly by not pursuing the "hackers" using legal means they let them create their own solution space. The third element is user friendliness, as Microsoft did not support the individual developer in their undertakings they did not develop anything to increase usability in their application development. The fourth element, modules and component library was not developed from Microsoft side in the first stage of the Kinect life cycle. The fifth element, transferring customer solutions can be subject to discussion, as Microsoft officially did not support the individual developer they did not hinder them either, which can be interpreted as they watch the developers findings in the unsupported code, as the code was developed externally it was not transferable directly to Microsoft without extra codification by Microsoft employees.

5.2.2.3 Using broadcast search and community competitions, first stage

The third Method involves broadcast search and community competitions to develop new innovations, Microsoft was not involved or supported any competitions or broadcast searches involving the development of applications for the Kinect device outside of specific use with the Xbox360. This was instead done by external actor Adafruit of which Microsoft was not related to.

5.2.2.4 Using Lead users, second stage

Second Stage: Release of un-commercial beta SDK for windows by Microsoft. In the second stage of the Kinect life cycle Microsoft took a different tune, with the release of their beta SDK they used the first method by inviting lead users to innovate using their beta SDK, Microsoft did not integrate lead users into the company, but they made use of the second method of lead users, inviting them to a developer workshop which they dubbed “code camp” and let the developers work freely with the beta SDK for 24 hours to see what they could come up with and also test the SDK.

5.2.2.5 Using a toolbox, second stage

The toolbox method proposed by Diener & Piller 2010, applied to the second stage of the Kinect lifecycle offers some analysis in the different elements. Trial & Error learning, this element in terms of what Microsoft did was more reversed, where the users showed Microsoft what they could do with the SDK instead of Microsoft giving the users feedback as proposed by Diener & Piller 2010, the definition of beta test describes the users as the ones giving feedback in order for the issuer of the test to develop the software further. The second element, solution space were also more specified in the beta stage, the developers were confined to a relatively small solution space with the beta SDK giving them access to set applications like skeleton tracking, whereas a large solution

space would be modular kit for the hardware or even access to the source code of the platform software. The third element, user friendliness can also be seen as one of the aims of the beta test to first internally develop a SDK to then test it with users before commercial release to make sure it measure up to the expectations of the “consumers”. The fourth element, Modules and component library were also available in the beta test with the set applications available for development, however the beta test was limited in the sense of modules and components but they existed and could be requested during the test as a future update of the SDK. The fifth element, transferring customer solutions was also developed as the SDK was built by Microsoft in coding languages that was know by internal Microsoft employees for ease of codification and update of the SDK.

5.2.2.6 Using broadcast search and community competitions, second stage

The third method of creating community competitions and broadcast searches fits well with what Microsoft did in the second stage. With the invitation of developers to the “code camp” Microsoft invited people with a wide variety of skill sets to test the beta SDK, They had developers from several tech universities, the founder of the OpenNI community that drove the first stage development with the “hacked” coding. They also invited people with no previous coding experience with windows to test the usability and learning curve needed to use the SDK. Looking at the eight parts that should be satisfied to have an effective competition Microsoft fulfilled most of them. Microsoft themselves organized it at the Microsoft HQ, The focus was to test the limits and the possibilities of the beta SDK and also use the results in the release conference of the beta SDK, the target group were both the developer community (Lead users), educational institutions, and software developers not previously using the windows coding language. As Microsoft performed the coding camp at the Microsoft HQ they had internal staff monitoring the progress to transfer knowledge, the time horizon was set to 24 hours, as it was more a challenge than a competition

there were no judges but the results was posted on Youtube for global access, the rewards were the visibility by doing something for Microsoft and the press coverage was quite substantial.

5.2.2.7 Using Lead users, third stage

Third Stage: Commercial release of Kinect SDK for windows by Microsoft The first method of using lead users in the last stage of the Kinect life cycle is an evolvement of the second stage where they were used in the beta stage, in the commercial release of the SDK Microsoft were further developing the cooperation with independent communities like OpenNI and Openkinect, they also started to integrate lead users into the firm by creating partnerships with start-up developers from other industries that wanted to use the technology Kinect could offer them. In that way Microsoft could drive the innovation with lead users working closely linked with the internal development team to come up with new applications for the Kinect device in non related industries. Jintronic is a good example of a company that already before were lead users in 3d depth sensing within the medical field that Microsoft integrated into the Kinect ecosystem.

5.2.2.8 Using a toolbox, third stage

The toolbox approach in the third stage with trial & error was a more mature and evolved element with updates to the commercial SDK continuously as new requests came up from the users. Every new version of the SDK offered a wider solution space for the users to work with giving them more functionality and user friendliness. The modules and components was also present in the third stage with the SDK and was also developed further as the SDK was released in more countries the software supported more language settings. Transferring software solutions was standardized in the commercial SDK so only windows coding language could be used to create applications so the ease for internal Microsoft employees to implement the requested changes was made easier. However as

the partnership was set up, Microsoft did not own any of the created software but instead gave the developers internal software support.

5.2.2.9 Using broadcast search and community competitions, third stage

The integration of users using the competition and broadcast search method was used sporadically in the third stage of the Kinect life cycle. It left Microsoft hands after the initial accelerator program, and moved into the hands of Microsoft Kinect partners. One example is the Kinect education initiative that was a partner with Microsoft learning, and they individually set up competitions to foster Kinect projects within the field of education. By outsourcing the competitions to their partners, Microsoft did not fulfill the eight requirements that this method requires to function effectively. They supported the initiative internally but made no contributions to foster them or develop them or make them more effective. However the theory also states that the innovation competitions are used mostly in the early stages of the innovation process (Diener & Piller,2010).

5. DISCUSSION

In this chapter of the study the findings of the analysis will be discussed, furthermore the implications of the findings based on the theoretical framework used to analyze the case company will be presented, and my research question will be answered

5.1 Presenting the findings

In the analysis three stages were identified as a mean to measure the development in the ecosystem of Kinect mainly from the point of the hardware device creator Microsoft. Two separate theories were used, one looking at processes needed to function effectively in the innovation process using open innovation, the second theory looked at methods of practice that should be used to actually function efficiently with users in a open innovation approach. As the thesis purpose was to investigate how *technology can advance non related industries through open innovation* there was a need for measuring the advancement, that is why the three stages were identified as they constitute different parts of the technology advancement. The findings of the different stages makes you question who really decides what a novel technology's main application is, the firm that creates the product or the users that takes it and develops it further, much as the windsurfing example.

Microsoft came out in the first stage with an amazing technology used together with a gaming platform Xbox360, the lead users took that technology and transformed it into something else.

The difference in the three stages are quite large considering Microsoft's involvement, moving from not involved at all to driving the development to gradually letting the development slide out to their partners.

5.1.1 First stage findings

The findings in the first stage shows that Microsoft released the product for a separate purpose and the community took control of the development outside its original sphere. In neither of the theories can I find any wide support that Microsoft is applying open innovation principles to drive the development and are at all involved with the users. They even tried to stop the “hacking” in the first phase but realized that this was not the way to go, when releasing the second statement Microsoft started something that most of us would not believe coming from Microsoft. The drive of the community and the creations they did was a spark that showed Microsoft that the technology could be so much more than just a gaming device, and I think thanks to Adafruit and secondly Primesense that Microsoft's senior leadership finally realized this. A second problem for Microsoft was that they did not know what they wanted to do with the Kinect outside of the Xbox which is supported by the interviews that Microsoft lacked focus.

Looking at the activities outside of Microsoft, and looking at what happened, apart for not being commercially viable, lead users used both the competition from AdaFruit to “hack” the Kinect and the toolkit from Primesense to be able to foster the user created innovation possible with the technology. As Microsoft is not known to give away their software for free it took them a while to realize that opening up was the best option for the development of the Kinect into non related industries and instead being able to create rents from the hardware sales. Unfortunately it took them six months to release a beta SDK and from the hardware release almost one and a half year until a commercial release aimed at windows users.

5.1.2 Second stage findings

In the second stage Microsoft released the beta SDK and in my view used the same strategy as AdaFruit and Primesense to attract users to their SDK only better and bigger, The difference being that Microsoft used their capability as a global company and as the owner of the product by promising a commercial release of their SDK so that developers could commercialize their projects which can be considered a great incentive to build a business around the product if an attractive enough application can be created. Microsoft built a strategy to grow the community, both using lead users and inviting them to code camps as well as supporting all the elements of the toolkit for effective open innovation, this also grew the community in a new way compared to the first stage as corporate developers started to invest time and capital into development of projects. By releasing the beta or internal knowledge to the community they showed that they supported the idea of finding out what the early projects in the first phase could actually be applied to commercially. By licensing their IP they applied an inside-out process, but only partly as the beta user agreement were quite limiting, also by having feedback loops from the community using the beta SDK they applied an outside-in process by collecting external knowledge to improve the software.

On the brink of the third stage Microsoft continued the commercial development by launching the accelerator program together with a venture capital firm to further grow the ecosystem. This is the point when Ubi interactive and Jintronix seriously started to look at the device for a commercial purpose, Jintronix moving away from their internally developed hardware and Ubi finding the support given by Microsoft and the reach as a deal closer for selecting Kinect as their commercial platform device. The ecosystem today is mostly owned and driven by Microsoft or their partners, as also pointed out by Dan and Anup when they decided on using Kinect instead of for example Primesense's own device you realize that the development of the ecosystem to the scale it is today

could never have happened without Microsoft as they owned the Kinect product and showed the world what the device could do through the interactive entertainment industry. But it was the lead users in other industries, the universities the researches that embraced the opportunity to create something other than games, they were the ones that initially created the ecosystem and the community which was later supported by Primesense OpenNI into a nonprofit organization to foster new ideas of what was possible with the Kinect. This creates the question who decides what a novel technology product is for, in the past it has been the firm that developed it, but I believe that it is changing.

5.1.3 Third stage findings

In the third stage Microsoft had developed most methods and elements needed for an effective open innovation model according to the theory I have used. However the applications of Kinect for windows have not yet really created any substantial rents for Microsoft. One reason could be that they have outsourced much of the methods at this point, as well as the SDK not being user friendly enough when looking at the mass market, that you need to have at least some coding background in order to create an application. This clearly shows us that developing applications for Kinect is not for the general mass market, but for professional coders or firm developers targeting industries rather than consumers.

5.2 Conclusion

My thesis departs on the quest to find what drives technology into non related industries through open innovation. The case study has shown support to the theory that lead users often are the ones innovating into a non related industry, furthermore in support of the theory they need a carrot or a reward scheme to get started in this case a monetary reward for innovating which is true in the AdaFruit competition. However as seen in the first phase the projects are not very advanced and are more showing the possibilities of the technology opposed to a clear use in a market. In order to further grow the development they need a firm that structures the development using toolkits, comparing the projects that was created in the first stage to the second and the third there is a big difference. A big contributor is the elements needed for an effective toolkit, once they are used and satisfied the results follows. Furthermore the use of different processes in different stages as shown in the analysis the ecosystem grew proportionally when Microsoft first nibbled on outside-in principles, and inside-out in the beta phase and lastly a fully developed coupled process in the commercial phase.

5.3 Final Point and future research

A final point is that the Kinect was never really accepted as a general consumer device outside of the gaming applications with the xbox360. Yet the application of the Kinect device are still widely used in research and now combined with other novel technology like VR (virtual reality), balance boards etc. Maybe Kinect was not a blockbuster in non related industries as it was with their home market with the xbox360 release, maybe it is just a step in the right direction and will pave the way for other technologies.

Future research could look at the release of the Kinect 2 for XboxOne that has not at all had the same sales in the first months, and also the windows version of the Kinect 2 again comes late after release to XboxOne, why has the interest gone down? Analyzing the market from a competitive view using porters five forces, did Microsoft miss the opportunity because they did not embrace the lead users at the time of release and then lost the first mover advantage because of new competition? There are several ways that future research can go, and I will look closely at the development of this technology as I truly believe it will be adopted into every home in 5-10 years time.

6. REFERENCES

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Dan Schacter the CEO and CO-founder of Jintronix, Interview performed: 02-24-2014, Skype name: Danschacter

6. APPENDIX

In this chapter the interview transcript is available

Interview transcript

1. What is your name
2. What is your background
3. When did you decided you wanted to be an entrepreneur?
4. Do you see yourself as a lead user in any area?
5. When did you first learn about the Kinect?
6. What channel did you learn it through?
7. What made you think about a possible business using the Kinect?
8. What was your first step to realizing your idea?
9. What made you pick Kinect instead of other 3d sensing technology?
10. How was the partner process with Microsoft?
11. How much support do you get from Microsoft?
12. Have Microsoft developed since you first started working with them?
13. How do you see the future for Kinect?
14. Apple buying Primesense how will that impact your company