

**MASTER**

**Evolution of the business model**

Leung, C.H.

*Award date:*  
2007

[Link to publication](#)

**Disclaimer**

This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain

Eindhoven, August 2007

**Evolution of the Business Model**

by

Ing. C.H. Leung

Master Thesis Innovation Management – TU/e (2007)  
Student identity number 0556712

in partial fulfilment of the requirements for the degree of

**Master of Science  
in Innovation Management**

Supervisors:

Dr. M.M.A.H. Cloudt, TU/e, OSM

Prof. Dr. W.P.M. Vanhaverbeke, TU/e, OSM

TUE. Department Technology Management.  
Series Master Theses Innovation Management, nr.8

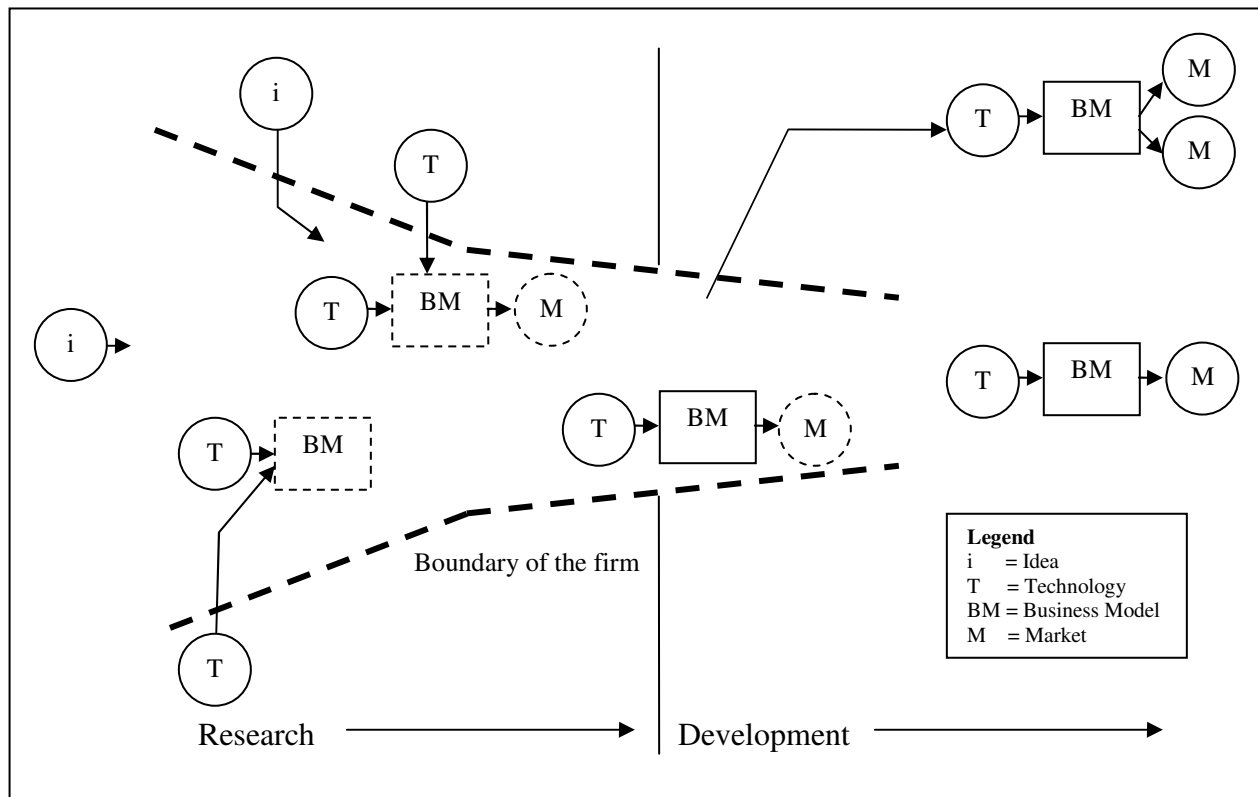
ARW 2007 IMA (8)

Subject headings: innovation : master theses / electronics; innovation / business management :  
master theses / business strategy / modelling

Master Thesis

OPEN INNOVATION + BUSINESS MODELS = OPEN BUSINESS MODELS

BUSINESS MODELING FROM CORPORATE LEVEL PERSPECTIVE



Master Program:

Author:

Student Id:

1<sup>st</sup> Supervisor TU/e:

2<sup>nd</sup> Supervisor TU/e:

Superior Philips 3D Solutions:

Mentor Philips 3D Solutions:

Date:

Innovation Management

Ing. C.H. Leung

0556712

Dr. M.M.A.H. Cloudt

Prof. Dr. W.P.M. Vanhaverbeke

Ir. P.J.L.A. Swillens

Ir. J.H. Angenent

August 2007

## Preface

This Master thesis is the result of the graduation project at the technology incubator venture Philips 3D Solutions of Royal Philips Electronics in the Netherlands.

The graduation project is part of the study Master of Innovation Management. The research was conducted at the Organization Science and Marketing group within the Technology Management Department of Eindhoven University of Technology.

I was supervised by Dr. M.M.A.H. Cloudt (1<sup>st</sup> supervisor) and Prof. Dr. W.P.M. Vanhaverbeke (2<sup>nd</sup> supervisor) during my master thesis preparation and master thesis project. I would like to use this opportunity to thank them for all their help and support with my master thesis project. I owe much gratitude to both of them.

Furthermore, I am greatly indebted to my mentor Ir. J.H. Angenent and my superior Ir. P.J.L.A. Swillens from Philips 3D Solutions for giving me the opportunity to conduct my master thesis project and for supporting and advising me. I would also like to thank Erik van der Tol, Rob de Vogel, Wessel Koning, Maarten Tobias, Miranda van de Pol, Maurice van der Pot, and Oscar Smits for their direct and indirect contribution to my master thesis. Furthermore, I would like to thank Patric Theune, Maurice van der Pot and all other Battlefield 2 players for all the fun after work.

Last but not least, my thank goes to my girlfriend Jen Nee Wong. I wouldn't be able to write this piece of text without her support in all these years. She has helped me in realizing this dream of mine. Another person that I would like to thank is my brother Tommy Leung for believing in me supporting me. Finally, I would like to thank my friends, family and my girlfriend's family for all their love and support.

As promised, this thesis is dedicated in memory of my mother Cheung Hau Wah...

Chun Hoe Leung  
Eindhoven, August 2007

# Table of Contents

<b>EXECUTIVE SUMMARY</b>	<b>7</b>
<hr/>	
<b>1. INTRODUCTION</b>	<b>10</b>
<hr/>	
<b>2. LITERATURE REVIEW</b>	<b>14</b>
<hr/>	
2.1 OPEN INNOVATION	14
2.2 BUSINESS MODELS	15
2.2.1 DEFINITION OF BUSINESS MODELS	15
2.2.2 GOAL OF A BUSINESS MODEL	18
2.2.3 TYPES OF BUSINESS MODELS	18
2.2.4 DOMAINS OF A BUSINESS MODEL	19
2.2.5 BUSINESS MODEL AND ENVIRONMENT	25
2.2.6 DESIGN METHOD FOR BUSINESS MODELS	25
2.2.7 FUSION OF CLOSED OR OPEN INNOVATION WITH BUSINESS MODELS	33
2.2.8 BUSINESS MODEL EVOLUTION	36
2.2.9 BUSINESS MODEL CHAINS	39
2.2.10 BUSINESS MODEL NETWORK	41
2.2.11 CONCLUSION	41
<hr/>	
<b>3. RESEARCH METHODOLOGY</b>	<b>42</b>
<hr/>	
<b>4. CASE STUDY</b>	<b>45</b>
<hr/>	
4.1 INTRODUCTION OF THE CASE	45
4.1.1 PHILIPS	45
4.1.1 PHILIPS 3D SOLUTIONS	45
<hr/>	
<b>5. CONCLUSION, DISCUSSION, AND RECOMMENDATIONS</b>	<b>49</b>
<hr/>	
5.1 CONCLUSION	49
5.2 DISCUSSION	50
5.3 MANAGERIAL RECOMMENDATIONS	50
<hr/>	
<b>6. RESEARCH LIMITATIONS AND FUTURE RESEARCH</b>	<b>51</b>
<hr/>	
6.1 RESEARCH LIMITATIONS	51
6.2 FUTURE RESEARCH	51
<hr/>	
<b>REFERENCES</b>	<b>52</b>
<hr/>	

**APPENDIX REST OF CHAPTER 4 (CONFIDENTIAL) ERROR! BOOKMARK NOT DEFINED.**

**4.2 PHILIPS 3D SOLUTIONS PAST AND CURRENT STRATEGY AND BUSINESS MODEL ERROR! BOOKMARK NOT DEFINED.**

4.2.1 STRATEGY OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.2.2 TECHNOLOGY OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.2.3 MARKET OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.2.4 BUSINESS MODEL OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

**4.3 PHILIPS 3D SOLUTIONS FUTURE STRATEGY AND BUSINESS MODEL ERROR! BOOKMARK NOT DEFINED.**

4.3.1 LICENSING STRATEGY OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.3.2 FUTURE TECHNOLOGY PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.3.3 FUTURE MARKET OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

4.3.3.1 DISPLAY INDUSTRY (LICENSEE) ERROR! BOOKMARK NOT DEFINED.

4.3.3.2 GAMING INDUSTRY (END USER) ERROR! BOOKMARK NOT DEFINED.

4.3.4 FUTURE BUSINESS MODEL OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.

**4.4 BUSINESS MODEL EVOLUTION OF PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.**

**4.5 RECOMMENDATIONS FOR PHILIPS 3D SOLUTIONS ERROR! BOOKMARK NOT DEFINED.**

## Executive Summary

After reviewing and analyzing the current business model literature, I identified a potential business problem that might occur when companies have to manage multiple business models at the same time. Business models are usually described by using business model components. However, both academics and practitioners are not unambiguous about the number of business model components to describe a business model. Some author(s) propose six components and others nine components to model a business. If a certain company uses nine components to describe 5 of their company's business models, then this company needs 45 components descriptions to describe all business models. This traditional method makes it possible, but hard for corporate strategists to identify differences, similarities and synergies between business models, not to mention about communicating to other corporate and or business strategists. A higher abstraction level modeling method and tool will simplify the identification process and improve understanding and communication of business models at both corporate and business level.

Although many academics (Hedmann & Kalling, 2003; Chesbrough, 2006) and practitioners (Viscio & Pasternack, 1996; Linder & Cantrell, 2000; Tucker, 2001) agree that business models evolve over time, they haven't provided a way to visualize the evolution of the business model yet. The business model typology only show business models at a certain point in time (Linder & Cantrell, 2000). Therefore, the higher abstraction level modeling method can further facilitate the ability of corporate strategists to map the evolution of business models. In order to visualize the business model correctly, it is important to know why and how business models evolve over time. Therefore, the main research question of this master thesis report is: "*Why and how does a Business Model evolve over time?*" The secondary questions that are closely related to the main research question are "*What is a business model?*", "*Does a business model(s) of a certain company evolve over time?*", and "*How to visualize the evolution of the business model?*"

The business modeling technique that is developed in this thesis is derived from the Chesbrough and Rosenbloom's business model that mediates between the technical and economic domains. The technique visualizes the number of technologies, business models, markets, and the way a company captures (closed or open) and creates value (closed or open).

To test the proposed business modeling technique, a case is selected. The case study is performed at Philips 3D Solutions, one of the technology incubators within Royal Philips Electronics. This technology incubator venture was founded in 2005 to commercialize the 3D technology that was developed within Philips Corporate Technologies. Due to confidentiality issues, the majority of the case study is relocated to the non-public appendix.

The past, present, and future business models of Philips 3D Solutions were first analyzed using the business model components. The business modeling technique, which is proposed in this thesis, was then applied to model the businesses at a higher abstraction level. All business models were ordered in a chronological way to visualize the evolution of the business models.

The case study results showed that it is possible to visualize business models at a higher abstraction level using the proposed business modeling technique, which simplifies the identification process of the differences, similarities and synergies between business models. It has further shown that the same modeling technique can depict the evolution of the business model within Philips 3D Solutions.



After the theoretical and the empirical analysis, the thesis concludes with the following:

*“What is a business model?”*

A business model is an abstract representation of some aspect of a firm’s strategy (Seddon & Lewis, 2003). The business model performs two important functions that include value creation and value capture. Business models capture value from technology and turn them into economic output by creating value to its customers. In general, business models can be described by using business model components.

*“Why does a Business Model evolve over time?”*

From both theoretical and empirical point of view, it can be concluded that business model components describe business models at a point of time. Due to shifting customer needs, markets, and competitive threats (Linder & Cantrell, 2000), firms must constantly tweak their current business model and find new business models in order to survive and grow (Tucker, 2001). Business models change as a result of the firm’s changing strategy. Therefore, it can be concluded that business models do evolve over time and it evolves in the way corporate strategists have designed it (changing number of technologies, business models, and markets).

*How does a Business Model evolve over time?”*

Even though that most of the business models start in almost the same structure (creating value with limited technologies and capturing value from limited markets), over time depending on its actors it develops and evolves on its own way. For example, some companies will make use of alliances, joint ventures, and mergers and acquisition. The strategy of the company, the introduction of new technologies, and the maturity of old technologies and markets are the main drivers that will affect the evolution of the business model. Some business models will eventually be dominated by the number of technologies, others by the number of business models, and others by the number of markets. A business model can turn from totally closed into totally open and vice versa or it can turn partly open. The business model is partly open when value creation is open and value capture is closed and vice versa. As with technologies, business models also have a life cycle and must be cannibalized or revolutionized over time in order to survive.

*“How to visualize the evolution of the business model?”*

The thesis has proposed a mapping technique and has showed that this is a way to visualize the evolving business model(s) over time at corporate level. By combining the business model and open innovation theory, it is even possible to visualize the embryonic evolution of the business model using the proposed mapping technique. The mapping technique is developed for corporate strategists to manage multiple business models and to simplify the identification of differences, similarities, and synergies between business models. Future research should prove whether the proposed technique has really reduced the communication gap or not.

Several managerial recommendations can be made. First of all, technologies and business models have limited life cycles and can't last forever. The value of technologies can be extended by using patents. Even though, they have to be cannibalized in the long term. Second, corporate strategists should experiment with and explore technologies, business models, and markets. Through probing and learning, it is possible to improve it in order to grow the business. It is important to learn as fast as possible from technologies, business models, and markets, because this knowledge can be turned into competitive advantage. However, do not blind yourself by focusing only on technology for example, but keep this process interactive. A business model can serve as the scientific method for managers to test hypotheses (Magretta, 2002). Third, corporate strategists can use the interaction pattern and value creation and value capture taxonomies / tools to analyze the business models of value chain and network partners and competitors.

# 1. Introduction

## Television

Television can be considered as one of the innovations that has major impact on human mankind. The television nowadays serves a number of different functions, varying from a communication device (news), an entertainment device (watching movies, playing video games), an education device (history, do-it-yourself), to an electronic display for external devices (camera, pc), and so on at the same time. Since the introduction of the first television, humans didn't stop innovating. In contrast, humans kept innovating even at a faster pace. The first color television was introduced after a number of decades. Televisions were improved on dimensions such as display size, display resolution, response time, television sound, and so on. The use of new materials and other innovations resulted in the introduction of flat panel displays. Flat panel displays has reduced the volume size of the television significantly. Right now, the Liquid Crystal Display (one of the flat panel display technologies) is disrupting the old display technology called Cathode Ray Tube televisions (Display Search, 2005). Another recent innovation that is worth mentioning is the Ambilight technology developed by Royal Philips Electronics. Ambilight increases the overall viewing experience and the design of the television. This technology produces a fully surrounding glow of light that complements the colors and light intensity of the displayed image on the television screen. The surrounding glow creates ambiance and stimulates more relaxing viewing experience. It further improves perceived picture detail, contrast and color.

## 3-Dimensional Television

Now in the 21<sup>st</sup> century, human mankind already succeeded in developing 3D games and other 3D software, but also succeeded in developing the first 3-dimensional televisions. This new dimension adds depth to current visualization applications and makes the television experience much more realistic. The companies that have succeeded in creating a 3D television by adding an extra dimension have leapfrogged their competitors by creating a blue ocean (Kim & Mauborgne, 2005). Major movie directors, such as James Cameron (movie director of Titanic), George Lucas (movie director of Star Wars), Peter Jackson (movie director of King Kong), have claimed that they are willingly to adapt new 3D filming techniques to produce 3D movies for the cinema (BBC, 2006). Some cinemas, such as the IMAX 3D and Real D, are already equipped with 3D technologies that made it possible to experience 3D movies. Probably, in the foreseeable future, these 3D movies will be released for 3D home televisions.

## Philips 3D Solutions

One of the companies that has commercialized a 3D display is Philips 3D Solutions, which is a technology incubator venture (hereafter called incubator) within Royal Philips Electronics (hereafter called Philips). The 3D technology was originally developed within Philips Research, part of the Corporate Technologies Sector. In order to bring this technology to market, Philips has decided to create the incubator Philips 3D Solutions, with the task of further nurturing and commercializing the 3D technology. Philips 3D Solutions has identified the digital signage market as the initial market to exploit the 3D display technology and developed a business model to target this specific market. Digital signage is the application where displays are used for advertisement and promotion purposes.

“3D Solutions didn’t start in the TV market where expectations would be too high and no 3D content being available”, explains Corina Kuiper (Philips, 2007, p. 18). After developing this market for several years, Philips 3D Solutions is ready to explore and enter new markets using their current technologies or products in order to increase and maximize its profit. In addition, not only Philips 3D Solutions is ready but also the 3D technology is ready to be developed in other segments. The technology incubator will also consider developing new products to target their new market. According to the matrix of Ansoff, the first strategy Philips 3D Solutions has chosen for its 3D technology is a market development strategy and second a diversification strategy, see figure 1 below.

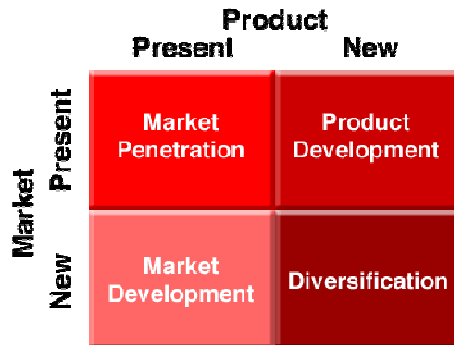


Figure 1 Ansoff Matrix  
 Source: Jobber & Fahy (2003)

Both strategies will result in changes in the behavior of the company. But will one of these strategies also affect the current business model? If so, how will the business model(s) develop further in the future? What happens to the business model when a company licenses a new external developed technology to another company? Or when it decides to merge, or ally with another company? Will the business model change and evolve over time? How can this evolution be depicted? This report will give a first attempt to uncover these mysteries.

**Previous Research about Business Models**

Most academic research on business models was done in the e-business (Weill et al., 2004), strategy, information systems and business management literature (Pateli & Giaglis, 2004). Research on e-business models has focused primarily on three complementary streams: components, taxonomies (Hedman & Kalling, 2003; Weill et al., 2004), and definitions of business models (Pateli & Giaglis, 2004). Business model research has expanded since Timmers’ publication on business models (Weill et al., 2004).

Research on *business model taxonomies* has grown as well. Pateli and Giaglis (2004) stated that taxonomy frameworks are differentiated on two factors: classification criteria and objects classified. Examples of classification criteria include functional integration and degree of innovation (Timmers, 1998), core activity and relative position on the price/value continuum (Linder & Cantrell, 2000), economy subjects and communication behavior (Bartelt & Lamershof, 2001), asset rights and asset types (Weill et al., 2004; Malone et al., 2006; Lai et al., 2006) and open and closed business models (Chesbrough, 2006). Object classified are usually initiated from real life businesses, some examples are Amazon or Yahoo (Timmers, 1998). These taxonomies are typically based on atomic business models that can represent real life businesses (Pateli & Giaglis, 2004).

This thesis contributes the business model taxonomies research stream by proposing a *categorization method based on interaction patterns* to classify business models at a higher abstraction level and a *new categorization method for determining the open business model maturity* using the value creation and capture matrix. These concepts will be explained and discussed in more detail further on.

Another business model research stream is *design methods and tools* (Pateli & Giaglis, 2004). These techniques improve the quality of the communication and the in-depth understanding of the business. The major stream of research has focused on standardizing modeling methods and tools to improve the communication gap between managers and system analysts (Pateli & Giaglis, 2004). However, the communication gap between corporate strategists and business strategists / managers is not well addressed. This gap might occur when firms have multiple business models. Using business model components to describe the business model might not be abstract enough to bridge this communication gap. For example, if company A has five different business models and the company uses nine business model components to describe one business model, then it needs 45 components to describe all five business models. This traditional method makes it possible, but hard for corporate strategists to identify differences, similarities and synergies between business models, not to mention about communicating to other corporate and or business strategists. A higher abstraction level modeling method and tool will improve communication and understanding of business models at corporate and business level. It further facilitates the ability to map the evolution of business models. Moreover, most of the research regarding business models is focused on the organizational level, but not on the industrial level.

This master thesis extends the business model design methods and tools research stream by proposing a higher abstraction level *modeling technique* to map the evolution of the business model, the business model chains, and business model networks. By integrating both open innovation and business model theory in the modeling technique, it is possible to visualize the embryonic evolution of the business model. The modeling technique will show that successful business models will evolve over time after launch and are not static phenomenon's after creation.

### **Main research Question**

Although many academics (Hedmann & Kalling, 2003; Chesbrough, 2006) and practitioners (Viscio & Pasternack, 1996; Linder & Cantrell, 2000; Tucker, 2001) agree that business models evolve over time, they haven't provided a way to visualize the evolution of the business model yet. The business model typology only show business models at a point in time (Linder & Cantrell, 2000). In order to be able to visualize the business model, it is important to know why and how business models evolve over time. Therefore, the main research question of this master thesis report is: "*Why and how does a Business Model evolve over time?*" The secondary questions that are closely related to the main research question are "*What is a business model?*", "*Does a business model(s) of a certain company evolve over time?*", and "*How to visualize the evolution of the business model?*"

**Goal of this research**

The goal of this research is to address the importance of evolving business models. Practitioners and academics will both need a way to visualize and communicate the changes of the business model. The visualization tool must provide companies with more than one business model the ability to easily identify and manage differences, similarities, and synergies between business models. Therefore, better visualization and communication improves the understanding of the current strategy, business, and the past evolution. The tool can also be used in the other way around; it can be used as a roadmap to provide overall direction for the business model development. Besides this, it improves the internal understanding of the position of a company the value chain (e.g. from raw material suppliers to customers) and value network (also including suppliers suppliers).

**Demarcation of the research assignment**

The focus of this thesis lies within the evolution of business model(s) within one company and it will not focus on other business models within the value chain and or value network of this company. More specifically, the thesis and the literature review will focus on the case that is performed at Philips 3D Solutions, which is a technology incubator venture within Royal Philips Electronics. The evolution includes the past, present, and the future from Philips 3D Solutions only. Since the business model is a visual representation of a company's strategy, this thesis will focus on both strategy (corporate- and business level strategy) and business model. It will not focus on the business processes, which is derived from business models.

**Organization of Report**

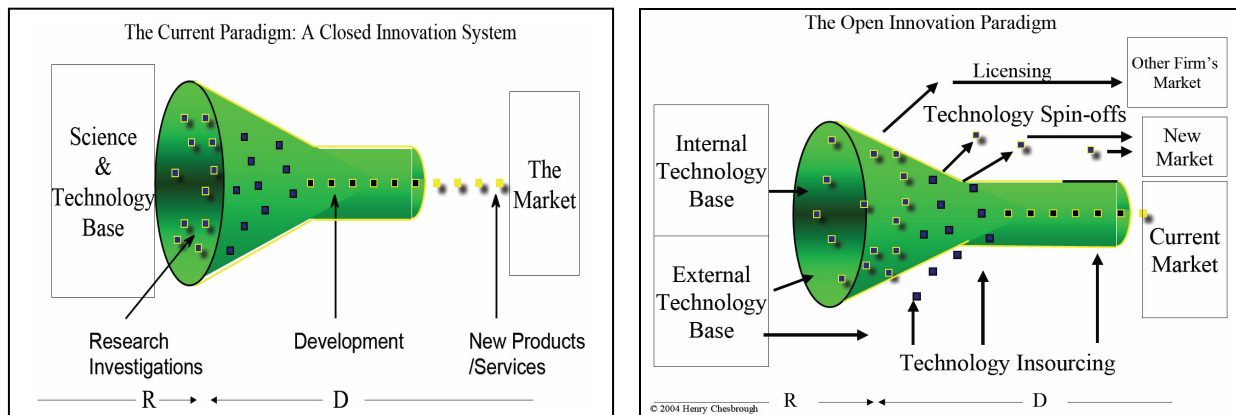
This thesis is organized as follows. The next chapter will review the current literature with regard to business models and open innovation. The third chapter describes the research methodology that is used in this thesis to manage and evaluate the quality of the research. The fourth chapter will present the case study results. Due to confidentiality issues, the majority of the case study is removed from this publicly report. The thesis ends with a conclusion, discussion, and recommendations chapter. Finally, the research limitations and future research chapter are presented.

## 2. Literature Review

### 2.1 Open Innovation

The term *open innovation* was first introduced by Chesbrough (2003). Chesbrough, Vanhaverbeke, and West (2006, p.1) defined open innovation as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation”. Open innovation is a paradigm that assumes that external ideas can be taken to market through internal channels, but also internal ideas can be taken to market through external channels to generate additional value (Chesbrough et al., 2006). Open innovation firms source external intellectual properties and sell or license internal generated intellectual properties to external companies, therefore, they rely on both internal and external R&D.

The opposite paradigm of open innovation is *closed innovation*. Closed innovation firms use only internal ideas and internal paths to market in order to advance their technology. External intellectual property is regarded as suspect, unreliable, and something to be avoided (Chesbrough, 2006). Furthermore, most of the internal intellectual properties will never get used either inside or outside the company and are simply placed on the shelf (Chesbrough, 2006). Closed innovation firms only rely on internal R&D. The differences between these two paradigms are displayed in figure 2 and 3.



**Figure 2 The Current Paradigm: A Closed Innovation System**

**Figure 3 The Open Innovation Paradigm**

Source: Chesbrough et al. (2006, p. 3)

Closed innovation and open innovation are based on opposite principles, see table 1:



Closed Innovation Principles	Open Innovation Principles
The smart people in our field work for us	Not all the smart people work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company
To profit from R&D, we must discover, develop 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 in order to profit from it
If we are the first to commercialize an innovation, we will win	Building a better <b>business model</b> is better than getting to market first
If we create the most and 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 <b>intellectual property</b> so that our competitor's don't profit from our ideas	<b>We should profit from others use of our IP</b> , and we should buy others IP whenever it advances our own <b>business model</b>

**Table 1 Contrasting Principles of Closed and Open Innovation**  
*Source: Chesbrough (2003, p. 38)*

Another main difference between the two paradigms is the centrality of the business model (Chesbrough et al., 2006). In the closed innovation paradigm, firms paid little or no attention to the business model in organizing for innovation. These firms focus on securing the best and the brightest people and funding their best researchers, hoping that they will come up with valuable new innovations that will somehow find a path to market (Chesbrough et al., 2006). On the contrary, open innovation explicitly incorporates the business model as the source of both value creation and value capture (Chesbrough et al., 2006). In addition, open innovation firms actively seek smart people from both inside and outside the firm to provide fuel for the business model. Ideas or technologies that don't fit in the current business model, can still find their path to market through a variety of channels, such as licensing, spin-off and so on (Chesbrough et al., 2006). This business model will enable the organization to sustain its positions in the industry value chain over time (Chesbrough et al., 2006).

As can be concluded, the business model is a very important concept within the open innovation paradigm, but what is exactly a business model? This issue will be discussed in the next paragraphs.

## 2.2 Business Models

### 2.2.1 Definition of Business Models

The *Business Model* concept is a frequently discussed subject between academics and used by practitioners (Alt & Zimmerman, 2001) since the mid-1990s (Seddon & Lewis, 2003). However, until now there is no unambiguous definition of this concept. A lot of scholars have made their own interpretation about the concept business models and gave their own definition in words or in components or both. Some of these definitions are general and others are more concrete, see table 2.



Author (s)	Definition of Business Model	Components of Business Model
Afuah (2004, page 9) cited from Van de Vrande et al. (2006)	“... the set of which activities a firm performs, how it performs them, when it performs them as it uses its resources to perform activities, given its industry, to create superior customer value... and put itself in a position to appropriate value”	
Amit & Zott (2001, page 511)	“A business model depicts the content, structure, and governance of transactions designed as to create value through the exploitation of business opportunities.”	N.a.
Christensen et al., (2004, page 292)	“The way a company captures value from its innovations. This includes the structure of its costs, how it prices its product or service, whom it attempts to sell that product or service, how it sells it (one time sale, licensing agreement, and so on), what value proposition it purports to offer, how it delivers its product or service, how it offers post sales support and so on.”	N.a.
Chesbrough & Rosenbloom (2002); Chesbrough (2006, page 109)	N.a.	<ol style="list-style-type: none"> <li>1. Value proposition</li> <li>2. Market segment</li> <li>3. Value chain</li> <li>4. Cost structure and profit potential</li> <li>5. Value network</li> <li>6. Competitive strategy</li> </ol>
Osterwalder (2004, page 15, 43)	“A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company’s logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams.”	<ol style="list-style-type: none"> <li>1. Value proposition</li> <li>2. Target Customer</li> <li>3. Distribution Channel</li> <li>4. Relationship</li> <li>5. Value Configuration</li> <li>6. Capability</li> <li>7. Partnership</li> <li>8. Cost Structure</li> <li>9. Revenue Model</li> </ol>
Seddon & Lewis (2003, p.246)	“A business model is an abstract representation of some aspects of a firm’s strategy; it outlines the essential details one needs to know to understand how a firm can successfully deliver value to its customers.”	N.a.
Timmers (1998)	“An architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues.”	N.a.
Tucker (2001)	“A business model is a description of how your company creates value for customers that in turn generated revenue and profits for your company.”	N.a.

**Table 2 Definitions of Business Models**

Of all business model definitions, Osterwalder’s definition is considered the most comprehensive (Pateli, 2002). Common to all these definitions of business and e-business models is the

emphasis on how a firm makes money (Malone et al., 2006) out of their ideas, resources, and technologies (Chesbrough, 2006) and how it is creating value (Weill et al., 2004; Petrovic et al. 2001).

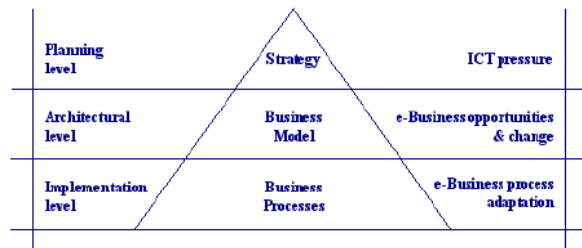
Even though that the concepts business model and strategy share a lot of common characteristics, a business model is not the same as strategy (Chesbrough & Rosenbloom, 2002; Magretta, 2002; Seddon & Lewis, 2003). According to Porter, *strategy* involves “defining a company’s long term position in the marketplace, making the hard trade-off about what the company will and will not do to provide value to customers, and forging hard to replicate fit among parts of the activity system the firm constructs to deliver value to customers, all with a view to making a superior return on investment” (Seddon & Lewis, 2003, p.240). Seddon and Lewis (2003, p.241) argue that “a business model is an abstract representation of some aspect of a firm’s strategy”. It is not necessary or possible (Papakiriakopoulos et al., 2001), and it should not (Petrovic et al., 2001) describe every business in detail with the business model. Abstracting from the complexity of real-world strategy simplifies comparison with other business models and identifying contrasts (Seddon & Lewis, 2003). As with any abstraction, decisions about what to model, and what to ignore has to be made (Seddon & Lewis, 2003). However, academics are not unambiguous about it, as can be seen from the definitions in table 2. Some author(s) propose to model six components and others nine components.

According to Chesbrough and Rosenbloom (2002), a business model differs from strategy in at least three ways. Two additional differences are identified and presented as the fourth and the fifth difference. The first difference is the attention to value capture and the centrality of competitive threats to returns. A strategy pays stronger attention to value capture and sustainability and takes competitive threats to returns more seriously than business models. A strategy is more concerned with competition between firms, whereas business models are more concerned with the core logic that enables a firm to create value for its customers and owners (Seddon & Lewis, 2003). A second difference is the creation of value. A strategy puts more emphasis in translating value of the business into value for the shareholders than business models. A third difference is the assumptions made about the state of knowledge. A strategy approaches assumptions more carefully than business models. A fourth difference is the amount of information; much more information is required to represent a firm’s strategy than is required to represent a business model (Seddon & Lewis, 2003). A fifth difference is that a firm’s strategy is specific to that firm and that firm alone. By contrast, a business model, that is an abstraction of a firm’s strategy, could then apply to more than one firm. Therefore, a firm’s strategy can be represented by any number of business models.

Johnson et al. (2005) distinguish three different levels of strategy, namely the corporate-level, business-level, and operational strategies. According to Johnson et al. (2005), corporate-level strategy is concerned with the overall purpose and scope of an organization and how value will be added to the different parts (business units) of the organization. Corporate strategists seek to develop synergies by sharing and coordinating staff and other resources across business units, investing financial resources across business units, and using business units to complement other corporate business activities. Business-level strategy deals with the question of how to compete successfully in particular markets and is clearly linked with the corporate-level strategy. In contrast to corporate-level strategies, business-level strategies deal with one rather than a portfolio of businesses. Corporate-level strategies can both assist and constrain business-level strategies (Johnson et al., 2005). Operational strategy are concerned with how the component parts of an organization deliver effectively the corporate- and business-level strategies in terms

of resources, processes and people. The strategic issues at the operational level are related to business processes. A business model can therefore be understood as a representation of the business-level strategy.

Osterwalder and Pigneur (2002) perceive the business model as the conceptual and architectural implementation of a firm's strategy and as the foundation for the implementation of business processes, see figure 4.



**Figure 4 Business Logic Triangle**

*Source: Osterwalder & Pigneur (2002, p. 2); Osterwalder (2004, p. 148)*

As can be concluded, every company has a business model, whether the model is articulated or not (Chesbrough, 2006). Although, the business model and strategy are different, they are complementary (Linder & Cantrell, 2001). A strategy should tell the firm how to change the business model in order to take advantage of shifting markets and new opportunities (Linder & Cantrell, 2001). So, a good understanding of a firm's business model is no substitute for strategy (Linder & Cantrell, 2001).

### 2.2.2 Goal of a business model

Seddon and Lewis (2003) and Petrovic et al. (2001) argue that the goal of business models is to abstract from all details in order to draw attention to the factors of interest to the modeler, and to suppress extraneous information. Modeling helps firms to develop, share, assess, redesign (Lagha et al., 2001) and execute (Magretta, 2002) business visions and strategies. Business modeling is the scientific method for managers, because hypotheses can be formulated, tested, and revised when necessary (Magretta, 2002).

A good business model provides according to Chesbrough (2006) the ability to serve multiple markets, to adapt to new conditions, to reduce the barrier to customer use, and openness to leverage others' ideas, technologies, and investments. A business model should be used as an analysis tool to understand customers, suppliers and competitor's business model and as a communication tool (Chesbrough, 2006). Furthermore, it should highlight the distinctive activities and approaches that enable the firm to succeed, such as attracting customers, employees, and investors, and delivering products and services profitably (Linder & Cantrell, 2000).

### 2.2.3 Types of business models

As already mentioned in the introduction, a business model can be classified in many ways. However, taxonomies differ in usefulness. Timmers (1998) combined interaction patterns (1-to-1, 1-to-many, many-to-1, many-to-many) and value chain integration (de-construction and re-

construction) to list 11 possible architectures of e-business models. Alt & Zimmerman (2001) distinguished business models into B2B and B2C. McGann and Lyytinen (2002) use also B2G and G2G, C2C for completeness, where G stands for Government. Bartelt and Lamersdorf (2001) take also the communication behavior of suppliers and customers into account and distinguished 5 different e-business models. Weill et al. (2004), Malone et al. (2006) and Lai et al. (2006) classify business models based on asset types and asset rights. Four asset types are distinguished, namely physical (f.e. houses, computers, cars), financial (f.e. cash, stocks, insurance policies), intangible (f.e. IP, goodwill, brand image), and human. Asset rights include creator (the right of ownership of an asset), distributor (the right of ownership of an asset), landlord (the right to use an asset), and broker (the right to be matched). A combination between these two dimensions results in 16 different business models, see figure 5.

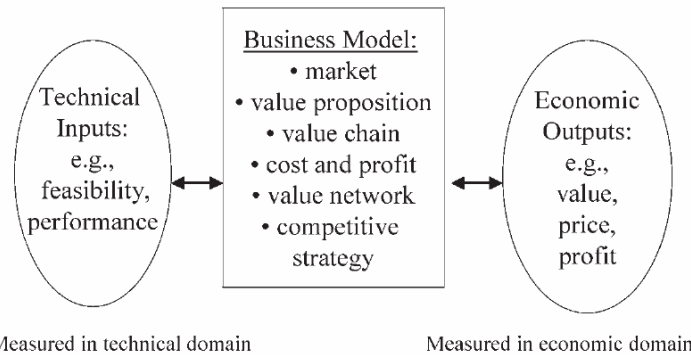
		<i>What type of asset is involved?</i>			
		<b>Financial</b>	<b>Physical</b>	<b>Intangible</b>	<b>Human</b>
<i>What rights are being sold?</i>	<b>Creator</b>	Entrepreneur (Kleiner Perkins)	Manufacturer (GM)	Inventor (Lucent Bell Labs)	Not applicable
	<b>Distributor</b>	Financial Trader (Merrill Lynch)	Wholesaler/ Retailer (Wal*Mart)	IP Trader (NTL Inc.)	Not applicable
	<b>Landlord</b>	Financial Landlord (Citigroup)	Physical Landlord (Hertz)	IP Landlord (Microsoft)	Contractor (Accenture)
	<b>Broker</b>	Financial Broker (Charles Schwab)	Physical Broker (eBay)	IP Broker (Valassis)	HR Broker (EDS)

**Figure 5 Sixteen Business Models**  
 Source: Lai et al. (2006, p. 28)

Chesbrough (2006) made a distinction between closed and open business models. Closed business models are based on closed innovation paradigm and open business models on open innovation paradigm. MacInnes (2005) introduced two business models based on the source of technology taxonomy; these are supply and demand business models. Business ideas that originate from entrepreneurs are called supply-push business models. Business ideas that originate from inventors are called demand-pull business models. These innovations emerged without a business plan in mind and are generally invented to serve the purpose of the creator (MacInnes, 2005). Furthermore, MacInnes (2005) argues that the distinction between disruptive and sustaining innovations is important, because it will affect the way a business model is designed.

### 2.2.4 Domains of a Business Model

*Value capture* and *value creation* are the two main functions of a business model (Chesbrough, 2006). The business model creates value by “defining a series of activities from raw material through to the final consumer that will yield a new product or service with value being added throughout the various activities. The business model captures value by establishing an unique resource, asset, or position within that series of activities, where the firm enjoys competitive advantage” (Chesbrough, 2006, p.2). In short, a business model creates value for the customer and captures value from the technology. The business model is therefore situated between the technological and the economic domains, see figure 6.



**Figure 6 The Business Model and the Technical and Economic Domains**  
*Source: Chesbrough & Rosenbloom (2002, p. 536)*

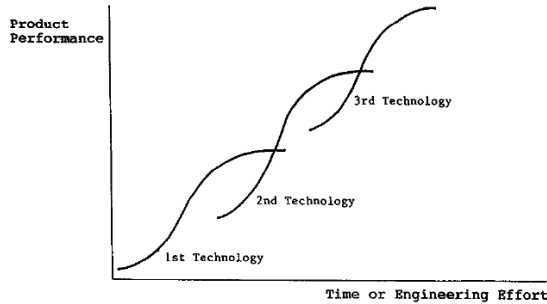
Business models are essential to unlocking latent value from a technology (Chesbrough, 2006). The same technology can be taken to market through two different business models, but each business model will yield different amounts of value. Therefore, a successful business model “takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic value” (Chesbrough & Rosenbloom, 2002, p. 532).

#### 2.2.4.1 Technical Domain as Input

The technical input of the business model can range from one technology to several technologies. Therefore, the technical input of these technologies can differ between each other. Some technologies will add more value to the same business model than others. The type of technology, such as product and process technologies, or incremental, radical and disruptive technologies will influence the technical input. The technical input of disruptive technologies is relatively more uncertain in comparison to more incremental technologies because these disruptive technologies must overcome several factors, such as technical, environmental, commercial, and maturity problems (MacInnes, 2005).

Besides, the life cycle of the technology also affects the technical input. Each technology follows a technology life cycle. According to Burgelman et al. (2004), the technology life cycle consist of four stages, namely (1) emerging technologies; (2) packing technologies; (3) key technologies; and (4) base technologies. *Emerging technologies* are technologies that have not yet demonstrated potential for changing the basis of competition. *Packing technologies* have demonstrated their potential for changing the basis of competition. *Key technologies* are embedded in and enable product/ process. Furthermore, it has major impact on value added stream (cost, performance, quality) and allows proprietary/ patented positions. *Base technologies* have minor impact on value added stream; it is common to all competitors, like a commodity (Burgelman et al., 2004).

Technologies might become outdated and new technologies will replace old ones, see Christensen’s S-curves in the figure 7 below.




**Figure 7 Prescriptive S-Curve Strategy**  
 Source: Christensen (2002, p. 340)

In other words, the technical input of the business model can change over time. As a result, a technology can enable (new technology) or constraint (old technology) business models (Alt & Zimmerman, 2001). According to Alt and Zimmerman (2001), technological issues can influence all aspects of the business model, such as the overall mission, structures, processes, and revenue models.

Intellectual properties can have a huge impact on the economic output of business models, because IPs can protect the value of the technology against competitors. For example, a technology that is not patented can be legally copied and used by competitors against the originating company. This occurrence can decrease the yield of the technology. Therefore, Chesbrough (2006) argues that technologies should be managed by the IP life cycle, because the practice of technology and the protection of that technology are not always aligned.

Technologies will be depicted as the symbol in table 3.

Description	Symbol
Technical input per technology	

**Table 3 Technical Input per Technology**

**2.2.4.2 Business Model**

The business model that is proposed by Chesbrough and Rosenbloom (2002) consists of six different functions. The first function of a business model is to identify a market segment. The purpose and the usefulness of the technology should be addressed. Furthermore, the revenue generation mechanism will be specified. The second function is to articulate the value proposition. This is the value that is created for the users through the converted technology by the business model. Third, the business model defines the structure of the value chain within the firm required to create and distribute the offering. Complementary assets are also determined. The fourth function is the estimation of the cost structure and profit potential of producing the offering. The fifth function describes the position of the firm within the value network. This network links the firm with suppliers and customers, and identifies the complementors and competitors. The sixth and the last function of the business model is to formulate the competitive strategy.



Even though that the business model attributes, proposed by Chesbrough and Rosenbloom (2002), are clear. It still lacks some attributes according to Osterwalder (2004), see table 4.

Business model ontology	Hamel 2000	Mahadevan 2000	Chesbrough and Rosenbloom 2000	Magretta 2002	Amit and Zott 2001	Applegate and Collura 2001	Maitland and Van de Kar 2002
Value Proposition	Product/market scope	Value stream	Value proposition	What does the customer value?	Transaction component	Product and Services offered	Value proposition, assumed value
Target Customer	Market scope		Market segment	Who is the customer?		Market opportunity	Market segment
Distribution Channel	Fulfillment & support, info & insight			How can we deliver value at an appropriate cost?		Marketing/sales model	
Customer Interface	Relationship dynamics					Brand and reputation	
Value Configuration	Core processes	Logistical stream	Structure of the value chain		Architectural configuration	Operating model	
Capability	core competencies, strategic assets					(Organization and culture, management model)	
Partnership	suppliers, partners, coalitions		Position in the value chain		Transaction component	Partners	Companies involved in creating value
Cost Structure			Cost structure	What is the underlying economic value?			
Revenue Model	pricing structure	Revenue stream		How do we make money in this business		Benefits to firm and stakeholders	Revenue Model

**Table 4 Business Model Ontology Compares with Literature Review of Osterwalder**  
*Source: Osterwalder (2004, p. 46)*

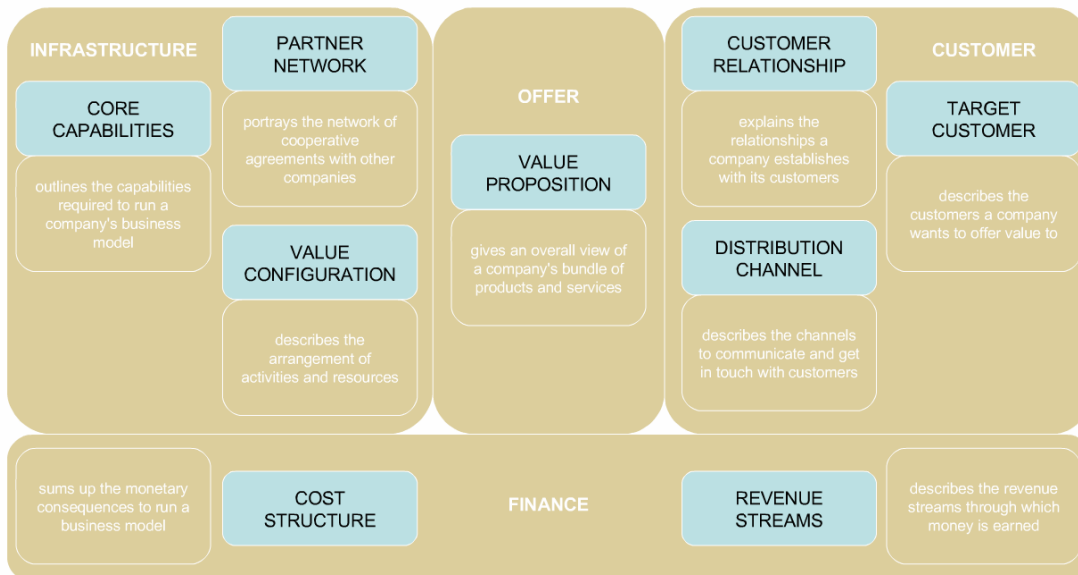
Osterwalder (2004) points out the white spots of Chesbrough and Rosenbloom’s proposed business model. The missing attributes are distribution channel, customer interface, capability, and revenue model. Osterwalder (2004) proposes a new business model ontology after analyzing the business model literature. The business model ontology of Osterwalder (2004) is based on four pillars and nine building blocks, see table 5.

Pillar	Building Block of Business Model	Description
Product	Value Proposition	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer Interface	Target Customer	The Target Customer is a segment of customers a company wants to offer value to.
	Distribution Channel	A Distribution Channel is a means of getting in touch with the customer.
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure Management	Value Configuration	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer.
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial Aspects	Cost Structure	The Cost Structure is the representation in money of all the means employed in the business model.
	Revenue Model	The Revenue Model describes the way a company makes money through a variety of revenue flows.

**Table 5 Description of the Business Model Ontology**

Source: Osterwalder (2004, p. 43)

Osterwalder (2004) depicts its business model ontology in the following way, see figure 8.



**Figure 8 Visualization of the Business Model Ontology**

Source: <http://www.slideshare.net/Alex.Osterwalder/business-model-template>




As already mentioned, one technology can be marketed through different business models. But what is more important, a good business model or a good technology? Chesbrough (2006) argues that a business model should be more important, because the business models determine whether a technological invention will be developed and commercialized within the company or whether it will be licensed out. Besides, it's not the technology itself but the business model behind the application of that technology that gives disruptive power (Vanhaverbeke & Cloodt, 2006). A good business model provides the ability to profit from-, scale-, continue innovating-, and to acquire technology (Chesbrough, 2006a). However, successful business models pose another risk. They create a strong inertia inside the company that can block any change to the current business model (Chesbrough, 2006) and other ways of doing business (Van de Vrande et al., 2006). This in turn, makes successful firms hard to respond appropriately to changes in their environment (Chesbrough, 2006). No matter how bulletproof a business model is, it will be challenged by new business models (Tucker, 2001). Over time, successful business models will be imitated, diluted, and commoditized (Tucker, 2001). A business model will be represented by the symbol as shown in table 6.

Description	Symbol
Business Model	<div style="border: 1px solid black; width: 40px; height: 40px; display: inline-block; text-align: center; vertical-align: middle;">BM</div>

**Table 6 Business Model**

### 2.2.4.3 Economic Domain as Output

The business model can convert one or more technologies into economic value originating from one or more markets. In other words, the economic output of a business model can be divided per market. Each market can result in different economic output, because the same technology or product can be priced different by the same company. The same technology or product can be valued differently by different markets. As a result, the profit will differ between markets. Other differences between markets are growth rate and market share. Some markets will adopt the technology or product faster than other markets. Even though that every company that enters a new market will start in general with the same amount of market share, the growth rate of the market share in each market will be greatly affected by the adoption rate by the market itself. Therefore, these markets can be categorized by *Question Marks*, *Stars*, *Cash Cows*, and *Dogs* from the Boston Consulting Group Growth-Share Matrix (Kotler, 2000). Kotler (2000) defined Question Marks as businesses that operate in high-growth markets but have low relative market shares. Most businesses start as a question mark. If the business turns out to be successful, it becomes a star. A star is the market leader in a high-growth market. The star will become a cash cow if the market's annual growth rate falls to less than 10 percent and if the star still has the largest relative market share. Dogs are businesses that have weak market shares in low-growth markets. Markets will be depicted as the symbol in table 7.

Description	Symbol
Economic output per market	

**Table 7 Economic Output per Market**

### 2.2.5 Business Model and Environment

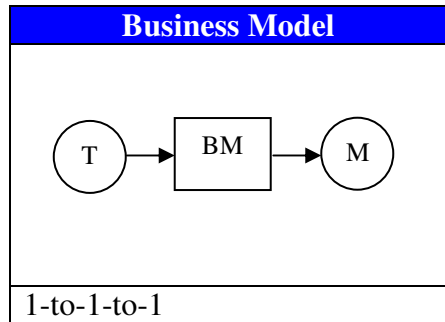
A company’s business model is continuously subject to external pressures that force a company to constantly adapt their business model to a changing environment (Osterwalder, 2004). These pressures influence directly or indirectly the business model and include technological change, customer demand, competitive forces, social environment, and legal environment (Osterwalder, 2004). The continuous introduction of new technologies (e.g. internet) force managers to reflect on how these technologies can be adopted in order to improve the business logic of the firm. Competition forces managers to tweak their business models that will result in competitive advantage. Changing consumptions patterns (e.g. purchasing on internet) of customers can affect the business models. The social environment can have impact on the business model. For example, in some countries child labor is still allowed, companies might have to change their value chain partners in order to be corporate responsible. The legal environment forbids for example the business model to trade with humans.

### 2.2.6 Design Method for Business Models

Research on design methods and tools for business models is relatively scarce in comparison with other business model sub-domains (Pateli & Giaglis, 2004). The majority of research in this sub-domain has historically focused on process modeling and simulation tools and is now shifting to standardization of modeling methods and tools. This includes Unified Modeling Language (UML) and eXtensible Markup Language (XML). For example, Lagha et al. (2001) introduced the e-Business Modelling Language (eBML) which is based on XML. Osterwalder (2004) improved and proposed the Business Model Modeling Language (BM<sup>2</sup>L) to capture business models. Gordijn and Akkermans (2001) present an e-business modeling approach that combines the rigorous approach of IT systems analysis with an economic value perspective from business sciences. This is done to bridge the communication gap between managers and system analysts. System analysts can only design the business processes when they fully understand the business strategy proposed by managers. The managers on the corporate-level can use the business model components (for example the nine components of Osterwalder) to communicate a certain business model. These business model components are a powerful tool to communicate the business model of the company. However, communicating on a business model component level might not be effective when a firm has more than one business model because of its low abstraction level. A higher level of abstraction might be required to communicate effectively. This thesis will provide a method for companies with more than one business model in order to visualize business models more effectively.

### 2.2.6.1 Company’s strategy and business models

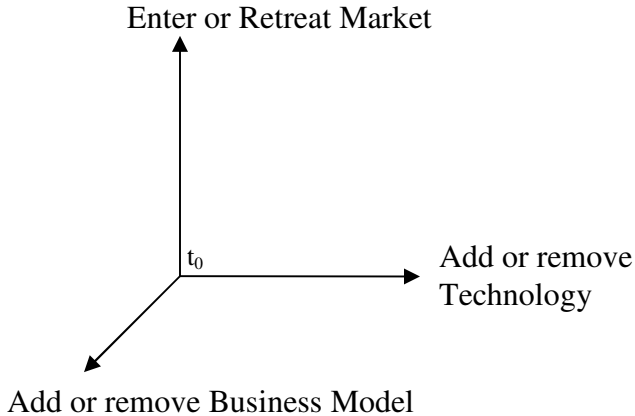
Using the previous defined symbols, the business model can be depicted as shown in table 8.



**Table 8 Business Model**

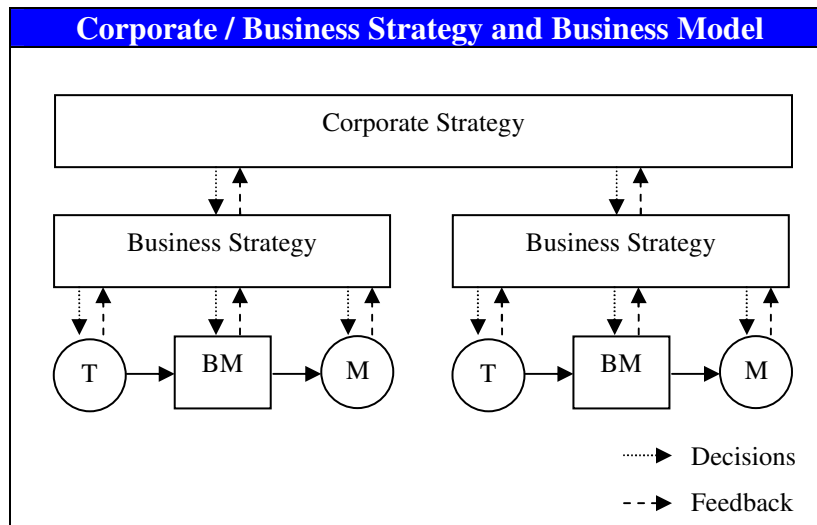
This business model captures value from one (patented) technology and creates value to one market. From an interaction pattern point of view, this business model has 1 technology, 1 business model, and 1 market relationship (or 1-to-1-to-1).

A company’s business strategy can affect a business model in several ways. First of all, a business strategy can affect the number of used technologies, the number of used business models, and the number of entered markets. In order to compete successfully in particular markets, a business strategist can choose to add new, remove, or remain using the current technology. This also counts for the business models and markets, see figure 9 below.



**Figure 9 Company Strategy affecting the Business Model**

The business strategy determines how the business model will look like. After implementation of the business model, the business model will provide feedback to business strategists. They review the business model performances and evaluate whether the targets are met or not, see table 9.



**Table 9 Business Model Decisions and Feedback**

Business strategists might use the evaluations to tweak the business model in order to improve the future performances. Corporate strategists collect the business level performances to compare it with its own performances and determine whether the targets are met or not. Depending on macro environmental forces and the business level performances, they will further adjust their corporate strategy if necessary and translate this to the business strategy.

Second, in addition to these three factors, a company can choose to create value internally (closed) and or externally (open) and capture value internally (closed) or externally (open). Chesbrough & Rosenbloom (2002, p. 534) defined value as something “what a buyer will pay for a product or service”. This is in line with Porter’s definition of value, Porter defined value as “the amount buyers are willing to pay for what a firm provides them” according to Amit and Zott (2001, p.496). A firm can create value “by differentiation along every step of the value chain, through activities resulting in products and services that lower buyers’ costs or raise buyers’ performance” (Amit & Zott, 2001, p. 496). Closed innovation firms create value through generating, developing, manufacturing, and commercializing their own ideas (Chesbrough, 2003). Chesbrough (2003) calls this approach self-reliance because they are too internally focused. Furthermore, closed innovation firms restrict themselves to markets they serve directly (Chesbrough, 2006). In other words, they capture value by using their current business. Closed innovation firms thus create and capture value internally, see table 10.

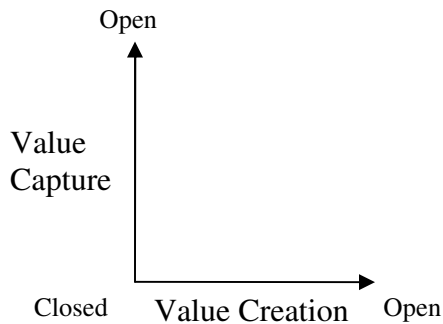
Open innovation firms in contrast, will support the use of external technologies within the firm’s business by shopping for rights to intellectual property that would fill in gaps of its own IP (Chesbrough, 2006). In addition, open innovation firms serve their own market, but also participate in other segments through licensing revenues, joint ventures, spin-offs, or other means (Chesbrough, 2006). These different streams of revenue create more overall revenue from the innovation (Chesbrough, 2006). Therefore, they create and capture value internal as well as external (Chesbrough, 2003). Internal ideas can be commercialized through channels outside of their current business in order to generate value to the organization (Chesbrough, 2003). External ideas that originate outside the firm’s own lab can be brought inside for commercialization (Chesbrough, 2003). Open innovation firms use vehicles or complementary strategies to capture

external ideas, technologies, and IP in order to create value and to speed up their innovation processes by saving internal development time and costs. Vehicles to create additional value include external corporate venture capital or venturing, in-licensing (Chesbrough, 2003), spinning in (Van de Vrande et al., 2006), and acquisitions. The vehicles to capture value externally include out-licensing, spin-offs, sale or divest (Chesbrough, 2006), and venturing (Van de Vrande et al., 2006), see table 10.

	Closed Innovation	Open Innovation
Value Creation	Internal R&D Internal Ideas Internal Intellectual Property	Internal & External R&D Internal & External Ideas Internal & External IP through Spin-in, In-licensing, Venturing, and Acquisitions
Value Capture	Internal path to market (own market)	Internal (own market) & External paths (Out-Licensing, Venturing, Spin-off, Sale/ Divesture) to market

**Table 10 Value Creation and Value Capture**

As a result, it can be concluded that both value creation and value capture can be done from closed or open innovation paradigm, see figure 10.



**Figure 10 Company Strategy affecting the Business Model**

Amit and Zott (2001) identified four interdependent sources of value creation or value drivers for e-business, namely: efficiency, complementarities, lock-in, and novelty. The more efficient the transaction processes, the lower the costs, and the more valuable it will be. Complementarities occur when a bundle of goods together provide more value than the total value of having each of the goods separately. Lock-in creates value by preventing the migration of customers and strategic partners to competitors through switching costs. Innovation has the potential of creating value. The sources of value creation show how and where value is created. It's the business model that has to identify the sources of value creation (Vanhaverbeke & Cloudt, 2006)

### 2.2.6.2 Design Method of Business model at corporate level

A firm can also choose to shift its strategy simultaneously in technology, business models, and market domain, see table 11 below. This table depicts the possible technology and market strategies when the current business model is still being used.


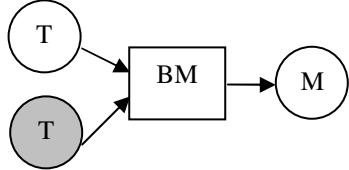
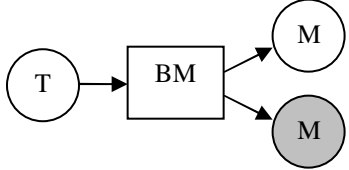
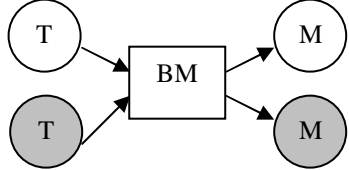
Current Business Model	Current Technology	New Technology
<b>Current Market</b>		
<b>New Market</b>		

Table 11 Current Business Model, Market and Technologies

Table 12 shows the possible technology and market strategies when a new business model is added next to the current one.

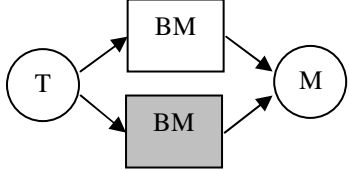
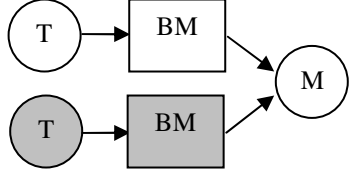
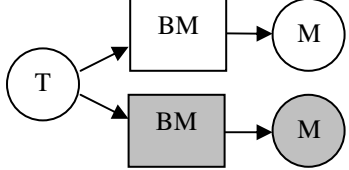
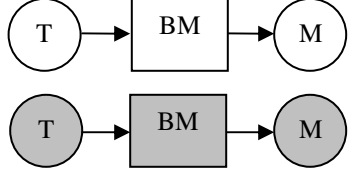
New Business Model	Current Technology	New Technology
<b>Current Market</b>		
<b>New Market</b>		

Table 12 New Business Model, Market and Technologies

### 2.2.6.3 Taxonomy for Business models at corporate level

In theory, business models can have different interaction patterns. Since there are three variables, eight different models (1-1-1, 1-1-many, 1-many-1, etc.) can occur, see table 13 below.


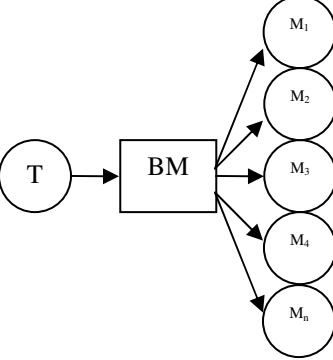
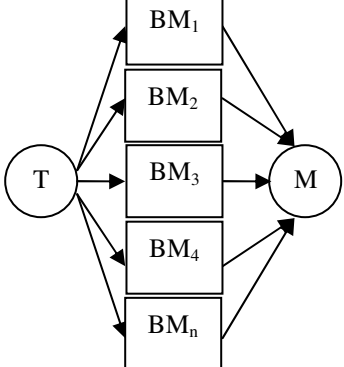
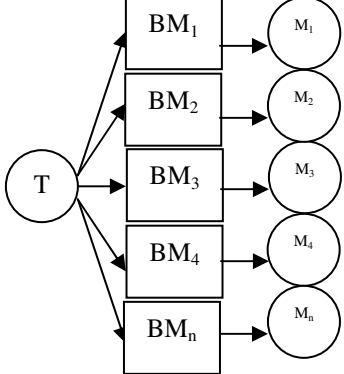
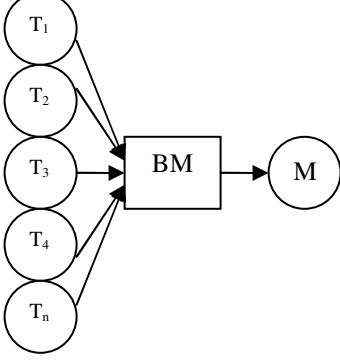
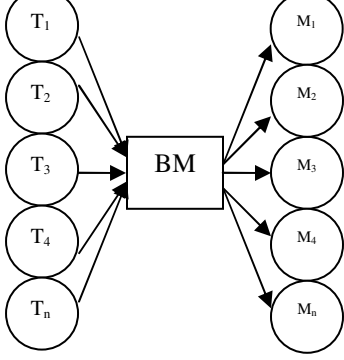
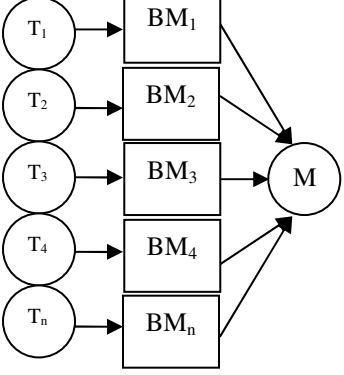
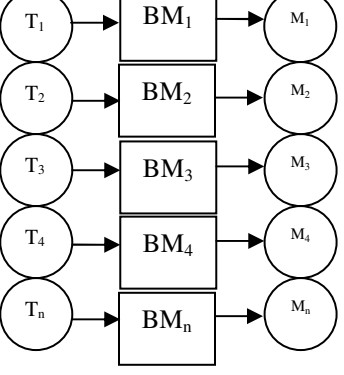
1-1-1	1-1-many	1-many-1
		
<p>Example: Start-up</p>	<p>Example: Bolt and nut</p>	<p>Example: Mobile Phone subscription</p>
1-many-many	many-1-1	many-1-many
		
<p>Example: DSM Dyneema</p>	<p>Example: ASML Wafer machines</p>	<p>Example: Navigation device (car, motorcycle, pedestrian)</p>
many-many-1	many-many-many	
		
<p>Example: Television</p>	<p>Example: Business units</p>	

Table 13 Examples of Extreme Business Models

Using multiple business models simultaneously to capture value from limited technologies and creating value to limited markets can be a useful strategy to experiment the suitability of the business model. This way the best business model can be selected. In addition, having alternative business models decreases the dependency on a single model to sustain profits and growth (Linder & Cantrell, 2001). The strategy of targeting many markets using limited technologies and business models can be useful when the company is experimenting with the best market for its business model. The markets that don't value the product or technology can be removed from the business model. Firms with limited resources should carefully consider which market to enter and which not, because promotion and marketing costs can put a constraint to financial resources. This strategy reduces the market dependency and the accompanying risks to the business model. Companies with limited resources should keep in mind that entering too many markets, can constraint the promotional and marketing budgets. Using multiple technologies is a good way to experiment which attributes the market really values. However, having too many technologies might add attributes that customers don't value, but it will increase the selling price. Managers should use these models to formulate, test, and revise hypotheses if necessary (Magretta, 2002) to determine a well balanced business model. In short, it is not the number of technologies, business models, or markets that is important, but the effectiveness of the business model.

#### 2.2.6.4 Design Method for Open and Closed Business Models

Table 14 shows the possible value creation and value capture strategies. Quadrant I represents a totally closed innovation firm. This firm creates and captures value internally. Since only internal ideas and technologies are commercialized within their current business, no arrows flow in and out through the boundary of the firm. Quadrant II depicts a firm with open value creation and closed value capture processes. This process can be referred as what Chesbrough (2006) calls "outside-in" process. An example of an outside-in process is licensing an IP in from external companies. The external technology crosses the boundary of the firm. Quadrant III represents firms with "inside-out" processes. In other words, these companies have closed value creation, but open value capture processes. Finally, Quadrant IV firms have both "outside-in" and "inside-out" processes. Worded differently, both value creation and capture processes are open.

	Closed Value Capture	Open Value Capture
Closed Value Creation	<p style="text-align: center;">Boundary of firm</p> <p style="text-align: center;">QI e.g. Using own patents</p>	<p style="text-align: center;">QIII e.g. Out-licensing</p>
Open Value Creation	<p style="text-align: center;">QII e.g. In-licensing</p>	<p style="text-align: center;">QIV e.g. In- and Out-licensing</p>

Table 14 Value Capture and Value Creation



### 2.2.6.5 Maturity of Open Business Models

Chesbrough (2006) introduced next to open innovation the term *open business model* and argues that the open business model utilizes both external and internal ideas to create value, while defining internal mechanisms to claim a portion of the captured value. The open innovation changes hands (through selling, buying, licensing, or else) at least once in their journey to the market. The open business model can offer lower costs to innovation, faster times to market, and the chance to share risks with others because the innovation labor is divided to another party (Chesbrough, 2006). However, many business models are closed and make little use of external ideas and technologies (Chesbrough, 2006). Business models differ in openness. In order to classify the openness of business models, Chesbrough (2006) introduced a business model framework (BMF) to determine the maturity stages of business models. The classification system is presented in the table 15 below:

Stage	Name	Characteristics	Example
1	Undifferentiated business model	<ul style="list-style-type: none"> <li>• Commodity</li> <li>• No differentiation</li> <li>• Hard work, hustle, luck</li> <li>• Can't attract capital, can't scale</li> </ul>	most restaurants
2	Differentiated business model	<ul style="list-style-type: none"> <li>▪ Performance advantage</li> <li>▪ Ad hoc processes</li> <li>▪ Hard to sustain</li> <li>▪ One hit wonders</li> </ul>	most technology startups
3	Segmented business model	<ul style="list-style-type: none"> <li>▪ Can serve multiple segments</li> <li>▪ More profit, more volume (low cost)</li> <li>▪ More sustainable</li> <li>▪ Still too internally focused</li> </ul>	many industrial firms; Xerox
4	Externally aware business model	<ul style="list-style-type: none"> <li>▪ Now harnesses external sources of technology to complement internal</li> <li>▪ More at bats with same dollars</li> <li>▪ Share risks as well as rewards</li> <li>▪ Broader market now available to serve</li> </ul>	SAP R/3; Big Pharma
5	Integrated business model	<ul style="list-style-type: none"> <li>▪ External sources routinely utilized to fuel your business model</li> <li>▪ Unused internal ideas allowed to flow outside to other's business models</li> <li>▪ Company becomes a systems integrator of internal and external technologies</li> </ul>	Millennium, other biotech's; IBM Global Services
6	Platform leadership business model	<ul style="list-style-type: none"> <li>▪ Penultimate stage, an ideal</li> <li>▪ Company now benefits from investment of others in the platform. Company can induce investment                             <ul style="list-style-type: none"> <li>• Suppliers, customers, third parties</li> </ul> </li> <li>▪ Ecosystem created                             <ul style="list-style-type: none"> <li>• Company must balance value creation with value capture</li> <li>• Cannot become predatory, destroys ecosystem</li> </ul> </li> </ul>	Ipod; .NET, WebSphere, Dell, Wal-Mart

**Table 15 Business Model Maturity Stages**

Source: Chesbrough (2006b)

I propose the use of the following taxonomy or matrix to determine the maturity of the open business models, see table 16.

	Closed Value Capture	Open Value Capture
Closed Value Creation	I	III
Open Value Creation	II	IV

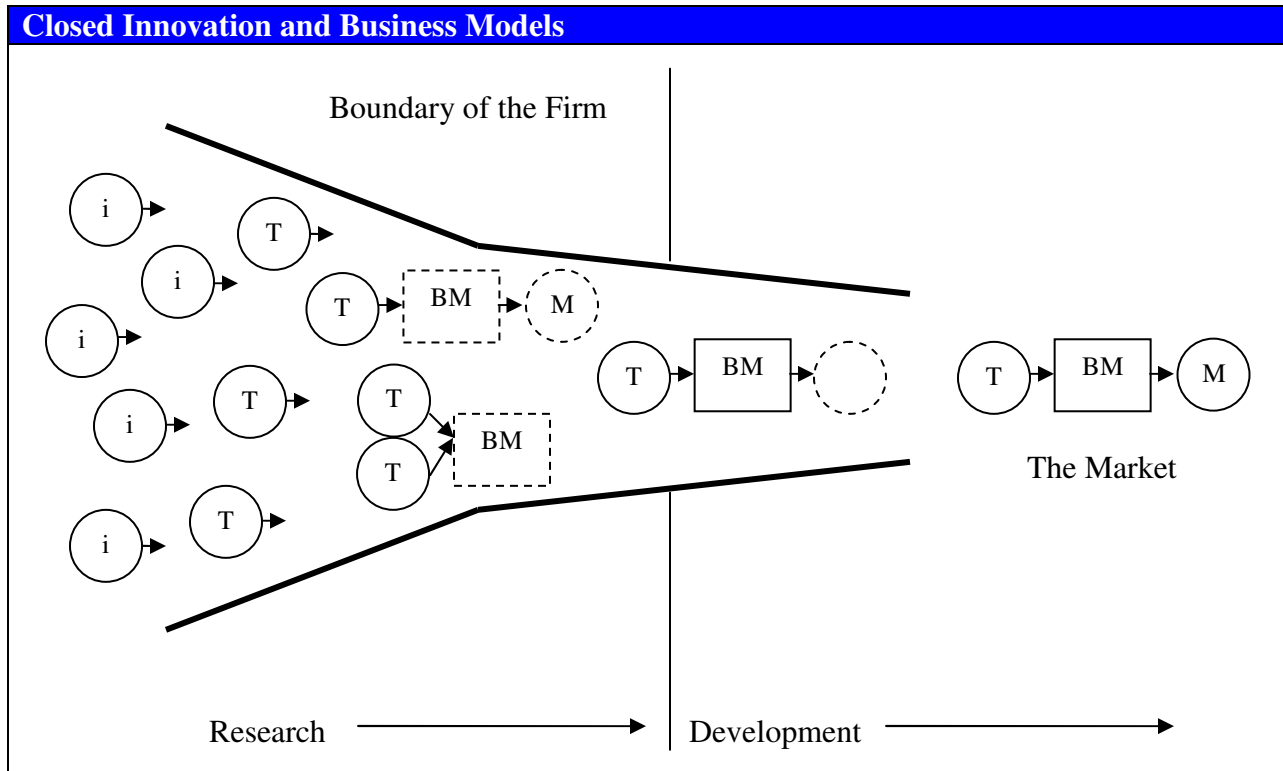
**Table 16 Value creation and Value capture Matrix**

Business models in the first quadrant capture and create value internally. They don't make use of any "outside-in" or "inside-out" processes. Therefore quadrant I business models are considered as the closest ones. Business models with "outside-in" processes belong to the second quadrant. Quadrant three business models innovate the other way around and have "inside-out" processes, but not "outside-in" processes. Quadrant II business models are more closed than quadrant III business models, because companies with quadrant II strategy doesn't have to expose internal developed technologies. The fourth quadrant consists of companies that source externally developed technologies to advance its own business models and expose internally developed technologies to other companies. Companies within this quadrant can be considered as having open business models.

### 2.2.7 Fusion of Closed or open innovation with business models

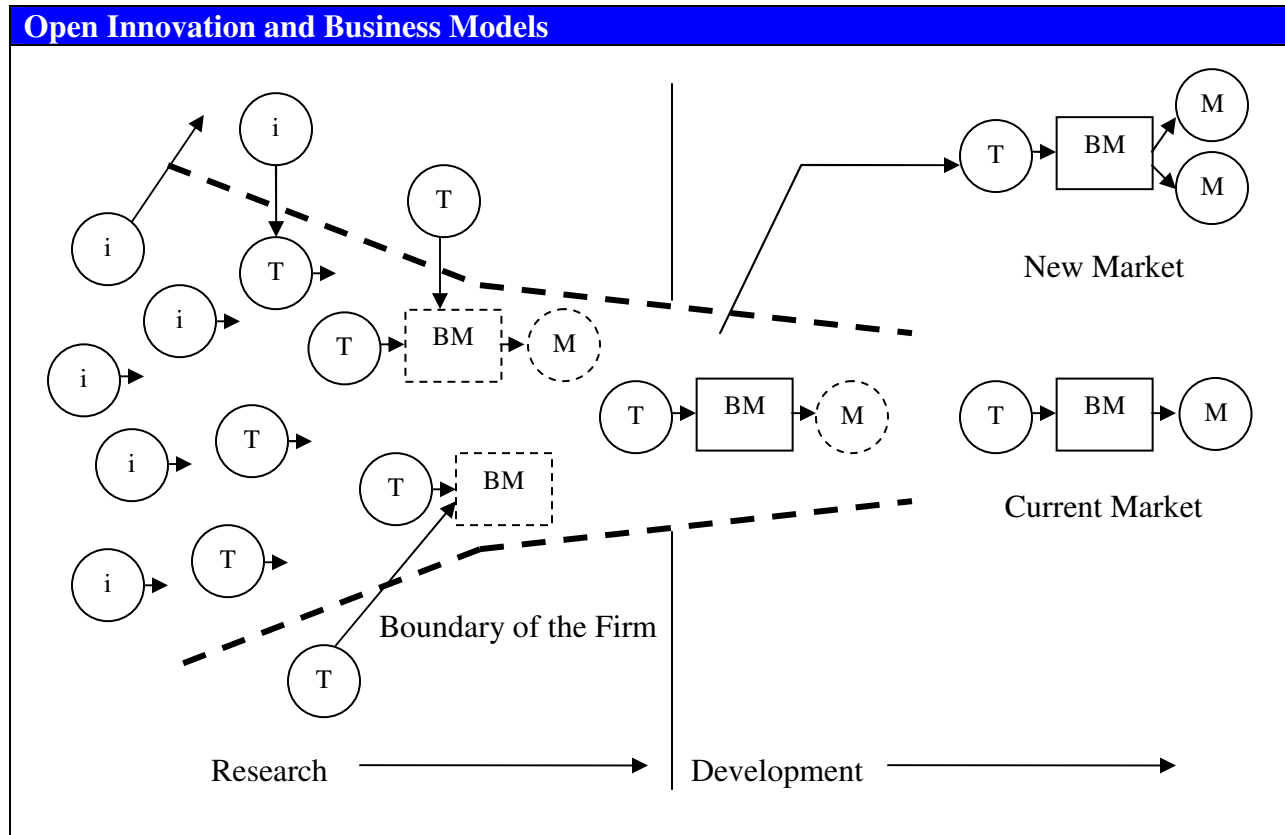
A business model is initiated and developed from an idea. This idea (depicted with an "i" inside a circle in figure 11 and 12) can be a certain description about an existing or non-existing technology, a business model, or a market. The development process of a business model will be an iterative process that flows between the technological and the economic dimension. When an idea survives and is turned into a technology (shown as the symbol in table 3) through research and development, a business model will be created and optimized to unlock the full potential of the technology. The creation and optimizing process is visualized with dashed lines. Step by step, a market will be found that fits into the business model. A business model can use more than one technology to create value in one or more markets. The business model can also be initiated from the market. This is the case when a certain market faces a certain problem that can't be solved or satisfied with current technologies and or products. In this situation, researchers can try to find a technological solution for this particular problem. The business model can be classified as newly born when the product or technology and business model are ready to be launched. Since the technology, business market, and market are clarified, the lines are not dashed anymore. Of course, a business model can be changed, or even replaced after the official launch.

*Closed innovation companies* only commercialize ideas and technologies that are generated and developed within the internal organization (Chesbrough, 2003); the visualization of closed innovation and the birth of business models will look like figure 11.



**Figure 11 Closed Innovation and Business Models**  
 Source: Adopted from Chesbrough (2003)

*Open innovation companies* create ideas and technologies from both internal and external of the organization and capture value through internal and external channels to markets (Chesbrough, 2006). Therefore, open innovation and business models can be depicted as figure 12. As can be seen, internal developed ideas or technologies can flow outside the company and being further developed externally.

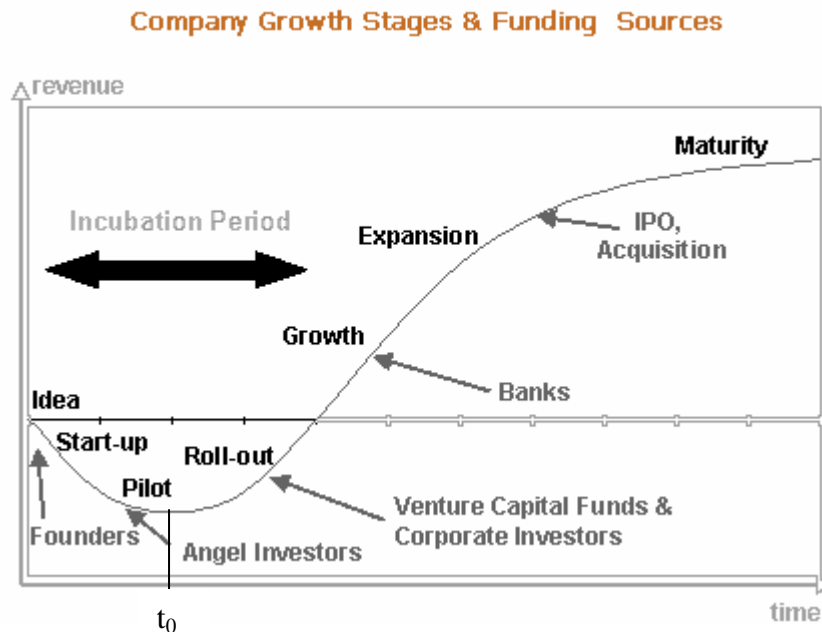


**Figure 12 Open Innovation and Business Models**  
*Source: Adopted from Chesbrough (2003)*

It should be noticed that the boundary between the open innovation company and its surrounding environment is porous; this enables innovations to move more easily between (Chesbrough, 2003). The boundary is represented by a dashed line.

## 2.2.8 Business model evolution

Business models are created from ideas, from value you are able to create, and or from value that you are able to capture. A business model is born when the product or technology is ready to be launched in the specified market by the business model (depicted with  $t_0$ ), see figure 13.



**Figure 13 Company Growth Stages and Funding Sources**

Source: [http://www.business-asia.net/business\\_incubators\\_main.asp](http://www.business-asia.net/business_incubators_main.asp)

But what happens to the business model after the launch ( $t_0$ )? Will it remain static or will it change over time? First of all, once the business model is launched; the underlying assumptions of the model are subjected to continuous testing in the marketplace (Magretta, 2002). Success depends on the ability of the management to tweak or replace parts of the business model (Magretta, 2002). Second, products, technologies, business models and markets will change over time and are influenced by external factors such as political, economical, legally, competitors, corporate strategy and so on, I argue that business models will also adapt these influences and change over time. The main determinants of the changing business model are caused by the strategy of the company. The determinants of how a business model evolves depends on strategic decisions of a company about whether a technology, business model, or market will be added or removed, see figure 9 on page 26. The second group of determinants are strategic decisions about whether the business model sources external ideas and technologies and externalizes internal ideas and technologies, see figure 10 on page 28.

Even though that most business models will be born as depicted in table 8, each business model will evolve differently from that point on. A business model can evolve over time by adding and combining technologies, or certain markets can be entered that require higher standards of the provided value propositions. A business model that was closed at certain moment of time can turn into semi open for a period of time. The other way also occurs; a semi open business model

can turn into a closed business model over time. How a business model will eventually evolve depends on the chosen strategy of the company.

Having said that, most companies will usually reach common milestones at a certain point of time, such as selling the business, merge with competitors, ally with other R&D companies, integrate vertically of the value chain, and so on. Each strategy will result in a different shape of the business model.

### 2.2.8.1 Acquisition

In case of an *acquisition*, the acquiring company might be only interested in the intellectual properties that the acquired company has in its inventory. If this is the case, the acquiring company might capture the IP value and discontinue the business model and creating value for the accompanying market, see situation 1 in table 17. It might happen that the acquiring firm is interested in the business model of an acquired company. The acquiring company might copy exactly and continue with the current business model, but it might add new or remove old technologies to create significantly more value to the accompanying market, see situation 2 in table 17.

Example acquisition	Before Acquisition	After Acquisition
<b>Situation 1</b>		
<b>Situation 2</b>		

Table 17 Business Models and Acquisitions

### 2.2.8.2 Joint Venture

In case of a *joint venture* of two companies, both business models of both companies will continue to exist. The difference is that a new legal entity will be created; usually this will be accompanied with the creation of a new business model(s). The new business model is depicted in the middle of the two companies, see situation 1 in table 18. The two companies might experiment with different business models in order to bundle their value sources and maximize the value creation and value capturing process. Table 16 shows that the two parent companies have poured some of their own technologies into the new joint venture, this is always necessary.

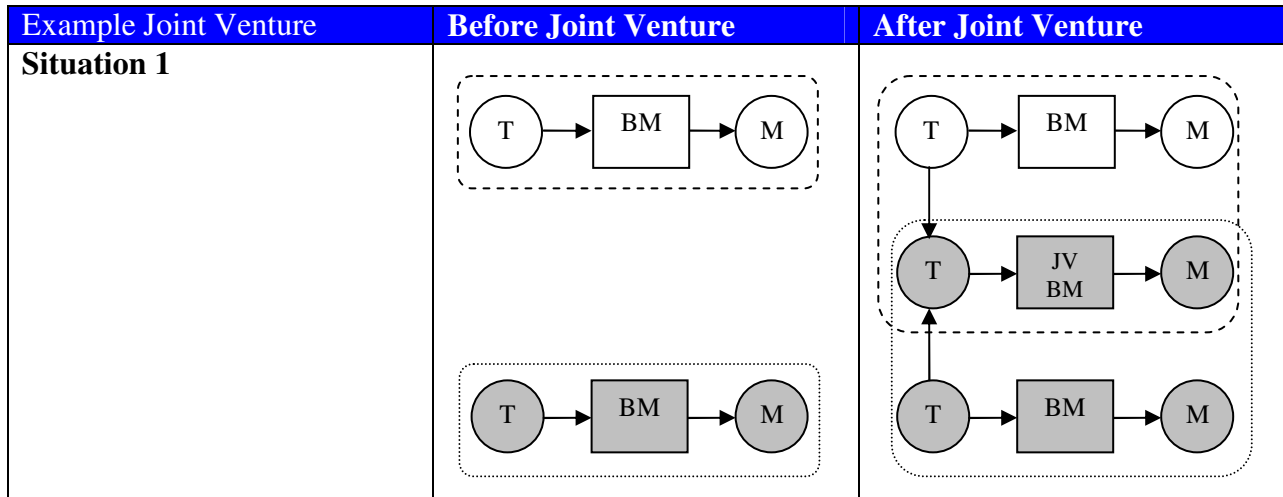


Table 18 Business Model and Joint Ventures

### 2.2.8.3 Alliance

When a company decides to ally with another company, a dyad will be created. This dyad can connect the technologies or markets together, depending on the kind of *alliance*. In case of a cross licensing alliance, all technologies of the allying companies will be pooled together, see situation 1 in table 19. If two companies from different industries ally together because of accessing and creating value for the same market, the two business model are connected through the same market, see situation 2 table 19. This way, these companies can share their market knowledge and experiences with each other.

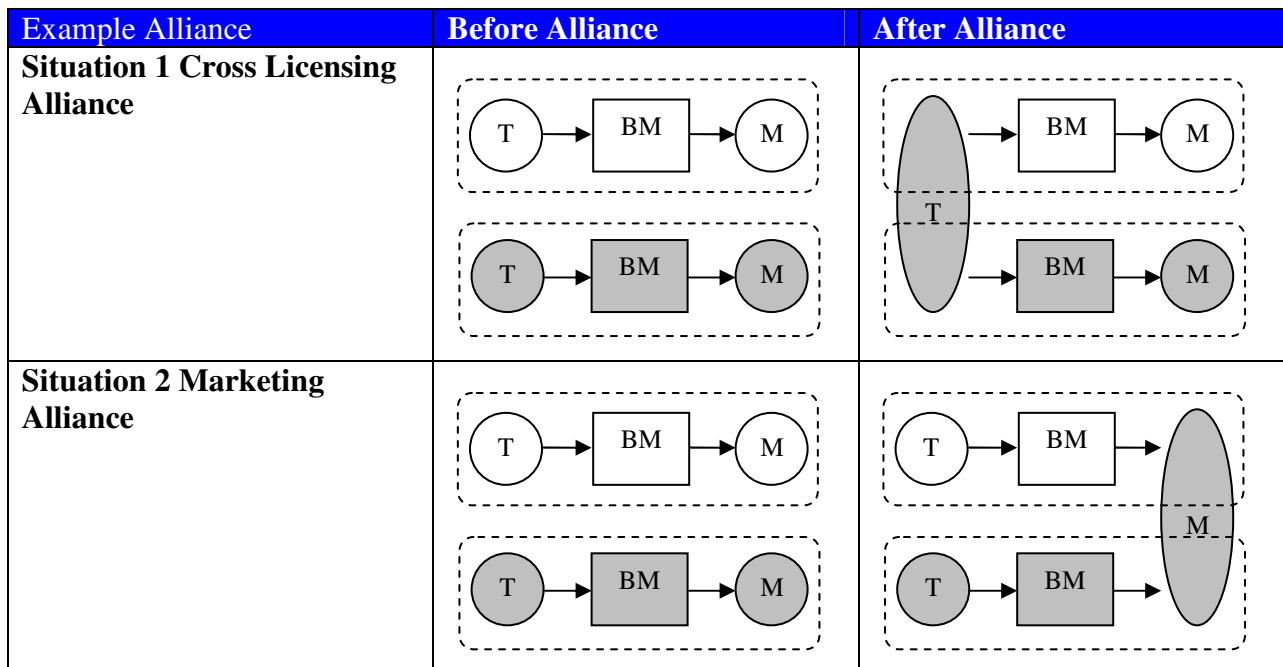


Table 19 Business Models and Alliances

### 2.2.8.4 Outsourcing

*Outsourcing* can affect the business model in a way that it might influence one or more components within the business model. First of all, outsourcing what is “more than good enough” technologies might result in favorable value propositions to the target market of the business model, because the same company can increase its resources to focus on improving technologies or products that are “not good enough” (Christensen et al., 2004). Solving the “not good enough” problems allows firms to create added value to their target market. Situation 1 of table 20 shows the situation of outsourcing a product or technology from one company to the other. In this case, the “white” company (customer) purchases the product or technology from the “grey” company (supplier). It should be noted that the arrow connects the market with technology (in case of outsourcing) and not with the business model (in case of licensing).

Example Outsourcing	Before Outsourcing	After Outsourcing
<b>Situation 1 Outsourcing</b>		

**Table 20 Business Models and Outsourcing**

As can be seen, a business model changes over time as a result of strategic decisions of a company.

### 2.2.9 Business model chains

Business models are part of companies and companies are part of value chains. In turn, value chains are part of value networks. Business models, the basic components that connect these companies into value chains, and in turn connect to value network are responsible for the existence of these larger chains and networks. I call this *business model chains* and business model networks. Business model chains can compete with other business model chains. Business model networks can compete with other business model networks. In the extreme case, there will be totally closed business model chains/networks on the one hand; on the other hand there will be totally open business model chains/networks. In between, there are semi open business model chains and networks. Closed Value Chains consists of companies that purely sources technologies or products from a transactional perspective. None of the companies within the value chain licenses any technology in or out, see table 21. In other words, all companies within the value chain create and capture value internally. An open value chain consists of companies that all individually create and capture value externally, see table 21. A semi open value chain consists of open business models and closed business models, see table 21.



Value Chain	Example
Closed Value Chain	
Semi open Value Chain	
Open Value Chain	

Table 21 Closed, Semi Open, and Open Business Model Chains

Table 22 shows an example of a more simplified way to visualize the openness of value chains.

Value Creation and Value Capture Matrix	Raw Material Supplier	Component Supplier	Manufacturer	Final Product Assembler
IV	■	■	■	■
III				■
II			■	
I	■	■	■	■

Table 22 Openness of Value Chain

### 2.2.10 Business model Network

*Business model network* can compete with other business model networks, just like business model chains do. Closed business model networks are a network of connected business models originating from different companies within the same industry. In contrast, an open business model network consists of connected business models originating from different companies within their own mainstream industry and other industries. The mainstream industry is the industry of their original business and the other industries are accessed through acquiring, in-licensing, selling, out-licensing of technologies from other companies in other industries. An open business model network outperforms the closed business model network in terms of number of connected network partners and variety of partners. The web of an open business model network is therefore much richer than a closed one.

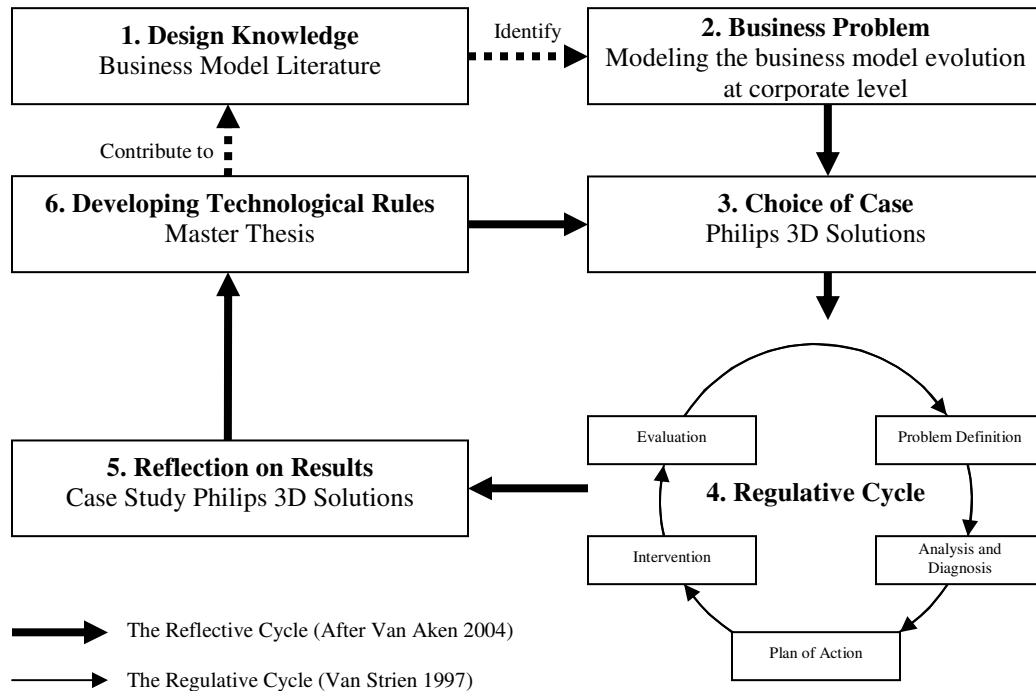
Another difference between closed and open networks is the ability to categorize companies. Companies within a closed network can be relatively easily categorized in one industry. Although, companies within an open network are in general active in several industries, this makes it harder to categorize companies within one industry.

### 2.2.11 Conclusion

This chapter has shown that a business model is an abstract representation of some aspect of a firm’s strategy. Business models are usually described by using business model components. However, business model components only show business models at a point of time (Linder & Cantrell, 2000). Business models have shelf lives because competition catches up, market shifts, and technology changes (Linder & Cantrell, 2000). Due to shifting customer needs, markets, and competitive threats (Linder & Cantrell, 2000), firms must constantly tweak their current business model and find new business models in order to survive and grow (Tucker, 2001). The business model changes as a result of the changing firm’s strategy. Therefore, it can be concluded that business models do evolve over time and it evolves in the way corporate strategists have designed it (changing number of technologies, business models, and markets). Using the modeling technique that is proposed in this chapter one can visualize how a business model evolves over time at corporate-level. Companies with multiple business models can also take advantage of the proposed modeling technique. Hopefully, the modeling technique will provide corporate strategists the ability to easily identify and manage differences, similarities, and synergies between business models. And as a result will improve the understanding and communication between corporate en business strategists.

### 3. Research Methodology

The research methodology of this research follows the roadmap which is developed by Van Aken et al. (2007), see figure 14 below.



**Figure 14 Theory-Based Business Problem Solving**  
 Source: Van Aken et al. (2007)

The research of this thesis can be categorized as a theory-based business problem solving, because it uses literature or theories to solve business problems (Van Aken et al., 2007). The goal is to provide general theory that can be contextualized for use in business problem-solving. After reviewing the current business model literature (**1<sup>st</sup> block**), I identified a potential business problem.

This business problem (**2<sup>nd</sup> block**) is concerned with the business modeling technique at the corporate-level of an organization and only occurs when companies have more than one business model. The proposed business modeling technique can be used to map the evolution of the business models. To test the proposed business modeling technique, a case is selected. The case study methodology can be used to provide description, to test theory, or to generate theory according to Eisenhardt (1989). Yin (2003) distinguished three classes of case studies, namely exploratory, explanatory, and descriptive case studies. The case study that is used in this thesis can be classified as an explanatory one. Explanatory case studies deal with questions like “how or why did something happen?” according to Yin (2003).

Only one case study is selected for research, because single case designs maximize the investigator's access to the evidence, but require careful investigation in order to minimize misinterpretation (Yin, 2003). The case study can therefore be categorized as a *single case holistic design*. The case study design is holistic because the research involves only one unit of analysis. The *unit of analysis*, which defines what the case is, is in this research defined as a business model of an organization.

The case study (**3<sup>rd</sup> block**) is performed at Philips 3D Solutions and the results are presented in chapter 4. Philips 3D Solutions is a relatively young incubator within Philips with a short history. On the one hand, a young organization makes it an ideal case to map the embryonic evolution of the business model. On the other hand, a young organization might not have a long history enough to show business model transitions and evolution.

The case study followed the regulative cycle (**4<sup>th</sup> block**) to solve the business problem. The steps of the regulative circle include problem definition, analysis and diagnosis, plan of action, intervention, and evaluation (Van Aken et al., 2007). The problem definition was how to model the evolution of the business model of Philips 3D Solutions. This includes analyzing the current business model and the construction of possible business model that fits with their future market. The analysis and diagnosis step provided specific knowledge about the development of the business models. Data were collected by using three sources of *quantitative and qualitative evidence*, namely interviews, documentation, and archival records. The collected data were then combined together to construct the business models. Interviews are performed within Philips 3D Solutions. Theoretically, a representative sample of respondents should include both corporate- and business-level strategists within the same company. However, young and small organizations, or single product organizations usually don't make the corporate- and business level distinction. In these organizations, corporate and business level overlap and can therefore be considered as one united strategy. Therefore, interviewees include people from the management team and were selected randomly. The documentation originates from Philips, Philips 3D Solutions, intranet, online newspapers, online branch websites, online research reports assigned by nations (EU for example), and commercial research organizations such as Insight Media, NPD, Ziff Davis Media, Gartner, Frost and Sullivan, and so on. By combining the multiple sources of evidence in the data analysis step, a more reliable study and construct reliability can be achieved because it uses the multiple sources of evidence to measure the same phenomenon. Yin (2003) calls this triangulation. Further, there are four types of triangulation according to Yin (2003); these are *data triangulation*, *investigator triangulation*, *theory triangulation*, and *methodological triangulation*. Data triangulation is also achieved by combining corporate-level and business-level data together. There is no investigator triangulation because the investigation counts only *one investigator*. However, research results were frequently shared and discussed between principals and student. The thesis used taxonomies from other academics to classify the business models and can therefore be considered as triangulation of theory. During the case study research, several case study databases are utilized to organize and document the data and sources of the data collected for case studies. The chosen mode of analysis is pattern-matching. This technique relates pieces of data to some theoretical propositions.

During the plan of action, a solution is designed for the business problem. The solution is based on the business modeling technique that is proposed in the previous chapter. Since the solution didn't disrupt the processes at the corporate level, the intervention could be kept in small scale. The solution was introduced to corporate-level strategists. Members of the management team determined if the results and improvements are achieved during the post-test only evaluation. The whole case study is reflected based on its results (**5<sup>th</sup> block**) with the aim of learning from it. All results are then codified in this master thesis (**6<sup>th</sup> block**). The master thesis will hopefully contribute to the current business model literature, which makes the circle round. The more cases or business problems will be tested using the same business solution, the more robust the business solution will become. The key data of the case study is summarized in the table 23 below.

Key data of the case study	Description
Single- or multiple case study	Single case holistic design
Number of cases	1
Unit of Analysis	Business model
Description of case	Philips, Incubator, Philips 3D Solutions,
Research problem	What is their current business model, what is the gaming business model
Data Sources	<ul style="list-style-type: none"> <li>○ Interviews</li> <li>○ Documentation</li> <li>○ Archival Records</li> </ul>
Investigators	Single Investigator
Output	<ul style="list-style-type: none"> <li>○ Past 3D Solutions Business Model</li> <li>○ Current 3D Solutions Business Model that is serving the current market</li> <li>○ Future 3D Solutions Business Model that might serve the gaming industry</li> </ul>

**Table 23 Key Data of the Case Study**

Construct validity, internal validity, external validity, and reliability are the four tests that judge the quality of the research design (Yin, 2003). In order to increase the quality of the research design, several tactics are used. Multiple sources of evidence are used, a chain of evidence is recorded, and some key informants within Philips 3D Solutions have reviewed the drafts of the case study in order to improve the *construct validity*. Pattern matching and addressing rival explanations will increase the *internal validity*. *External validity* increases when theory is used within the single case study. During the data collection phase, a database is used to store the data. Data triangulation was performed during data analysis phase. This has increased the *reliability* of the research design.

## 4. Case Study

This chapter will first start with a paragraph that shortly introduces the mother company Philips and the technology incubator venture Philips 3D Solutions which represents the case. The organization of the rest of this chapter is structured in a chronological way. So, the second paragraph will provide a description of the past and current strategy and business model. The third paragraph describes the future strategy and business model of Philips 3D Solutions. The fourth paragraph of this chapter will present the evolution of the business model of Philips 3D Solutions. The fifth and the final paragraph provides some recommendations for Philips 3D Solutions. Most of the case study is labeled as confidential and is therefore relocated to the appendix.

### 4.1 Introduction of the case

#### 4.1.1 Philips

Philips is with a sales volume of 27.0 billion euro (realized in 2006) one of the worlds biggest and Europe's largest electronics companies. The company employs approximately 122,000 employees in more than 60 countries worldwide. It is a global leader in color television sets, lighting, electric shavers, and medical diagnostic devices. The four main businesses of Philips are Domestic Appliances and Personal Care (DAP), Lighting, Medical Systems, and Consumer Electronics. Philips is with 80,000 registered patents, 26,000 trademarks, 15,000 design rights and 1,600 domain name registrations an innovative organization. In 2005 Philips ranked 1<sup>st</sup> that filed the largest number of patent applications with the European Patent Office.

#### **New Business Development and Philips Technology Incubator**

Philips has established three types of incubators (healthcare, lifestyle, and technology) to help business teams developing ideas into new business. The Philips Technology Incubator aims to further develop novel technology created by Philips Corporate Technologies. Philips Corporate Technologies includes innovation and emerging businesses. The Philips Technology Incubator only invests in novel technologies created by Philips Corporate Technologies. It does not invest in external ventures. The technology portfolio of Philips Technology Incubator consists of:

- Handshake Solutions
- Silicon Hive
- Polymer Vision
- Content Identification
- 3D Solutions
- amBX

#### 4.1.1 Philips 3D Solutions

Philips 3D Solutions is one of the technology incubators within Philips. This technology incubator venture was founded in 2005 to commercialize the 3D technology that was developed within Philips Corporate Technologies. The head office of Philips 3D Solutions is located in

High Tech Campus in Eindhoven. Philips 3D Solutions sells 3D displays in the digital signage market, see figure 15.



**Figure 15 3D display of Philips 3D Solutions**  
 Source: *Internet Website of Philips 3D Solutions*

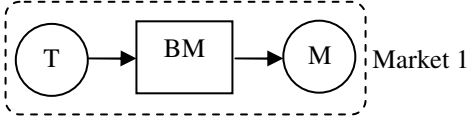
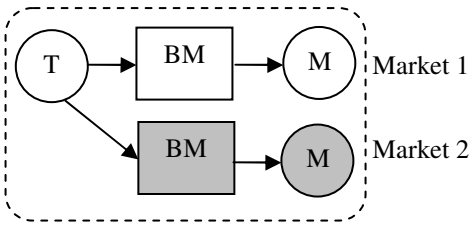
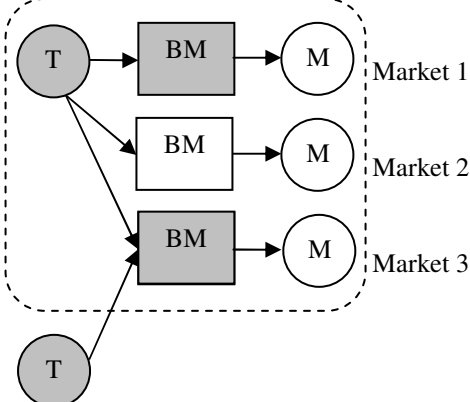
The Philips 3D displays are based on auto stereoscopic 3D technology. The auto stereoscopic technology makes sure that viewers don't need to wear special glasses in order to see and experience 3D effects. Philips calls its 3D technology WOWvx. The WOWvx technology can be considered as an emerging breakthrough innovation.

**Example of the rest of the case study**

The rest of this chapter is relocated to the appendix due to confidentiality issues. In spite of that, I will provide some guidelines how to structure the case study for research replication reasons and show some examples how the evolution of a business model can look like for readers.

Using the business model and strategy constructs that are defined in the literature review chapter, one can collect and reconstruct the business models and strategies of the case study company. The business models and strategies can be described and presented in chronological order starting from the idea, the idea that is turned into a technology, the launch of the business model, the current business model, and the future business model. The descriptions should be translated and modeled into symbols of the mapping technique that are presented in thesis. After modeling all business models at business-level, one can show the evolution of the business model at corporate-level. The evolution of a business model might look like table 24:

Time	Description	BM-Taxonomy	Business Model Evolution
	Idea about Flat Panel Display		(i)
	Research turning idea into LCD technology		(T)

T <sub>0</sub>	Launch business including LCD Display Calculators	B2B, Closed, Demand-Pull, Manufacturer, 1-1-1, I	
T <sub>1</sub>	Launch of LCD Display Watches	B2B, Closed, Supply-Push, Manufacturer, 1-many-many, I	
T <sub>2</sub>	Future market LCD display for Microwave Displays	B2B, Open Value Creation, Closed Value Capture, Supply-Push, Manufacturer, many-many-many, II	

**Table 24 Example of business model evolution**

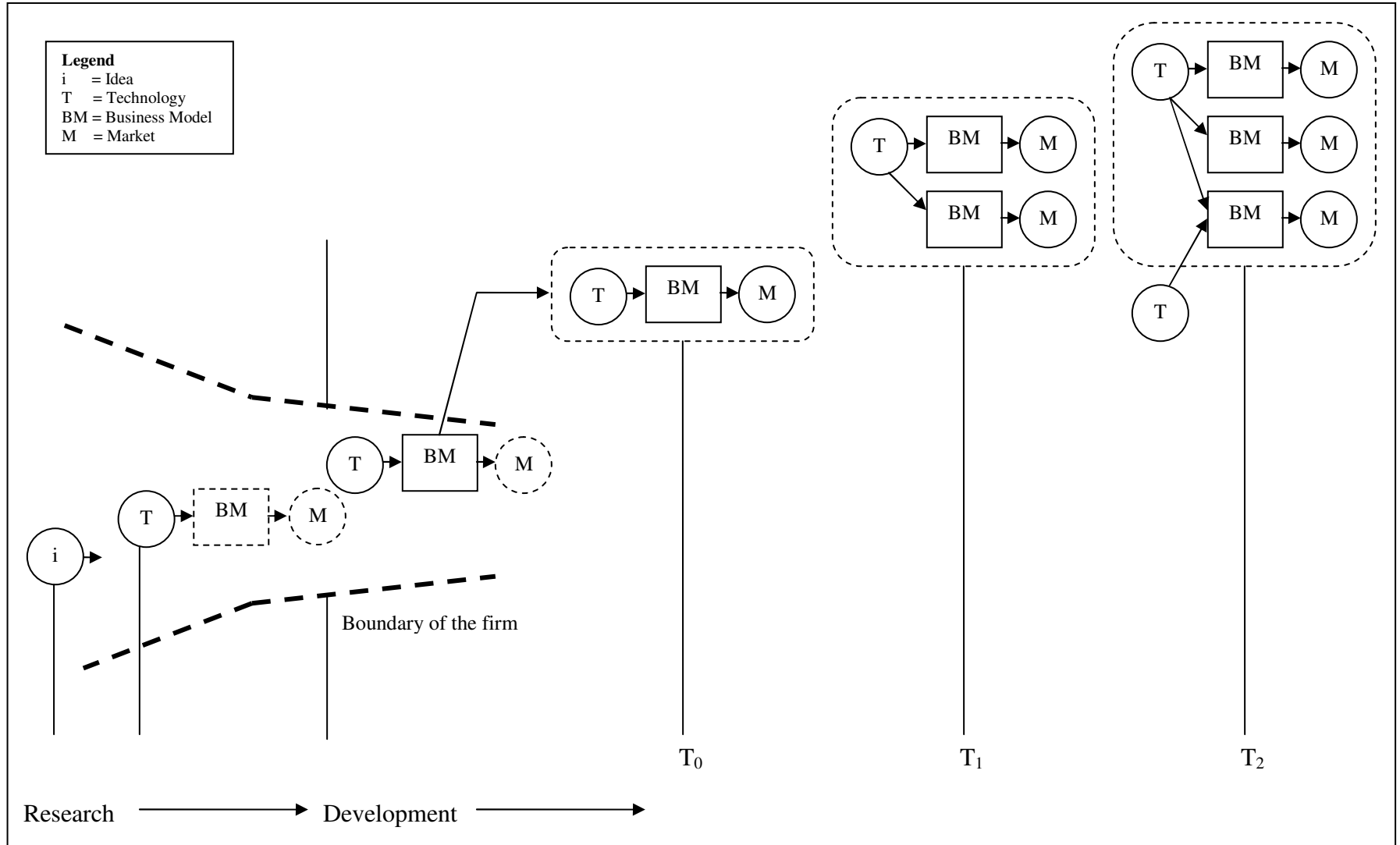
Table 24 serves as an example to show how a business model can evolve over time. The LCD technology is chosen for explanatory purposes.

The evolution of business model can be described in the following way. The idea to develop a Flat Panel Display has been a dream of every researcher. The real research and development of the LCD display took place in 1960 for example. After conducting research and development for 20 years the company succeeded in turning the idea into a technology. The company found a market and constructed a business model to create value using their LCD technology and to capture value from their target customers. The business and business model was launched at 1980 (T<sub>0</sub>). After 5 years of additional research in the 3D technology, the company managed to develop a LCD display for watches and was launched in 1985 (T<sub>1</sub>), and etcetera. Table 25 shows how the evolution of all business models within an incubator can look like.

The mapping technique can be supported by business model taxonomies to characterize the presented business models. In this example, the B2C / B2B (Alt & Zimmerman, 2001), open or closed value creation and open or closed value capture, supply-push and demand-pull (MacInnes, 2005), 16 business models based on asset rights and asset types (Weill et al., 2004; Malone et al., 2006; Lai et al., 2006), and the interaction pattern presented in this paper are used.



By combining the business model and open innovation theory, table 25 shows the embryonic evolution of the business model of an incubator using the proposed mapping technique. The mapping technique is developed for corporate strategists to manage multiple business models and to simplify the identification of differences, similarities, and synergies between business models.



**Table 25 Example Evolution of Business Model from an Incubator**

## 5. Conclusion, Discussion, and Recommendations

### 5.1 Conclusion

*“What is a business model?”*

A business model is an abstract representation of some aspect of a firm’s strategy (Seddon & Lewis, 2003). Business models can be described by using business model components.

*“Why does a Business Model evolve over time?”*

From both theoretical and empirical point of view, it can be concluded that business model components describe business models at a point of time. Due to shifting customer needs, markets, and competitive threats (Linder & Cantrell, 2000), firms must constantly tweak their current business model and find new business models in order to survive and grow (Tucker, 2001). Business models change as a result of the firm’s changing strategy. Therefore, it can be concluded that business models do evolve over time and it evolves in the way corporate strategists have designed it (changing number of technologies, business models, and markets).

*How does a Business Model evolve over time?”*

Even though that most of the business models start in almost the same structure (creating value with limited technologies and capturing value from limited markets), over time depending on its actors it develops and evolves on its own way. The strategy of the company, the introduction of new technologies, and the maturity of old technologies and markets are the main drivers that will affect the evolution of the business model. Some business models will eventually be dominated by the number of technologies, others by the number of business models, and others by the number of markets. A business model can turn from totally closed into totally open and vice versa or it can turn partly open. The business model is partly open when value creation is open and value capture is closed and vice versa. As with technologies, business models also have a life cycle and must be cannibalized or revolutionized over time in order to survive.

*“How to visualize the evolution of the business model?”*

The thesis has proposed a mapping technique and has showed that this is a way to visualize the evolving business model(s) over time at corporate level. By combining the business model and open innovation theory, it is even possible to visualize the embryonic evolution of the business model using the proposed mapping technique. The mapping technique is developed for corporate strategists to manage multiple business models and to simplify the identification of differences, similarities, and synergies between business models. Future research should prove whether the proposed technique has really reduced the communication gap or not.

## **5.2 Discussion**

Due to the newness of the mapping technique, one can argue what the exact definitions are for technology and market that is used in the mapping technique. Is technology defined as everything that is patented? Is market defined as an industry or as different market segments? Again, this depends on the desirable abstraction level. The first question you should question yourself is: “How is technology defined in the business model level?” Only relevant technologies that really contribute to the business model should be addressed. It can turn out that a technology will be abstract enough at module level; others might find component level relevant. Second, from a corporate-level perspective, the technologies that were considered as relevant for the business model level might be too detailed for corporate strategists. For example, corporate strategists may consider the 3D display product / technology to be representative as one technology, instead of the many component technologies. The same logic counts the definition of the market.

Another issue is the change of one component within the business model, is this considered as an evolutionary change of the business model or not? For example, the company works with an additional distributor that expands the same market but in another continent. Well, using the same product to sell in an additional continent doesn't change the value propositions of the business model. I argue that as long as the value propositions remain the same, then the business model should not be considered as evolving.

## **5.3 Managerial Recommendations**

Technologies and business models have limited life cycles and can't last forever. The value of technologies can be extended by using patents. Even though, they have to be cannibalized in the long term.

Corporate strategists should experiment with and explore technologies, business models, and markets. Through probing and learning, it is possible to improve it in order to grow the business. It is important to learn as fast as possible from technologies, business models, and markets, because this knowledge can be turned into competitive advantage. However, do not blind yourself by focusing only on technology for example, but keep this process interactive. A business model can serve as the scientific method for managers to test hypotheses (Magretta, 2002).

Furthermore, corporate strategists can use the interaction pattern and value creation and value capture taxonomies / tools to analyze the business models of value chain and network partners and competitors.

## 6. Research Limitations and Future Research

### 6.1 Research Limitations

As with every research, this research has also its own limitations. The limitations of this research are related to the research methodology and the number of case studies performed. From research methodological point of view, the research counts only one investigator. The investigator might be biased in one way or another, which affects the reliability of the study. However, the bias might be mitigated by standardizing research procedures and frequently sharing documents and thoughts with principles and superiors. The number of case studies performed can greatly affect the generalizability of theories. The thesis only investigated one case study and is externally not valid. It is therefore not possible to conclude that the proposed mapping technique can really reduce the communication gap between corporate and business strategists. However, the thesis has identified a possible communication gap and has provided a possible solution for it. Future research will prove whether the proposed solution is robust enough or not.

### 6.2 Future Research

“A good theory is the result of rigorous methodology and comparative, multi-case logic.” (Eisenhardt, 1991, p.627). The mapping technique is only tested with one case. Repeating case study makes cross case analysis possible. Furthermore, findings of earlier cases can be replicated and hypotheses of earlier cases can be tested (Van Aken et al., 2007). This doesn't mean that an infinite number of case studies are needed to test the technique. The appropriate number of cases depends on how much is known and how much new information is likely to be learned from incremental cases (Eisenhardt, 1991). Future research should use the current experiences and apply the technique to more complex cases (companies with more business models) like: established companies, companies in other industries, companies in other countries or continents in order to learn from the extremes. Applying the mapping technique in multiple and diverse cases, one can conclude whether the mapping technique can reduce communication gap between corporate and business strategists.

Another interesting future research is the relationship between technology, markets, and strategy on business model components. Knowing this can increase our awareness of what causes success or failure.

Finally, competition between closed, semi-open, and closed business models (business model chains, and business model networks) will add a new dimension in both open innovation and business model literature.

## References

### Books

- Afuah, A. (2004) *Business Models: A Strategic Management Approach*. New York, NY: McGraw-Hill/ Irwin. From Van de Vrande, V., Lemmens, C., Vanhaverbeke, W. (2006), Choosing Governance Modes for External Technology Sourcing, *R&D Management* 36, 3, pp. 347-363
- Burgelman, R.A. Christensen, C.M., Wheelwright, S.C., *Strategic Management of Technology and Innovation*, McGraw-Hill, fourth edition, 2004
- Chesbrough, H.W., *Open Business Models How to Thrive in the New Innovation Landscape*, Harvard Business School Press, 2006
- Chesbrough, H.W., Vanhaverbeke, W.P.M., West, J., eds., *Open Innovation: Researching a New Paradigm*, Oxford, Oxford University Press, 2006
- Christensen, C.M., Anthony, S.D., Roth, E.A., *Seeing What's Next Using Theories of Innovation to predict Industry Change*, Harvard Business School Press, Boston, 2004
- Grindley, P., *Standards, Strategy, and Policy* Oxford University Press, 1995
- Jobber, D., Fahy, J., *Foundations of Marketing*, McGraw-Hill Education, 2003
- Johnson, G., Scholes, K., Whittington, R., *Exploring Corporate Strategy: Text and Cases*, Prentice Hall, 2005
- Kim, W.C., Mauborgne, R., *Blue Ocean Strategy How to Create Uncontested Market Space and Make the Competition Irrelevant*, Harvard Business School Press, Boston, 2005
- Kotler, P., *Marketing Management: The Millennium Edition*, Prentice-Hall International, 2000
- Mohr, J., Sengupta, S., Slater, S., *Marketing of High-Technology Products and Innovations*, New Jersey, Pearson Education, 2005
- Parr, R.L., Sullivan, P.H., *Technology Licensing Corporate Strategies for Maximizing Value*, John Wiley & Sons, Inc., 1996
- Rogers, E.M., *Diffusion of Innovations*, New York: The Free Press, 1983
- Van Aken, J.E., Berends, H., Van der Bij, H., *Problem Solving in Organizations: A Methodological Handbook for Business Students*, Cambridge University Press, 2007
- Vanhaverbeke, W., Cloudt, M. (2006) "Open Innovation in Value Networks". In: Chesbrough, H., Vanhaverbeke, W., West, J. (Eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, 2006
- White, E.P., *Licensing A Strategy for Profits*, Licensing Executives Society, 1997
- Yin, R.K., *Case Study Research: Design and Methods*, Second Edition, Applied Social Research Methods Series Volume 5, Sage Publications, 2003

### Journals

- Alt, R., Zimmerman, H.D. (2001), Preface: Introduction to Special Section Business Models, *Electronic Markets*, Volume 11(1), pp. 3-9
- Amit, R., Zott, C. (2001), *Value Creation in E-Business*, *Strategic Management Journal*, No: 22, pp. 493-520

- Bartelt, A., Lamersdorf, W. (2001), A Multi-criteria Taxonomy of Business Models in Electronic Commerce, *L. Fiege, G. Muhl, and U. Wilhelm (Eds.): WELCOM 2001, LNCS 2232, Springer-Verlag Berlin Heidelberg 2001*, pp. 193-205
- Basu, A., Mazumdar, T., Raj., S.P. (2003), Indirect Network Externality Effects on Product Attributes, *Marketing Science*, Vol. 22, No. 2, pp. 209-221
- Besen, S.M., Farrell, J. (1994), Choosing How to Compete: Strategies and Tactics in Standardization, *The Journal of Economic Perspectives*, Vol. 8, No. 2, pp. 117-131
- Chesbrough, H.W. (2003), The era of open innovation, *MIT Sloan Management Review*, Spring, Vol. 44, No. 3, pp. 35-41
- Chesbrough, H.W., Rosenbloom (2002), The role of the Business Model in capturing value from Innovation: Evidence from Xerox Corporation's Technology Spin-off companies, *Industrial and Corporate Change*, Volume 11, No. 3, pp. 529-555
- Christensen, C.M. (2002), Exploring the Limits of the Technology S-Curve. Part I: Component Technologies, *Production and Operations Management*, Vol. 1, No. 4, pp. 334-357
- Eisenhardt, K.M. (1989), Building Theories from Case Study Research, *The Academy of Management Review*, Vol. 14, No. 4, pp. 532-550
- Eisenhardt, K.M. (1991), Better Stories and Better Constructs: The Case of Rigor and Comparative Logic, *The Academy of Management Review*, Vol. 16, No. 3, pp. 620-627
- Gordijn, J., Akkermans, H. (2001), Designing and Evaluating e-Business Models, *IEEE Intelligent Systems*, pp. 11-17
- Hedman, J., Kalling, T. (2003), The Business Model Concept: Theoretical Underpinnings and Empirical Illustrations, *European Journal of Information Systems*, 12, pp. 49-59
- Hilmola, O.P., Helo, P., Holweg, M. (2005), On the Outsourcing Dynamics in the Electronics Sector: The Evolving role of the Original Design Manufacturer, *Judge Institute of Management*, University of Cambridge, pp. 1-31
- Lagha, S.B., Osterwalder, A., Pigneur, Y. (2001), Modeling e-Business with eBML, In *Proceedings of 5<sup>th</sup> International Conference on Management of Networked Enterprises (CIMRE), Mahdia, October 25-26*
- Lai, R., Weill, P., Malone, T.W. (2006), Do Business Models Matter?, MIT Sloan School of Management, pp. 1-35
- Linder, J., Cantrell, S. (2000), Changing Business Models: Surveying the Landscape, *Accenture Institute for Strategic Change*, pp. 1-15
- Linder, J., Cantrell, S. (2001), Five Business Model Myths that hold Companies back, *Strategy & Leadership*, 29, 6, pp. 13-18
- Lord, M.D., Mandel, S.W., Wager, J.D. (2002), Spinning out a Star, *Harvard Business Review*, pp. 115-121
- MacInnes, I. (2005), Dynamic Business Model Framework for Emerging Technologies, *International Journal Services Technology and Management*, Vol. 6, No. 1, pp. 3-19
- Magretta, J. (2002), Why Business Models Matter, *Harvard Business Review*, R0205F, pp. 1-8
- Mahadevan, B. (2000), Business Models for Internet-Based E-Commerce: An Anatomy, *California Management Review*, Vol. 42, No. 4, pp. 55-69

- Malone, T.W., Weill, P., Lai, R.K., D'Urso, V.T., Herman, G., Apel, T.G., Woerner, S.L. (2006), Do Some Business Models Perform Better than Others?, MIT Sloan Working Paper 4615-06, pp. 1-34
- McGann, S.T., Lyytinen, K. (2002), Capturing the Dynamics of e-Business Models: The e-Business Analysis Framework and the Electronic Trading Infrastructure, In *Proceedings of 15<sup>th</sup> Bled Electronic Commerce Conference – e-Reality: Constructing the e-Economy*, Bled, Slovenia, June 17-19, 2002, pp. 36-54.
- Normann, R., Ramirez, R. (1993), From Value Chain to Value Constellation: Designing Interactive Strategy, *Harvard Business Review*, July-August, pp. 65-77
- Osterwalder, A. (2004), The Business Model Ontology A Proposition in a Design Science Approach, Ph.D. dissertation, University of Lausanne
- Osterwalder, A., Pigneur, Y. (2002), An e-Business Model Ontology for Modeling e-Business, In *Proceedings of 15<sup>th</sup> Bled Electronic Commerce Conference – e-Reality: Constructing the e-Economy*, Bled, Slovenia, June 17-19, 2002, pp. 1-12
- Papakiriakopoulos, D.A., Poylumenakou, A.K., Doukidis, G.J. (2001), Building e-Business Models: An Analytical Framework and Development Guidelines, In *Proceedings of 14<sup>th</sup> Bled Electronic Commerce Conference*, Bled, Slovenia, June 25-26, 2001, pp. 446-464.
- Pateli, A.G. (2002), A Domain Area Report on Business Models – White Paper, Athens, Athens University of Economics and Business, pp. 1-47
- Pateli, A.G., Giaglis, G.M. (2004), A Research Framework for Analyzing eBusiness Models, *European Journal of Information Systems*, 13, pp. 302-314
- Petrovic, O., Kittl, C., Teksten, R.D. (2001), Developing Business Models for e-Business, In *Proceedings of International Conference on Electronic Commerce 2001*, Vienna: October 31-November 4, 2001
- Pouloudi, A., Ziouvelou, X., Vassilopoulou, K. (2003), A Societal Perspective on E-Business Adoption, *Info. Comm. & Ethics in Society*, 1:1, pp. 31-47
- Seddon, P.B., Lewis, G.P. (2003), Strategy and Business Models: What is the Difference?, In *Proceedings of 7<sup>th</sup> Pacific Asia Conference on Information Systems*, 10-13 July 2003, Adelaide, South Australia, pp. 236-248
- Strube, J., Schade, S., Schmidt, P., Buxmann, P. (2007), Simulating Indirect Network Effects in the Video Game Market, In *Proceedings of the 40<sup>th</sup> Annual Hawaii International Conference on System Sciences (HICSS'07)*, pp. 1-10
- Sull, D.N. (1999), Why Good Companies go Bad, *Harvard Business Review*, Vol. 77, No. 4, pp. 42-52
- Timmers, P. (1998), Business Models for Electronic Markets, *Electronic Markets*, Vol. 8, No. 2, pp. 3-8
- Tucker, R. (2001), Strategy Innovation takes Imagination, *Journal of Business Strategy*, Vol. 22., No. 3, pp. 23-7
- Van de Vrande, V., Lemmens, C., Vanhaverbeke, W. (2006), Choosing Governance Modes for External Technology Sourcing, *R&D Management* 36, 3, pp. 347-363
- Voelpel, S.C., Leibold, M., Tekie, E.B. (2004), The Wheel of Business Model Reinvention: How to Reshape your Business Model to Leapfrog Competitors, *Journal of Change Management*, Vol. 4, No. 3, pp. 259-276



- Weill, P., Malone, T.W., D'Urso, V.T., Herman, G., Woerner, S.L. (2004), Do some Business Models Perform better than Others? A Study of the 1000 Largest US Firms, MIT Sloan School of Management Working Paper, pp. 1-39

### Articles

- BBC (2006), Film Director 'sees future in 3D', published at April 25<sup>th</sup> 2006
- Chesbrough, H. (2006a), Open Innovation and Open Business Models: A New Approach to Industrial Innovation, Presentation to Joint OECD/ Dutch Ministry of Economic Affairs Conference on "Globalization and Open Innovation", Published on Dec. 6, 2006
- Chesbrough, H. (2006b), The Business Model: A Primer, Presentation to Lester Center's, Best Practice Series, Published on Februari 22, 2006
- CNET (2006), Playstation 3 Component Prices: Why so High?, author Michael Kanellos
- DDD (2005), Dynamic Digital Depth (DDD) and Real-time 2D to 3D conversion on the ARM processor, Published at November 2005
- Display Search (2005), Flat Panel Display Market Outlook, author David Hsieh, published at November 5<sup>th</sup> 2005
- ESA (2006), Essential Facts About the Computer and Video Game Industry – 2006 Sales, Demographic and Usage Data
- Forrester (2006), North American Video Gaming: Surviving a Milddlife Slowdown
- Ip, B. & Adams, E. (2002), From Casual to Core: A Statistical Mechanism for Studying Gamer Dedication, Gamasutra, Published at June 5<sup>th</sup> 2002
- iSuppli (2006), Playstation 3 offers supercomputer performance at PC Pricing, iSuppli's Teardown Analysis Reveals, published at November 16<sup>th</sup> 2006
- Nielsen (2006), The State of the Console – Video Game Console Usage Fourth Quarter 2006
- NPD (2006), Power Players in Mobile Gaming, Wireless Bulletin, author Drew Hull
- NPD (2007), NPD: 25-34 Age Group Biggest Mobile Gamers, Gamasutra, Published at April 25<sup>th</sup> 2007
- Philips (2007), Circle, Philips Research' Employees Magazine, Vol. 20, pp. 1-20
- TXP (2006), The Economic Impact of Austin's Entertainment Software/ Digital Media Industry, Published at September 2006
- X-bit Labs (2006), Nintendo Wii Costs About \$160 to Manufacture, Published by Anton Shilov on December 15<sup>th</sup> 2006
- Ziff Davis Media (2006), Digital Gaming in America

### Websites

- [www.business-asia.net/business\\_incubators\\_main.asp](http://www.business-asia.net/business_incubators_main.asp)
- [www.business-model-design.blogspot.com/atom.xml](http://www.business-model-design.blogspot.com/atom.xml)
- [www.business-sites.philips.com/3dsolutions/about/Index.html](http://www.business-sites.philips.com/3dsolutions/about/Index.html)
- [www.nintendo.com](http://www.nintendo.com)
- [www.philips.com](http://www.philips.com)
- [www.playstation.com](http://www.playstation.com)
- [www.slideshare.net/Alex.Osterwalder/business-model-template](http://www.slideshare.net/Alex.Osterwalder/business-model-template)
- [www.xbox.com](http://www.xbox.com)

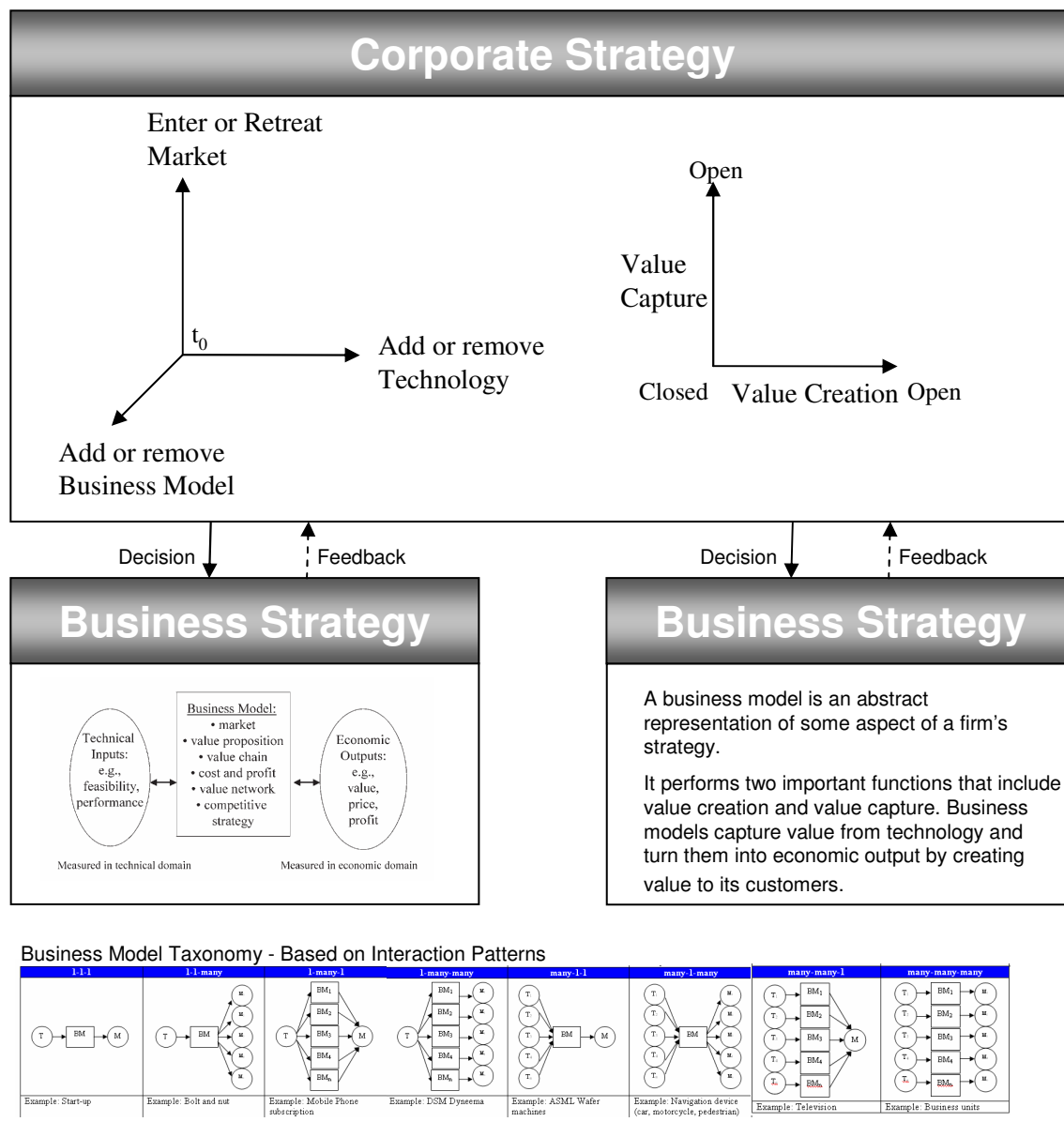


# Evolution of the Business Model

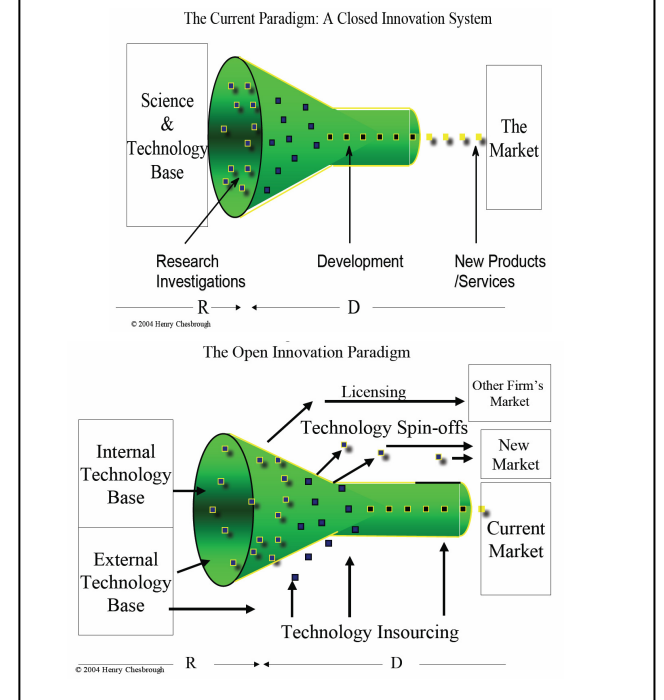
## 1. Research Question

"Why and how does a Business Model evolve over time?"

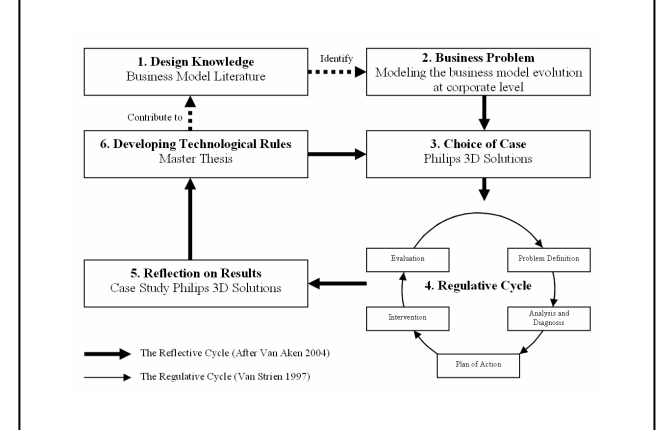
## 2a. Business Model Theory



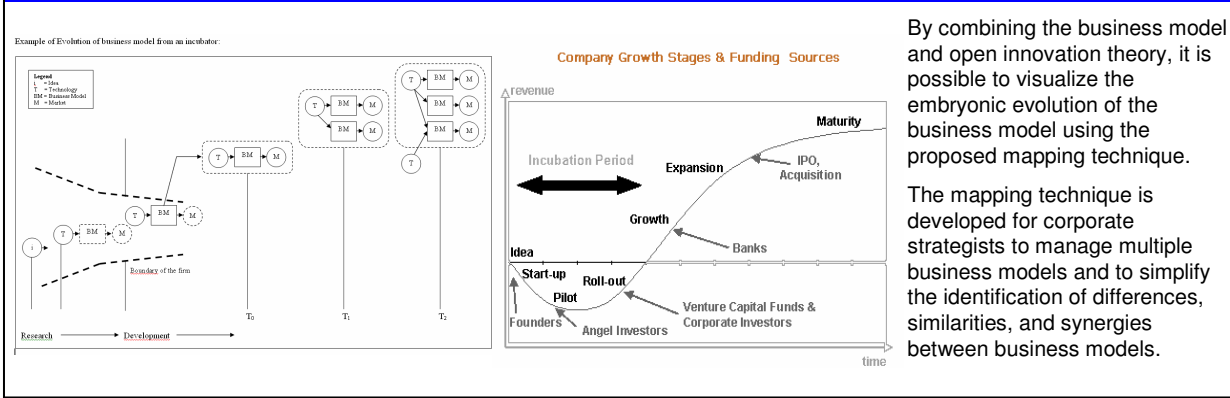
## 2b. Open Innovation Theory



## 3. Methodology



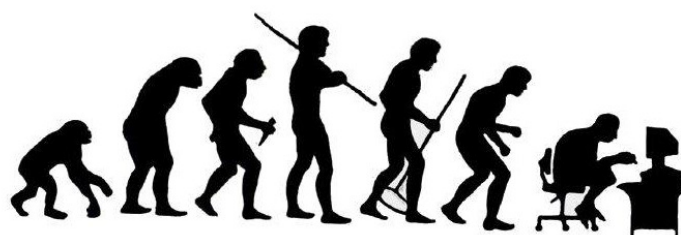
## 4. Results - Business Model Evolution



## 5. Conclusion

Due to shifting customer needs, markets, and competitive threats (Linder & Cantrell, 2000), firms must constantly tweak their current business model and find new business models in order to survive and grow (Tucker, 2001).

Business models evolve over time in the way corporate strategists have designed it (changing number of technologies, business models, and markets).



**Supervisors:**  
Dr. M.M.A.H. Cloudt, TU/e, OSM  
Prof. Dr. W.P.M. Vanhaverbeke, TU/e, OSM

Master of Science Program Innovation Management



Designed by  
C.H. Leung