UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Business Modeling for Internal IT

-A Comparison of AstraZeneca IT and Business Model Typologies

Master Thesis in
Industrial and Financial Management

School of Business, Economics and Law at
University of Gothenburg

Spring 2011

Supervisor: Anders Axvärn

Henrik Pettersson	851025
Simon Sigvardsson	870501
Ted Sporre	870715

Abstract

Authors Henrik Pettersson, Simon Sigvardsson, Ted Sporre

Supervisor Anders Axvärn

Title Business Modeling for Internal IT - A Comparison of AstraZeneca IT and Business Model Typologies

Problem Many companies suffer from complexity in their IT activities due to the rapid growth and investments in this area. The business model concept can be used as a strategic tool to handle such complexities and has been growing in popularity the last decades. However, there is a dispersed view of what elements the business model entails and what archetypes and typologies of business models are available. Furthermore, business models have not been studied in relation to internal organizations to a larger extent.

Purpose The purpose of this thesis is to use business models to describe internal IT and analyze what lessons can be drawn by applying business model typologies to handle complexity in an internal IT organization.

Method First, an analysis framework is developed based on the four business model typologies of Weill et al. (2005) combined with the nine business model dimensions of Osterwalder and Pigneur (2010). This framework is as a tool to direct data collection and analysis in this study. The study is then approached with a case study design with a qualitative data collection process based on interviews at AstraZeneca IT in Gothenburg, Sweden.

Conclusions The case study of AstraZeneca IT has shown that the business model can be a useful tool for analyzing complexity, as it has resulted in a suggestion to re-evaluate the current business model at AstraZeneca IT. The business model in general has shown to be a good communication tool in describing roles and relationships of a business and further helps in addressing problems in terms of gaps and overlaps in how a business operates.

Further Studies It would be interesting to study how performance can be measured in internal organizations, as they are not profit-driven. On the other hand, it would be interesting to study the implications of opening up the business model of internal organizations to expose it to competition. Finally, it is considered interesting to conduct further research in the area of business model typologies and their characteristics.

Keywords Business model, Business model typologies, Business Model Canvas, Internal IT, IT organizations

Acknowledgements

This master thesis has been carried out during the spring of 2011 as a major stage of finalizing our studies at the Industrial and Financial Management Masters' Program at the School of Business, Economics and Law at University of Gothenburg.

The execution of this master thesis project has been both challenging and inspiring. We are therefore very grateful for all the support that has been given by different people throughout this process, which has finally resulted in the report you are now reading.

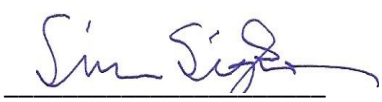
First of all we would like to thank our supervisor Anders Axvärn at University of Gothenburg. Axvärn has been an important support in developing the structure and research method of this thesis. We further want to thank our supervisor at AstraZeneca IT in Gothenburg, Jan Boberg. Boberg has given us all his support and showed a lot of enthusiasm for our work. This has not only been related to the issues AstraZeneca IT faces, but also the academic challenges that the concept of business modeling brings.

We also want to thank Ph.D. Öystein Fjeldstad who has provided us with much useful information and literature in the topics of business modeling and value configuration. Fjeldstad has not only contributed with information about his own work but also given us insights into other important writings in the topic.

Another valuable individual has been Håkan Enquist from the IT University of Gothenburg. Enquist is a researcher in the field of business modeling for ERP systems and his ideas have been a value-adding benchmark for this master thesis.

Finally, we want to thank all employees at AstraZeneca IT who has been participating during our interview sessions. Without your accommodating approach and cooperation this thesis would have been impossible to finalize.

Göteborg, May 2011


Henrik Pettersson Simon Sigvardsson Ted Sporre

Table of Contents

Table of Figures

1 Problem Background

This chapter describes the theoretical problem background, including an introduction to the problem that is in focus of this case study and a problem analysis. Furthermore, the purpose of the thesis is presented.

Over the last decades Information Technology (IT) has become an important enabler for the functioning of different activities within a firm. IT currently serves important functions when it comes to cost reductions together with process efficiency and strategic competitive advantage (Lin et al. 2005). Therefore, there tend to be reasons on all levels of the business that motivate the utilization of IT. Borenstein and Betencourt (2005) furthermore identify the importance of IT in that as much as 50 percent of the capital expenditure of large organizations can be IT related. This has lead to that companies benefit from having an internal department responsible for IT related activities.

One of the companies that are spending significant resources on IT is AstraZeneca, where more than 2000 employees are working in the internal IT organization. AstraZeneca is one of the world's leading pharmaceutical producers, employing 65 000 people in over 100 countries. There are several reasons for the high emphasis on IT within AstraZeneca, for instance that customized systems often are needed in order to support specific research projects as well as that there is strict regulations around storage of information. AstraZeneca's IT organization has the responsibility to provide IT solutions to different functional departments in AstraZeneca, such as Research & Development (R&D), Global Operations and Commercial. This includes solutions such as applications used by research scientists for measurement and development, production support systems, Enterprise Resource Planning systems as well as infrastructure for storage and distribution of data. As considerable resources are spent on IT it is important to optimize investments and guarantee the quality of systems and applications.

A problem that AstraZeneca IT currently experiences is that IT spending and coordination of IT related activities are inadequate and inefficient. This is a common problem among organizations today as the complexity of IT related activities has lead to that investments are not being optimized. According to the research company Gartner (2008), in average 25 percent of company IT spending in 2007 was on unnecessary and redundant customization. This is one fact pointing towards that the work of optimizing IT investments is a complex task, especially within big companies where diverse needs of many internal customers have to be reflected in the products and services produced. The complexity at AstraZeneca IT arises due to a disjointed set of processes that are supported by different methodologies, controls and tools. There is no clear definition of the roles of the different departments in the IT organization, which leads to that it is hard to find who is actually responsible for certain tasks. Recent decisions to outsource work to Indian partner companies has added to this complexity, and there is no clearly communicated strategy for what activities that should be outsourced to partners and what should be made in-house.

The lack of joint processes is especially difficult to handle as the IT organization on one hand has the goal of providing quick solutions to the business departments, while on the other hand having the responsibility of ensuring synergies of the overall IT architecture. This leads to many different process steps, which results in many handovers between different people that have somewhat dispersed views on what constitute the most important business drivers. All of the problems that AstraZeneca

IT experiences could be said to be derived from a complex situation, which needs more clarity into how to manage the overall value creation of the organization and how to clearly communicate this everyone.

1.1 Problem Analysis

Complexity can be described as a characteristic of a system that has many parts and many interactions between these parts (Duggan & Sribar 2010). Due to the combination of complexities in products, markets and the surrounding environment, there are very few individuals that understand the entire logic of an organization. This means that complexity is something that will be present in more or less any organization. It is however a fact that an organization with excessive complexity wastes resources and loses its capability to transform in line with new business needs (Mena 2003).

Predictions uphold that 65 percent of companies will mismanage the complexity of their information services (Heffes 2003). The increased complexity is meant to be caused to a high degree by strategic outsourcing of activities, which will also increase the need for organizational changes within companies that have an inflating effect on costs (Heffes 2003). The complexity of internal IT is also driven by the size of application portfolios, often comprising hundreds or thousands of different applications (Duggan & Sribar 2010). Handler (2011) means that all IT efforts consist of interdependent projects, which means that program managers must develop an understanding for complexity science to reach the best outcome. Ultimately, the question therefore is how organizations can handle complexity in the best possible way.

According to Mena (2003) there are a number of different strategies to deal with unwanted complexity. Traditionally authors such as Adam Smith and Frederick Taylor supported approaches focused on finding the simplest and most efficient way of performing individual tasks, while more recent management approaches include whole processes (Mena 2003).

1.1.1 Management Approaches for Managing Complexity

There are several management approaches that can be seen as intended to structure processes and in that way reduce complexity. The choice of which management approach to use, is highly dependent on the wanted level of analysis. This in turn depends on what kind of problems that are experienced.

On a corporate strategic level, approaches such as vision- and mission statement can be used to bring clarity of the purpose and main activities of the organization. A vision statement is used to state intention and ambition of the company in order to communicate enthusiasm to others, while the mission statement describes how the company intends to reach the vision. The vision statement is often no longer than one sentence and mission statements are also intended to be very concise, which means they do not leave space for much detail (Dorf & Byers 2005).

On a strategic level, the business model concept is also a tool for handling complexity in organizations. There are many different definitions of what the concept business model actually includes, but most of them involve the description of how the company creates and captures value. Often this is done through describing a number of different building blocks that describe the value creating rationale of a company (Zott et al. 2010). Based on the corporate strategy choices are made that in turn will lead to a business model that is validated and refined to fulfill the strategic choice (Schafer et al. 2005). The business model therefore is a strategic tool but not a strategy itself.

Business models thus deal with how activities of a business are intended to be aligned, but not with how to design an organizational structure to conduct these activities (Magretta 2002). Chesbrough and Rosenbloom (2002) goes as far as comparing business models with the notion of sensemaking, meaning that they can provide a contextual rationality in environments characterized by high complexity.

While strategic tools are good for solving problems related to alignment in the value creation process, organizational design and specific operational tools such as Lean Production tend to be better to use if the aim is to solve specific problems. Organizational design can be used with the purpose of reducing complexity by finding the most effective organizational structure based on characteristics both inside and outside the organization (Tushman & Nadler 1977). On an even lower level of analysis, business process design is a method which is used to define business activities. The purpose is to design a streamlined process that can be seen as a tool for reducing organizational complexity through clearly defining the processes through which value is created (Hammer 1990). On an operational level, tools are often outlining specific rules and principles for how specific problems can be reduced.

As shown above there are a number of tools for handling complexity. It is hence important to relate to the specific situation of AstraZeneca IT when choosing if the analysis should be made on a strategic- or operational level and what management approach that should be used. As the IT organization already has a rather clear mission of providing IT solutions for the business units within AstraZeneca, the highest level of vision- and mission statements are not seen as providing significant value in this type of case study. The intention is not either to become very detailed on an operational level or analyzing the current organizational structure. Opposed to operational tools as Lean Production that focus on solving specific problem areas, there is a need to reduce complexity by giving everyone in the organization a common picture of what should be done and clearly define the roles in how value should be created and captured. This is where the concept business model has an advantage, as business models try to make the complexity understandable for everyone involved in the process of creating and capturing value. Business models also provide the advantage that they can be easily compared with the business models of other organizations, which makes the business model a suitable tool for providing an outside perspective that challenges the current way an organization is managed.

1.1.2 Growing Interest in Business Models

Business modeling has become an increasingly popular area of study in academic literature over the last decades. Zott et al. (2010) conducted a search of published articles on the topic of business modeling between the years of 1975 and 2009 and found a remarkable trend. Since the mid 1990's the interest for the business model concept has exploded, not only in published academic journals (PAJ), but also in published non-academic journals (PnAJ). Figure 1 visualizes this trend.

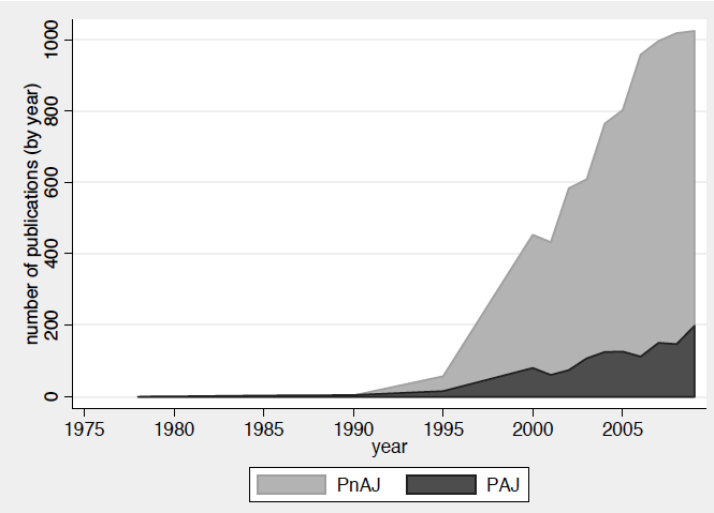


Figure 1. Published business model articles (Zott, Amit & Massa 2010, p. 5).

The popularity of the business model concept has followed the development of Internet, which has enabled new sources of competitive advantage and new ways of conducting business. The flora of articles in the field of business modeling is characterized by a diverged view of what a business model actually is. Some articles tend to take for granted what a business model is without bothering to define and explain the concept. Other articles tend to describe the elements and relationships of the business model to a deeper extent. What the area of business modeling is still lacking, according to Zott et al. (2010), is a common language and understanding for what elements that the business model concept comprises.

1.1.3 Business Modeling for the Internal IT Function

Today, the business model has become an established management tool for describing an organization from a high level perspective (Teece 2009). However, large organizations often consist of many different departments with heterogeneous characteristics. For example, the R&D department often has different goals and activities compared to the Marketing department. From this point of view each functionality, department or division within a company could be explained and modeled as an own business, having its own business model.

The rapid development in IT has led to a growing strategic importance of the IT function within the organization (Lin et al. 2005). While business modeling has traditionally been applied to how the company as a whole captures, creates and delivers value, it has started to become relevant to model the IT function as its own business. This field of business modeling for the IT department is however a relatively immature and unexplored area of study compared to the business modeling of the company as a whole. A company that has used business modeling for internal IT to gain competitive advantage in practice is Volvo IT, which has extended their customers to companies outside the Volvo Group. The aim of this business model for internal IT is not mainly to increase profits, but to use a broader customer base and higher volumes to offer more competitive prices to both Volvo- and other customers. This is also meant to put a higher pressure on efficiency which is a gain for all customers. Volvo IT however declines customizing solutions that would not be used within the Volvo group to external customers; all solutions built are motivated by internal value (Wik 2009). The Volvo IT-example shows the value that business modeling can have in order to challenge and develop the role of internal IT.

The fact that the topic of business modeling for internal organizations in general is not separately treated in available business model writings leads to that there is limited literature about business models for internal organizations. Instead, an interesting aspect is to explore what internal organizations can learn from business modeling of companies in the market. Furthermore, instead of focusing on business models of role model companies and compare the internal organization to these, it is considered more beneficial to outline different typologies of business models that are used for companies on the market. This approach can challenge the way the internal organization currently operates and provide an outside view of the business. Such an artificial benchmarking can be done if there are business model typologies available that represent the major part of different kinds of companies. Furthermore, to enable a rewarding comparison there is a need for a structured and exhaustive description over the contents of each business model typology. While many authors have written about the concept business model, there are however not many authors that have defined more generic typologies of business models. Weill et al. (2005) have made a distinction between the four archetypes of Creators, Distributors, Landlords and Brokers. Similarly, Stabell and Fjeldstad (1998) and Christensen, Grossman and Hwang (2009) distinguish between business models of companies defined as value chains, value shops and value networks. There is however still a theoretical lack of more detailed descriptions of business model typologies described by a standardized and exhaustive framework.

To summarize, complexity can be a problem and business models could be a potential way to reduce this issue. This thesis aims to bring the areas of business models and internal IT together by analyzing how alignment and reduced complexity can be achieved, by studying how business model typologies can be used as a benchmark for an internal IT organization.

The primary intention is to analyze what can be learnt from this comparison rather than proposing an optimal and detailed business model for an internal IT organization. This will be done through a case study of the Swedish part of the IT organization at AstraZeneca. The concept of Internal IT in this report thus refers to the IT department within a company, as opposed to an independent external provider of IT. The study is limited to a description of problems at an aggregated level in line with the business model concept. This means that the discussion will be at the level of roles, responsibilities, activities and resources rather than detailed technical and operational issues.

1.2 Purpose

The purpose of this thesis is to use business models to describe internal IT and analyze what lessons can be drawn by applying business model typologies to handle complexity in an internal IT organization.

2 Literature Review

The literature review provides a theoretical basis on the topic of Business Models. The chapter is initiated with a definition and description of the business model concept, followed by description of four generic business model typologies.

2.1Defining the Business Model Concept

This part of the theory aims to define the business model concept, including its evolution, a hierarchy of business models and a description of key elements.

2.1.1 What is a Business Model?

According to Chesbrough and Rosenbloom (2002) a business model is a construct that mediates the value creation process between the technical and economic domains. As mentioned in the *Problem Background* different authors however have dispersed definitions of business models. The main difference between their definitions is what building blocks that a business model contains. Schafer et al. (2005) investigated 12 different definitions of business models and subsequently found 42 different unique building blocks or elements. However, most authors agree on that a business model constitute of one part describing how value is created and one part describing how value is captured (e.g. Weill 2005; Chesbrough & Rosenbloom 2002; Schafer et al. 2005). Hamel (2000) and Schafer et al. (2005) furthermore mean that neither value creation nor value capture occurs in a vacuum, but within a value network that can include suppliers, partners, distribution channels and coalitions that extend the company's own resources. Osterwalder and Pigneur (2010) have noted this, and provide a definition of the business model concept that covers the dimension of delivering value as well. Therefore, the definition of Osterwalder and Pigneur (2010) will be used to describe the business model concept in this thesis:

"A business model describes the rationale of how an organization creates, delivers and captures value." (Osterwalder and Pigneur (2010), p. 14)

The business model is meant to be an effective communication tool since it can be used as a basis for employee communication and motivation, leading to powerful execution (Magretta 2002). This relies on that it can be seen as a way to tell a good story, which can align everyone in the organization around the kind of value the company wants to create. Stories are easy to understand and grasp and can thus be used to help individuals to see their own jobs within the larger context of what the company is trying to do and tailor their behavior accordingly (Magretta 2002).

According to Gluhsko (2008) business models can also be used to identify gaps in an organization, activities that should be done but are not done. It is also meant to be a valuable way to identify inefficiencies and overlaps in the practice of an organization, as well as future opportunities for how the business can be changed and improved (Gluhsko 2008). The value of business models is also easy to recognize when considering that new business models have reshaped entire industries and redistributed billions of dollars of value (Christensen, Johnson & Kagermann 2008).

2.1.2 Evolution of the Business Model Concept

As Figure 2 displays, the historic evolution in research about business models can be divided into four phases. The first phase comprises suggesting business model definitions, the second is about proposing elements of business models in the form of simple shopping lists, describing these

components more detailed in the third phase and finally modeling the components conceptually culminating in business model ontologies in the fourth phase (Gordijn, Osterwalder & Pigneur 2005). From the beginning of the 2000's, these different phases have lead to an increased understanding and more detailed conceptualization of the business model concept. As an example of the fourth phase, Osterwalder and Pigneur (2010) have proposed an ontology constituting of nine building blocks, which are meant to represent all the vital elements of a business model. Christensen, Johnson and Kagermann (2008) have also constructed a business model ontology which constitutes approximately the same building blocks as Osterwalder's ontology, but with somewhat other names of the headlines.

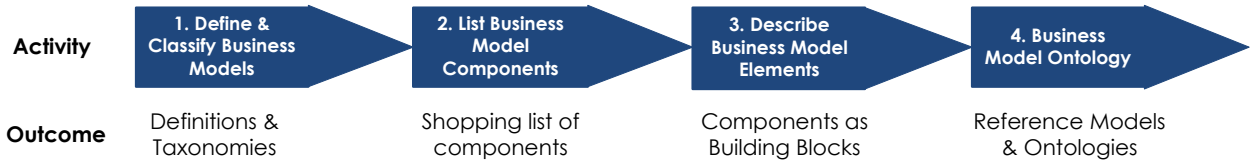


Figure 2. Evolution of the business model concept in research (Gordijn, Osterwalder & Pigneur 2005, p.2).

2.1.3 A Hierarchy of the Business Model Concept

To understand the different levels of the business model concept, the business model hierarchy displayed by Osterwalder, Pigneur and Tucci (2005) in Figure 3 is clarifying. The first level defines what a business model is and what building blocks business models consist of, for instance the nine general building blocks proposed by Osterwalder and Pigneur (2010). The level below deals with taxonomies of business models, categorizing different types of generic business models based on common characteristics. These first two levels are of a conceptual nature, while the third level deals with so called instances which are concrete business model representations of real world companies. For example several authors have used business models in order to describe companies as Dell, Amazon and eBay. At the bottom of the hierarchy is the real world company.

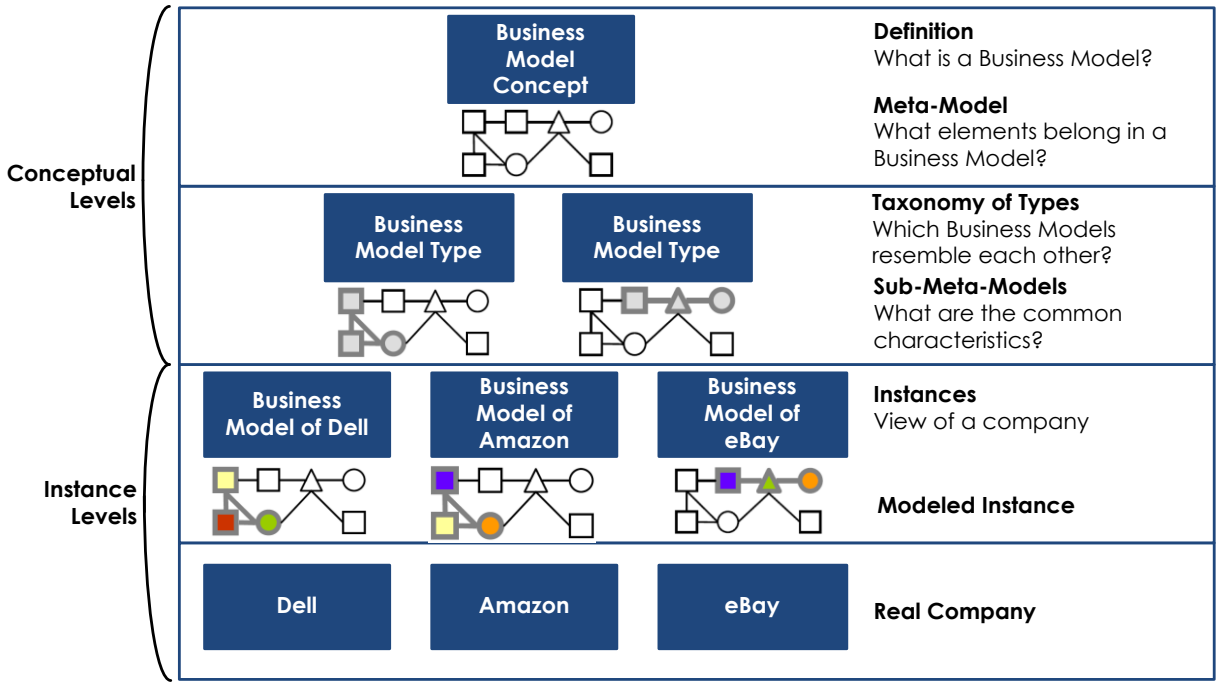


Figure 3. Hierarchy of the business model concept (Osterwalder, Pigneur & Tucci 2005, p. 9).

2.1.4 The Nine Building Blocks of the Business Model Canvas

By synthesizing what has been written about the business model concept, Osterwalder (2004) concludes the value proposition and the revenue flows of the company tend to be keystones of most business model theories. In addition to these there is however meant to be a lack of agreement between authors on what complimentary elements are needed to describe how the company creates, delivers and captures value (Osterwalder 2004). By adding different views of the business model concept together, Osterwalder (2004) aims to provide a comprehensive description of the business model by identifying nine elements. The model is referred to as the *Business Model Canvas* and has been further refined with time, leading to the representation of Osterwalder and Pigneur (2010) which is outlined in Figure 4. The nine building blocks are described in more detail below.

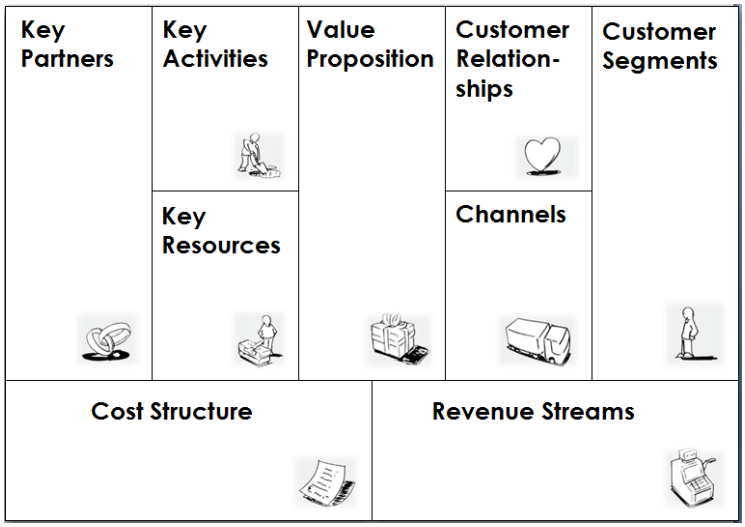


Figure 4. The Business Model Canvas (Osterwalder & Pigneur 2010, p. 44).

A *value proposition* consists of a selected bundle of products and/or services that caters to the requirements of a specific customer segment. There are a lot of different value propositions including improving product or service performance, tailor products and services to the specific needs of customers and to offer similar value to lower price (Osterwalder & Pigneur 2010).

Key resources can be physical, financial, intellectual or human (Osterwalder & Pigneur 2010). Different combinations of these types of resources will be needed depending on the type of business model. The *key activities* will also be dependent upon the business model; Microsoft for example has software development as a key activity, while key activities for the PC manufacturer Dell include supply chain management.

Key partnerships can be of four main types; strategic alliances between non-competitors, strategic partnerships between competitors, joint ventures to develop new businesses and buyer-supplier relationships to assure reliable supplies (Osterwalder & Pigneur 2010). Partnerships are used in order to reduce risk, acquire resources and optimize business models since it is irrational for a company to own all resources or perform all activities by itself.

A business model may be aimed to one or several *customer segments*, which are used to deeply understand specific customer needs and deliver the right value propositions. If the business model targets a mass market there will be no significant distinguishing between different customer

segments, while a business model aimed to niche markets or specific segments will have targeted value propositions.

Customer relationships have many different purposes including customer acquisition, customer retention and boosting sales (Osterwalder & Pigneur 2010). Customer relationships can range from self-service where the company has no direct relationship with customers to co-creation where companies co-create value with customers.

Channels are defined as touch points that play an important role in the customer experience (Osterwalder & Pigneur 2010). Channels serve several functions which can be divided into five different phases; raising awareness among customers about the offered products and services, help customers to evaluate value propositions, allow customers to purchase specific products and services, deliver a value proposition and provide post-purchase customer support (Osterwalder & Pigneur 2010).

Revenue streams are generated from each customer segment and can involve two different types; transaction revenues that occur from one-time customer payments and recurring revenues resulting from ongoing payments to either deliver a value proposition to customers or provide post-purchase support (Osterwalder & Pigneur 2010).

To minimize the *cost* is a natural part of every business model, but more important to some business models than to others. On a high level business models can either be cost-driven, meaning that focus is on minimizing costs wherever possible, or value-driven, meaning that cost is subordinate to value creation (Osterwalder & Pigneur 2010).

2.2 Business Model Typologies

In the same way that there is a need to define what a business model is and how it can be described, there is a need to categorize different types of business models. A review of the business model literature in this area reveals that such categorization is referred to as typologies, taxonomies or archetypes of business models. What these concepts have in common is that they are trying to group together business models that resemble each other. The literature is dispersed in this area and there is a multitude of factors serving as a basis for such a categorization, including for instance value creating logic and revenue streams. Many of the taxonomy categorizations however only focus on one dimension, as for example the razor-blade model which describes a revenue stream logic but provide no clear definition of what characterizes the other dimensions. Here, two examples of typologies will be described.

2.2.1 MIT Business Model Archetypes

One of the most discussed categorizations of business models is the MIT business model archetypes, developed by Weill et al. (2005). These were developed as a basis for an empirical research study to assess the relative performance of different business models, which demanded a way to separate different models. Based on the amount of transformation of assets and what kind of legal right a company sells, Weill et al. (2005) distinguishes between four business model archetypes; Creator, Distributor, Landlord and Broker.

2.2.2 Value Configurations

As an extension to the value chain concept, Stabell and Fjeldstad (1998) use the value creation logic to distinguish between three different types of companies; the value chain, the value shop and the value network. The value chain is described as representing the transformation of inputs into outputs in a sequential relationship. The value shop is creating value through solving customer problems based on intense resources and the value network adds value through linking customers. While this work is not directly intended to reflect business models, it is still relevant as a way to differentiate companies as the value creation logic constitutes a large part of what is defined as a business model. It is also described by Christensen, Grossman and Hwang (2009) as a framework of business model typologies.

2.2.3 Business Model Categorization in the Following Literature Review

In this literature review the choice has been made to use the four archetypes of business models outlined by Weill et al. (2005) as a basic framework to categorize business models. This is mainly due to the fact that it is clear and easy to understand as it involves the limited amount of four basic types. It is also comprehensible in the way that it is not limited to business models within a certain field or industry. The following literature review will therefore be structured into the four business model categories of Creators, Distributors, Landlords and Brokers. The value configuration categorization by Stabell and Fjeldstad (1998) will also be used to describe the value creating logic of these four archetypes in more depth, as these have strong similarities and are describing the value creation logic in more detail than Weill et al. (2005). The four types will also be exemplified with a specific company in order to make the taxonomy characterizations more tangible.

2.3 Creators

The Creator buys components or raw material from suppliers and then assembles or transforms this input into output in the form of a product that is sold to buyers. The Creator is described as the dominant business model in manufacturing industries (Weill et al. 2005).

2.3.1 Key Resources, Key Activities, Value Proposition

The definition of a Creator has clear similarities with the type of company that Stabell and Fjeldstad (1998) defines as a value chain. Physical assets tend to be the main key resource for Creators as these types of companies conduct their work in repetitive ways and the capability to deliver value is embedded in processes and equipment rather than people (Christensen, Grossman & Hwang 2009). The value creation is embodied in a product that is used by customers, complemented by post-purchase service in order to instruct the customer to use the product properly, correct defects or increase the lifetime of the product. The typical value proposition of a Creator can hence be described as value embodied in products that increase performance or reduce costs for customers.

Key activities for a Creator include inbound logistics which is associated with receiving and storing product inputs, operations that transforms the product into its final form and outbound logistics which includes storing and distributing the product to buyers (Porter, 1996). When it comes to operations a typical example of a Creator is assembly-line manufacturing, which is designed to produce standard products with a low unit cost through exploiting economies of scale. Activities in the chain are disaggregated, contribute in different ways to the product and each activity has different economics. They are performed in a sequential manner, where the output of one activity is

the input to the next one. For a Creator, marketing and sales together with the previously mentioned post-purchase service are also important activities (Stabell & Fjeldstad 1998).

In the value chain, Porter (1996) characterizes procurement, research and development, human resource management and firm infrastructure as supporting activities. For the typical Creator there is high focus on process improvements to reduce costs of the product (Stabell & Fjeldstad 1998). This is certainly true for cost competitors, but those Creators that want to position themselves as differentiators often put high emphasis on R&D and regard it as a key activity. The same reasoning is also applicable for the other activities that Porter (1996) regards as supporting.

2.3.2 Key Partners and Channels

Many Creators emphasize to have close partner relationships with input suppliers and Distributors to improve operational efficiency (Stabell & Fjeldstad 1998). The method is however not only used in manufacturing, which is exemplified by Staats, Brunner and Upton (2011) in a case study of the software services provider Wipro. By focusing on the four lean-based principles of task specification, streamlined communication, simple process architecture and hypothesis-driven problem solving the company managed to improve their operational performance.

2.3.3 Customer Segments and Customer Relationships

Generally the needs of customers are fulfilled with standardized products, but there are also Creators that customize products to individual customers to a large extent. Customer segments hence mainly constitute of customers that seek to satisfy a need through a rather standardized product, even if differentiators tend to customize products. Creators are focused on operations and thus they often have a limited level of customer intimacy as they use Distributors for providing post-purchase services (Anderson and Weitz 1992). However some Creators might choose to provide post-purchase service directly to customers in the belief that they demand better service than Distributors can give (Anderson and Weitz 1992).

2.3.4 Revenue Streams and Cost structure

A Creator transfers value from the company to its customers via the product itself (Stabell & Fjeldstad 1998). Value can therefore be measured as the price that buyers are willing to pay for a product (Laffey & Gandy 2009). Most often the product is priced in advance, since the outcomes and costs are relatively predictable (Christensen, Grossman & Hwang 2009). The total amount of revenue streams is hence more or less the same as the amount of products sold multiplied with the price.

The magnitude of cost drivers will vary by firm or industry, but the major driver of cost is scale (Stabell & Fjeldstad 1998). This leads to a high importance of maximizing capacity utilization, which is done through optimizing component flow and reducing product variation (Fjeldstad 2005). The main fixed costs constitute of physical assets as there are high investments in production equipment and facilities involved. The typical Creator is thus dependent upon high volumes to spread out fixed costs, but scale can also increase cost due to a need for coordination within the company. Variable costs mainly constitute of production input material. The cost for a Creator is also highly affected by the level of vertical integration, where high level of vertical integration can reduce uncertainties in demand and supply (Stabell & Fjeldstad 1998).

Important areas to monitor for manufacturing companies thus becomes cost, efficiency, speed and quality conformance, which is done through management information about for instance output, uptime, adherence to production plan and quality rate (Ahmad & Dhafr 2002).

2.3.5 Toyota – An Example of a Creator Business Model

Automobile manufacturing is one of the world's largest manufacturing industries and probably the most intuitively thought of in the area of manufacturing (Balakrishnan 2003). In the 1980s Toyota began to make its mark through reliable cars that required less maintenance than those from American competitors. Today, Toyota has managed to become the world's largest automobile manufacturer through a value proposition of quality and reliability combined with a broad product portfolio targeting different customer segments (Liker 2004; The Economist 2009). This has been done through process excellence, following a standard process in all activities from training employees to design and production of cars. Doing it in the same way every time provides a basis for continuous improvement where the goal is to reach a perfect result (Christensen, Grossman & Hwang 2009).

The basic idea of the Toyota Production System is to maintain a continuous flow of products, which is made possible through focusing on adaption to demand fluctuations and quality assurance to assure that each process supplies good units to the subsequent process (Balakrishnan 2003). The system is also highly dependent upon human resources, with a management policy focused around respect for humanity and stimulation of creativity and loyalty. The relationship with suppliers and component manufacturers is characterized by a strong partnership, for instance by helping partner companies to solve potential problems instead of threatening to drop them if problems arise (Liker 2004). Altogether, the Toyota Production System results in qualitative products and a cost structure that has been a clear advantage compared to competitors (Balakrishnan 2003).

2.4 Distributors

A Distributor is defined as a company that buys a product and resells this product to someone else, with a limited amount of change made to the basic product. Instead the Distributor can add value through for instance customer service, transporting or repacking. An important distinction between a Distributor and Creator is that a Creator designs their products themselves. Wholesalers and retail companies are typical examples of Distributors (Weill et al. 2005).

2.4.1 Key Resources, Key Activities and Value Proposition

Distributors can be compared to the value creating logic of value chains as described by Stabell and Fjeldstad (1998), but they can be seen as representing the storage and flows from the point of production through to the customer (Rushton, Croucher & Baker 2006). The value proposition for a Distributor can thus be described as bridging the gap between production and consumption in terms of time and place (Hutt & Speh 2007).

Primary activities for a Distributor involve transport, warehousing, inventory, packaging and information management. These sub-activities need to be planned systematically, both in terms of their local scope and the overall distribution system (Rushton, Croucher & Baker 2006). An important capability for Distributors is streamlined and automated business operations that can minimize waste and inventory levels in the supply chain. Physical storage facilities, supply chain resources and information systems for planning constitute key resources for being able to perform important activities and have the right capabilities.

2.4.2 Key Partners and Channels

Important key partners for Distributors consist of networks of companies that above have been characterized as Creators. Creators specialize in what they do well – manufacturing products – while Distributors specialize in handling various phases of the distribution path. There are two main channels for Distributors depending on whether they are retailers or wholesalers. Retailers usually sell a large assortment of goods in small quantities to a large number of end-customers, while wholesalers specialize in moving goods from numerous manufacturers to a large number of retailers (Tompkins and Harmelink 1993). For Creators the Distributor can offer value through market penetration, sales contacts, storage, customer support, order handling and limited amounts of product customization. The value of a Distributor is evident if the number of contacts needed to provide business between four different suppliers and four different customers are mapped. If these interactions are performed without a Distributor each company would need to work with four partners, but if a Distributor is involved as an intermediary each company would only need to work with the Distributor (Hutt & Speh 2007).

2.4.3 Customer Segments and Customer Relationships

Distributors that are characterized as wholesalers have retailers as their customer segment, while Distributors characterized as retailers have end-consumers as their customer segment. According to Betancourt (2004) the value of a Distributor for the end-customer is provided through breadth and depth of product assortment, accessibility of location, assurance of product delivery as well as information regarding prices and other characteristics of the products. To be able to deliver this kind of value it is important to make sure that relationships with both suppliers and customers are strong, making customer relationship management a key activity (Hopkins 2010).

2.4.4 Revenue Streams and Cost Structure

Distribution companies earn their revenues from receiving a certain margin on the final price of the products that they distribute (Goldberg and Campa 2010). Major costs for Distributors include transport, the cost of warehousing and carrying inventory as well as administration (Betancourt 2004). Transport networks and warehouses constitute large fixed costs and hence scale is an important driver for reducing costs.

Central performance measures for a Distributor are reliability, flexibility and cost. These are monitored by having management information related to on-time delivery, effectiveness of transportation systems, frequency of deliveries and availability of new products (Erol & Ferrell Jr. 2004).

2.4.5 Wal-Mart – An Example of a Distributor Business Model

During the last 30 years Wal-Mart has developed from being a small niche retailer to the largest retailer, and even one of the largest companies, in the world with over 8000 supermarkets worldwide (Stalk, Evans & Shulman 1992; WalMart.com 2011). This has been achieved with a value proposition based on providing customers with qualitative goods at competitive pricing, available where and when customers want them. The foundation of Wal-Mart is their supply-chain capabilities combined with large purchasing volumes, which has made it possible to maintain a competitive cost structure. For instance Wal-Mart uses cross-docking, where products are continuously delivered to warehouses in which they are repacked and then dispatched directly to stores, reducing time spent in inventory. This requires sophisticated planning with continuous contact between distribution

centers, suppliers and electronic point-of-sale information systems. In addition, Wal-Mart owns its own dedicated truck fleet which makes it possible to refill shelves more often than competitors. Senior management is focusing on creating an environment where the company can learn from and respond quickly to customer needs, instead of instructing individual store managers on what to do (Stalk, Evans & Shulman 1992).

The Wal-Mart model is also based on close relationships with suppliers, since they are an important enabler for the advanced logistic planning. This is manifested by for instance good payment terms for suppliers. The human resources system of Wal-Mart has relied heavily on stock ownership and profit sharing as a way to motivate employees, which in turn is a strategy to satisfy customer service needs (Stalk, Evans & Shulman 1992).

2.5 Landlords

The third type of business model described by Weill et al. (2005), Landlord, is selling the right to use an asset for a period of time without changing the ownership of the underlying asset. This archetype does not only include the use of physical assets such as houses, hotel rooms or airline seats, but also consultants providing services produced by human assets that are temporarily hired.

2.5.1 Key Resources, Key Activities, Value Proposition

In this thesis the Landlord will be focused upon a knowledge intensive organization that hires its assets to solve customer problems. This choice is made since Weill et al. (2005) provides consultancy firms as typical examples of Landlords. Organizations that assembly and match problems with its problem-solving resources are named value shops by Stabell and Fjeldstad (1998). The value creation for this kind of organizations is based on problem-solving, changing an existing problematic state to a more desired one for the customer. Customer value is created through delivering solutions of problems that have been generated through diagnosis of the problem and generation of a solution. In the problem diagnosis process hypotheses are iteratively tested, rejected and reformulated. The problem solving process comprises feedback from generation and implementation of solutions, either leading to a fit with the problem at hand or a new process of redefining the problem or finding an alternative solution (Stabell & Fjeldstad 1998). Hence, the value proposition can be said to constitute of providing high quality customized solutions to customers' unique problems.

Together with human and knowledge capital, reputation and relationships are key resources for the Landlord as it improves access to both the best personnel and access to the best clients (Stabell & Fjeldstad 1998). In the typical Landlord organization, overall performance is based primarily on the quality of the individual professionals assigned to client projects (Stabell & Fjeldstad 1998). The performance of each professional is also dependent upon the firm level learning across projects and clients. The work performed by Landlords tends to be unique and can vary from project to project (Christensen, Grossman and Hwang 2009). As an effect of the uniqueness, Landlords do not use a sequential fixed set of activities or resources to create value. Often specific competencies are instead needed in a project, which puts high demand on coordinating people and activities within the Landlord organization (Stabell & Fjeldstad 1998).

2.5.2 Key Partners and Channels

Landlords often differentiate themselves through having tacit knowledge in-house (Stabell & Fjeldstad 1998). Hence they use partners to a limited extent as they have the problem-solving capacity in-house. Landlords instead use external resources for getting input and increasing internal

knowledge even more. Landlords are also delivering solutions directly to customers and they rely on reputation for making customers contact them.

2.5.3 Customer Segments and Customer relationships

The relationships with customers are characterized by a strong information asymmetry between the firm and its client. This asymmetry is the reason for why customers approaches the problem-solving firm and it also leads to that it is sometimes hard for the customer to evaluate the appropriateness of the service that have been used to solve the problem (Stabell & Fjeldstad 1998). As problem diagnosis is such an important step for being able to provide a good solution, Landlords tend to have high customer intimacy (Stabell & Fjeldstad 1998). Any type of organization can turn to Landlords with their problems, but individual Landlords are often specialized in specific areas of knowledge.

2.5.4 Revenue Streams and Cost Structure

Landlords almost always charge their clients on a fee-for-service basis (Christensen, Grossman and Hwang (2009). As solutions are tailored to the problems of customers, Landlords are embracing customer intimacy strategies. This means that Landlords understand the difference between profit or loss on a single transaction and profit over the lifetime of their relationship with a single customer better than other types of organizations (Treacy & Wiersema 1992).

Customers of organizations characterized as Landlords primarily look for relatively certain solutions to their problems, and not for services with low prices as main attribute (Stabell & Fjeldstad 1998). As opposed from Creators, Landlords seem to have limited scale advantages, as it is hard to find a high number of outstanding professionals, coordination is costly and there is more difficult to communicate effectively with increasing scale (Stabell & Fjeldstad 1998). There are however positive scale advantages related to cases where resource mobilization is important, for instance for consulting firms serving global clients (Stabell & Fjeldstad 1998).

2.5.5 McKinsey & Company – An Example of a Landlord Business Model

Weill et al. (2005) mean that a consultancy firm is an example of a Landlord. As one of the leading consultancy firms in the world, McKinsey & Company follows a business strategy where they focus on customized solutions and individual services that serve to add value to the client's business. The business model of McKinsey & Company is centered on a global knowledge management strategy, with knowledge communicated as the key strategic resource since the founding of the company. The management of knowledge has led the firm to be a leader in quality and innovation as well as the value added to the services (Grolik et al. 2003).

It is the professional skills of the consultants that constitute the value creation process together with the international orientation of the company. Tacit knowledge is important as a solution that has been implemented for a customer cannot be copied, while the general knowledge about problems and methodology is being shared throughout the company (Grolik et al. 2003). Diagnosing the cause of a complex problem and devising workable solutions have such high leverage, that customers are willing to pay high prices for the services of leading consultants at firms like McKinsey & Co, often topping $ 1000 per hour (Christensen, Grossman & Hwang 2009).

2.6 Brokers

The business model of a Broker is characterized by the matching of potential buyers and sellers in order to trigger sales. Instead of taking the ownership of a product like the Distributor, the Broker

receives fees from the buyer, the seller or both. This archetype is common in for instance real estate- and stock brokerage (Weill et al. 2005).

2.6.1 Key Resources, Key Activities, Value Proposition

The Broker business model can be compared to mediating technology as a way of doing business discussed by Thompson (1967). The value proposition of a Broker can be described as a link between two groups of actors that are, or wish to be, interdependent. The value of the mediating technology comes from whom the mediator can connect the potential buyer to.

Stabell and Fjeldstad (1998) discuss the value network as a typology of value configuration, which is very similar to the Broker business model. While the concept Broker focuses on matching buyers and sellers, the value network configuration extends the logic to matching and mediating between different actors that aren't necessarily buyers and sellers of a product or service. The society consists of a complex set of actual or potential relationships between people and organizations. A value network then realizes these relationships, which for example can be through a phone carrier or a retail bank. The relationships can be direct, for example by the phone carrier who directly connects one actor to the other via the phone line. The relationship can also be indirect, for example a bank that indirectly connects customers through a common pool of funds. A more traditional Broker matches actors with a desire to buy a something with actors with a desire to sell that thing. What is important to notice is that the firm itself is not a part of the network, but it rather provides the networking service (Stabell & Fjeldstad 1998).

The Broker business model requires a layered infrastructure that enables mediation over time and in multiple activities. For example in telecommunications there are different network providers internationally, regionally and locally that connects servers. Key activities for the Broker business model involves inviting, maintaining and selecting customers, establishing and maintaining links between customers and maintaining and running the information infrastructure. Key resources to perform these activities are mainly relationship capital in the form of customer sets and physical assets constituting of platform infrastructure (Stabell & Fjeldstad 1998). Thompson (1967) states that standardized operations and processes are key for the infrastructure of the network service provider. This is important in order to assure each segment of the organization that the other segments are operating in compatible ways.

2.6.2 Key Partners and Channels

The infrastructure that the Broker provides constitute the channel that is used to reach both buyers and sellers that seeks to be interdependent (Stabell & Fjeldstad 1998). The main partners of a Broker are suppliers of customer databases and mediating technology.

2.6.3 Customer Segments and Customer Relationships

In the Broker business model the firm and its customers are committed to a mutual set of obligations through contracts. Katz and Shapiro (1985) discuss how networks provide value through positive network externalities. The first customers joining a value network usually experience lower value, while the incremental value for the next customers is increasing. The positive network externalities are occurring since the value of becoming a member is increasing with the number of other members.

Fjeldstad and Ketels (2006) further discuss the importance of the customer base in a value network in comparison to a traditional value chain. A typical value chain evaluates a customer based on discounted cash flow but is not paying attention to the network externalities. The value network instead focuses attention on the size and composition of the customer set and further on identifying, attracting and retaining customers whose membership has a positive value for other clients. Christensen, Grossman and Hwang (2009) further discuss the firm as an intermediary in a value network and distinguish it from the typical literature on network externalities. Traditionally, network externalities are created due to the size of the customer base. For a firm acting as the intermediary in a value network it is not only the size of the customer set that is important, but also the compatibility between customer sets.

2.6.4 Revenue Streams and Cost Structure

The revenue model of a Broker may vary, but usually networking service fees consist of two separate parts. First there is a subscription fee for being part of the network and secondly there is a fee for actual usage of the service provided. The different fees can be tailored to the cost of providing capacity for the customer and the incremental cost of providing a service. A bank usually charges a monthly or yearly fee for its customers to be members of the bank and further charges a fee per transaction (Stabell & Fjeldstad 1998). Costs of providing a networking service is usually highest in the introduction phase since it is not yet spread over a large amount of customers. This all leads to distinct life cycle phases in which the network service provider may provide membership for free in the initial phase in order to build a customer base. However in later phases costs are spread out over a larger amount of customers while at the same time the customer value is much greater due to network externalities (Stabell & Fjeldstad 1998).

The typical costs for a network service provider are directly linked to the value it enables for its customers, in general consisting of two main parts. First, the actual membership of the network implies a cost for capacity and infrastructure maintenance. Capacity utilization therefore becomes a critical trade-off since it may reduce the marginal cost if it is high at the same time as it may decrease the quality of the service and intermediation provided. Secondly, the utilization of the network, for example a service, implies a transaction cost for the firm (Stabell & Fjeldstad 1998).

2.6.5 Google – An Example of a Broker Business Model

Since the introduction of Internet, the advertisement e-business model has become increasingly popular. This kind of business model is a typical example of a Broker business model since it is based upon providing the match between different groups of actors. Shuen (2009) explains Google's revenue model in terms of network externalities. Google has subsidized information seekers, who are allowed to use Google's services for free. The other side of the market, the advertisers, however pays Google in two general ways. First, there is Google Adword, which enable the advertiser to pay for certain keywords that will increase the likelihood of having that specific company's website to appear as the information seeker is using Google's services. It also has the pay-per-click service, which implies that the advertiser can put their advertisements on Google for free but pays a fee each time an information seeker clicks on the add. In this sense Google acts as a Broker between customers and sellers in which the companies enjoy positive network externalities as more information seekers are using Google (Shuen 2009).

3 Research Method

In this chapter the developed analysis framework is described, followed by the research design, the empirical data collection process and the data analysis. Finally this chapter assesses the reliability and validity of the study.

3.1 Analysis Framework

Based on the literature review a framework of business model typologies has been constructed to serve as the analysis framework of the study and is illustrated in Figure 5. The framework is a combination of the nine business model components in the Business Model Canvas presented by Osterwalder and Pigneur (2010) and the four business model typologies described by Weill et al. (2005). The nine dimensions in the Business Model Canvas can be used to describe any kind of business model and therefore covers the rationale for how companies create, deliver and capture value (Osterwalder & Pigneur 2010). In the *Literature Review*, these nine dimensions have also been showed to constitute a good representation and summary of what other authors have written on the topic of business models. Following this reasoning it would also be possible to use the nine dimensions of the Business Model Canvas by Osterwalder and Pigneur (2010) to describe the four typologies presented by Weill et al. (2005).

	Creator	Distributor	Landlord	Broker
Typical example	Auto Manufacturer	Food retailer	Consultancy	Internet Search Engine
Value Proposition	*Value embodied in standardized products that increase performance or reduce costs for customers*	*Bridging the gap between production and consumption in terms of time and place*	*Providing high quality customized solutions to customers' unique problems*	*Matching actors with a desire to be interdependent by providing linkages and services to establish and maintain these relationships*
Key Partners	-Input supplier network -Distribution partners	-Network of product suppliers	-Limited outsourcing - tacit knowledge key resource	-Suppliers of mediating technology
Key Activities	-Operations -Inbound- & outbound logistics -Marketing & Sales -Post-purchase service	-Transport -Warehousing -Information Management	-Problem Solving -Project Management -Knowledge Management -Interorganizational learning	-Manage customer set -Linking customers -Manage network Infrastructure
Key Resources	-Production equipment / Physical assets	-Physical storage facilities -Supply Chain Resources -Information systems for planning	-Human- and knowledge capital -Reputation and relationships	-Intellectual -Physical infrastructure
Customer Relationships	-Relations with customers through distribution channels -Limited level of customer intimacy	-High Customer intimacy - Support activities	-High customer intimacy -Information asymmetry - company having much more knowledge than customer	-Through physical infrastructure -Higher customer intimacy for low volume brokers
Channels	-Distribution partners for logistics and sales to customers	-Own stores or transport network	-Customers contacting the firm or directly contacting customers -Delivering solutions directly to customers	-Physical infrastructure ►Direct contact for low volume brokers
Customer Segments	-Customers seeking to satisfy a need through a rather standardized product	-Consumers or other distributors further down the value chain	-Customers that need a solution to a problem that cannot be solved using own resources and activities	-Buyers and sellers of a product or service
Cost Structure	-Fixed costs: Physical assets -Variable costs: Production input material -Scale and capacity utilization drivers	-Fixed costs: Transport network and Warehouses -Variable costs: Inventory -Scale is a driver	-Fixed costs: Employees -Limited variable costs -Value-driven - taking on high costs to solve problems if this will lead to long term loyalty	-Fixed Costs: Infrastructure -Variable Costs: Transaction costs and customer management -Capacity utilization is a driver
Revenue Streams	-Based on number of products sold and price	-Margin on amount of distributed products	-Usage fee of a service - the more the service is used, the more the customer pays	-Subscription fee for members -Transaction fee for utilizing services

Figure 5. Analysis framework of business model typologies, based on an own synthesis of Osterwalder and Pigneur (2010) and Weill et al. (2005).

The analysis framework summarizes the nine dimensions for a typical Creator, Distributor, Landlord and Broker. In this thesis, the analysis framework will be used for describing the similarities and differences between AstraZeneca IT and these four typologies. The analysis framework will furthermore serve the function of determining what typology that AstraZeneca IT resembles the most today. In the next step the typology representation of AstraZeneca IT today will be contrasted to the experienced problems. In this step the analysis framework will be used to discuss if AstraZeneca IT can reduce complexity and decrease problems by taking lessons from alternative typology representations. It should be clarified that the analysis framework is however not intended to be used as a tool for directly solving detailed operational problems by targeted measures. With that said, the lessons drawn from the typology representation on a high level can however still lead to that operational problems are solved.

Weill et al. (2005) mean that all types of companies can be described as fitting into one of the typologies of Creators, Distributors, Landlords or Brokers. When making a framework by synthesizing the nine dimensions presented by Osterwalder and Pigneur (2010) with the four typologies, a tradeoff is however reached between clarity of the framework and the number of bullet points inserted in each box. The constructed analysis framework can therefore be criticized for not being able to describe all kinds of companies. For some of the nine dimensions, there is for example a difference between how a Creator focusing on low cost conducts business compared with how a Creator focusing on differentiation conducts business. The choice has however been made to favor clarity as a more extensive framework would be too complex, even though the ability to represent all organizations with these four typologies is thus lowered.

Weill et al. (2005) furthermore only describe the four typologies on an overall level, not focusing on specific details. For being able to describe the four typologies in nine dimensions, synthesis of literature describing similar concepts as the four typologies had to be made. As an example the nine dimensions of a Creator was to a large extent described by using the value chain company representation by Stabell and Fjeldstad (1998). Other literature was used in the same way for the synthesis, based on the similarity with the basic description provided by Weill et al. (2005). It must however be questioned if the synthesized literature to a full extent provide exactly the same description of the typologies as Weill et al. (2005) would do with a more specific description. As a conclusion of what has been said above, another researcher might to some extent have come up with different descriptions and bullet points of the four typologies.

Except from the creation of the tool, it can also be questioned whether different researchers applying the tool would get the same result. As the four different typologies are only described with short bullet points in the analysis framework, there is a risk that different researchers will not make identical interpretations. In order to have the same interpretation of the analysis framework it therefore becomes important to study the more extensive background description of the four typologies in the L*iterature Review.*

3.2 Research Design

Bryman and Bell (2007) distinguish between five different categories of research designs; experimental or quasi-experimental design, cross-sectional design, longitudinal design, case study design and comparative design. The choice of research design has been made in order to collect empirical data as input for usage of the analysis framework, as this will be used to describe the

current business model of AstraZeneca IT and compare it with the four typologies in the framework. In addition, there is a need to collect data for an assessment of the problems and challenges faced within AstraZeneca IT. The case study design has been chosen since it entails specific and in depth description of the processes and characteristics of the IT organization and the anticipated problems. This research design also best suits the purpose since qualitative data collection has tolerance for contradictions, which was seen as an important aspect to assess different views of the organization and its problems. The drawback of using a case study design is that it is often difficult to generalize the results (Denscombe 2009).

The study has been conducted through systematic combining, which is similar to an abductive approach (Dubois & Gadde 2002). This implies that the case study of AstraZeneca IT has continuously been matched with theory on and related to Business Models in an iterative process.

3.3 Empirical Data Collection

The AstraZeneca IT case study has been based on both primary and secondary sources provided by the company. Secondary sources constitute of internal documents such as presentations, organization charts and education material. The main data source is primary data that have been collected by qualitative interviews with employees at different levels from the majority of areas of the IT organization, including the central Corporate IS (CIS) function as well as parts of the SET IS organization that are operating closer to the core business of AstraZeneca. The reason for choosing interviews is that it contributes to the deep description of the organization and problems for which the case study design was intended, but also because subjects like business modelling and management information are of a subjective and complex kind. This would have made it hard to choose data collection methods such as questionnaires, since it would not have given interviewees the possibility to give thorough explanations. In addition, questions regarding this kind of subjects sometimes need to be rephrased to make the respondent understand the correct meaning of the question, which is hard to do with other data collection methods than interviews.

Two types of interviews have been conducted during the research, open and semi-structured. Two initial open interviews were conducted in order to get an overview and understanding of AstraZeneca and the IT organization. Through these interviews the authors of this report gained an understanding for the organizational structure and a first insight into how the processes of the IT organization work today, including some of the encountered problems. The learning from these initial studies and interviews were then used for forming relevant questions to the semi-structured interviews.

The semi-structured interviews intended to get a comprehensive view of the current operating model and experienced problems. The interview questions differed somewhat depending on the position of the interviewee, but in the same group of interviewees the questions posed were almost the same and posed in a similar order. Sometimes follow up questions were necessary in order to make a complex reasoning more understandable or to make the interviewee express her- or himself more clearly. Interview guides were used for having prepared areas to pose questions about and during interviews follow up questions and probing techniques were used for making the interviewee reason further around the actual question posed. An initial interview template for the semi-structured interviews can be found in *Appendix A*. During these interviews the Business Model

Canvas of Osterwalder and Pigneur (2010) was also used in order to encourage respondents to describe their view of the IT organization.

During the semi-structured interviews, two or three of the researchers were always present and took notes at the same time as the interviews were digitally recorded. The original list of key respondents obtained from the initial interviews was complemented with additional respondents over time, as areas of high interest were determined. The interviewing process was stopped when saturation was achieved in the sense that each new interview did not contribute with much new information. Nine semi-structured interviews were conducted in total and each interview lasted between 1 and 1.5 hours. A comprehensive list of the profile of the interviewed staff can be found in *Appendix B*.

3.4 Data Analysis

In analyzing data from a case study there are mainly two different techniques to use; within-case analysis, where data is compared with theory, and cross-case analysis, where data from one case is compared with data from other cases (Miles & Huberman 1994). As this thesis is a single case study where data will be compared with the business model analysis framework, the technique of within-case analysis is used. The focus of the analysis is on data in the form of words, emanating mainly from interviews conducted. These words require processing, which in itself is a form of analysis (Miles & Huberman 1994).

Data reduction, data display and conclusion drawing are the three steps of qualitative data analysis (Miles & Huberman 1994). The reduction of data is an analysis that organizes the data and allows for final conclusions to be drawn. In this thesis data from the interviews will be reduced through comparing the data with the analytical framework as well as comparing the interviews to one another, sorting out important data. In the second step, data display, empirical data about how the IT organization is currently working regarding goals, business drivers and processes will be displayed. In the third step, conclusion drawing, the current IT organization will be compared to the four business model typologies described in the analysis framework for discussing and concluding what AstraZeneca IT can learn from them.

3.5 Validity

Validity is a concept that measures the truthfulness of research and exists in many different forms (Bryman & Bell 2007). The three most fundamental forms of validity that is discussed in this report are construct, internal and external validity.

3.5.1 Construct Validity

Construct validity implies that a study actually measures what it is aimed to measure (Bryman & Bell 2007). This study uses business models as a measure to describe the logic of an organization. Since business models themselves can be described in many different ways, a number of actions have been taken to assure the construct validity of the study.

To begin with, the literature review has been used to provide a clear definition of what is meant by a business model in this study. This has been further clarified by construction of the analysis framework, which is used as a structure for comparison throughout the report. For adding to the validity a close collaboration has also been kept with AstraZeneca IT during analysis generation, including contact with respondents to avoid the risk of interpreting them in a wrong way. Drafts and

content of the report were also presented to AstraZeneca IT during the work to make sure descriptions and facts are presented accurately.

The technique of triangulation, i.e. multiple sources of evidence being compared to each other (Yin 1994), was also used to favour the validity. For instance interviews were performed at different levels and in different parts of the organization to compare the collected data. As previously described this was also complemented with other secondary sources of information. So called investigator triangulation has also been performed in the sense that all three researchers have been able to provide their research interpretations and input throughout the work. Altogether, the construct validity of the research is therefore meant to be high.

3.5.2 Internal Validity

Internal validity implies that the right people with the right competence are interviewed and that causal relations exist between the measured variables (Svenning 2003; Bryman & Bell 2007). In this study different sources and a multitude of respondents have been used to analyze the problem. This is meant to assure the internal validity, but it is a fact that statistically proven causation is hard to assess regarding business factors and such multifaceted subjects as business models.

Since the scope and limited time of the study has limited the amount of possible interviews, this makes it reasonable to discuss whether the sample size gives a representative view of the opinion within the IT organisation. Due to the sensibility in choosing respondents to achieve a multitude of perspectives this is meant to be the case, but it cannot be excluded that a larger sample size could have lead to somewhat different results. However, during the interview process the respondents' answers started to become saturated, hence indicating that a larger amount of interviews might not have been significantly useful in providing additional insights.

3.5.3 External Validity

External validity means that the research can be applied in a broader perspective in order to generalize the conclusions (Svenning 2003). Bryman and Bell (2007) means that ensuring external validity is made with a thorough description of the object and concept of study. The external validity of this study is hard to confirm in an objective manner since many of the results are based on the specific character of the studied company and the context in which it acts. It can be assumed that many of the results are valid for other IT organizations in large companies, but this study is not enough to validate such a generalization. With this follows that the study provides *learning* regarding what value business models can provide for an IT organisation, but the exact value for an organisation is something that must be assessed specifically case by case.

3.6 Reliability

Reliability is a concept that describes to what extent the results of a study are repeatable. The reliability is predominantly an issue related to quantitative research, since it is sometimes hard to assess in a qualitative study. Data is collected in interaction with other people in a given point of time, which makes it hard to collect identical data that do not change over time. Christensen et al. (2001) therefore argue that the reliability-concept is irrelevant for judging the value of a qualitative analysis. This study is mainly based on qualitative data from interviews, which thereby is meant to render low repeatability. However, since the same type of questions have been posed to many of the different respondents, the probability of other researchers making the same analysis is argued to be high if using a similar method and interview questions.

In this case study, most evaluations have been done on a qualitative basis by the authors. This leads to subjectivity in these evaluations. Furthermore, qualitative data is words rather than numbers that bring both advantages and disadvantages to the reliability of the thesis. Words are descriptive and explaining, but at the same time they could also be ambiguous and difficult to compare objectively. One observer´s description, however precise, may not concur with another´s.

4 Empirical Description

This chapter presents the empirical data that was collected about the current situation within AstraZeneca IT. It describes the structure and processes of the IT organization as well as the current business model based on the nine elements of the analysis framework. The chapter is finalized with experienced problems within AstraZeneca IT, which will be an important input for analyzing the current business model as well as discussing a proposed business model for AstraZeneca IT.

4.1 The Structure and Processes of the IT Organization

In order to understand the structure and processes of AstraZeneca IT it is found useful to first outline the value chain of AstraZeneca as an overall business. The value chain of AstraZeneca is illustrated in Figure 6.

Figure 6. Generalized value chain of AstraZeneca (own illustration).

Primary activities consist of R&D, Global Operations and Commercial activities. R&D within AstraZeneca is the core of the business due to the nature of the pharmaceutical industry. Global Operations considers activities related to manufacturing of the pharmaceutical product once it is developed, tested and accepted. As the final step in the chain, commercial activities entail all marketing and sales related tasks. Support activities are all activities needed in order to support the primary activities. These support activities are called Enabling Functions in AstraZeneca and consist of for example Human Resources, Finance and Administration.

The IT organization within AstraZeneca can be described as consisting of one centralized part and one decentralized part, as well as involving interfaces with vital external partners and customers (see Figure 7). The decentralized part is called SET IS and is directly related to the value chain of primary activities in which IT professionals work closely with the business. Each primary function in the value chain has its own IT department. In addition to this there is one IT department that is concerned with all the supporting activities as well. Therefore, there are four decentralized IT departments, making up the part of the IT organization called SET IS. SET IS reacts to the information needs and IT requirements of the business activities and make up the initial contact area for any individual working in R&D, Global Operations and Commercial.

The centralized part is called Corporate IS (CIS) and is working further away from the business than SET IS does. Before CIS was established in AstraZeneca, the IT organization only consisted of decentralized departments. As the IT organization has grown to become a significant cost center of the AstraZeneca as a whole, concerns regarding decision making, prioritization, portfolio management and formalization of IT related tasks have been raised. This led to that CIS was established in 2003 in order to bring structure to the way AstraZeneca was handling IT within the organization and to enable project management expertise for driving IT projects within AstraZeneca.

Therefore, CIS has implemented an operating model divided into the three steps of Plan-Build-Run as a rationale for developing and maintaining IT solutions.

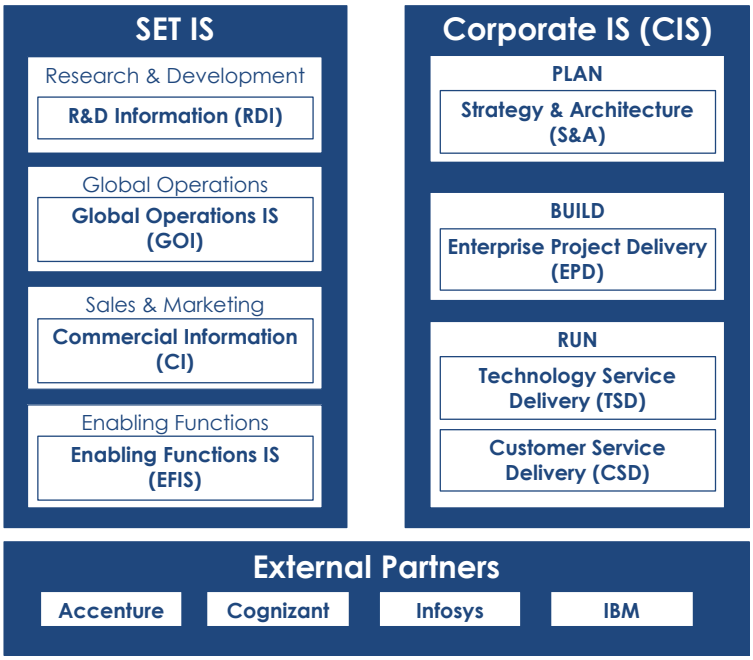


Figure 7. The structure of the IT organization at AstraZeneca (own illustration).

The operating model further defines how CIS is divided. Strategy and Architecture (S&A) is responsible for the Plan-phase, which involves creating guidelines for project management and overlooking the IT architecture. Enterprise Project Delivery (EPD) is responsible for the Build-phase, which involves driving the actual project. These include setting up requirements in cooperation with SET IS, resource planning, managing relationships with external partners that build the IT solution, and delivering the IT solution. The Run-phase is governed by Customer Service Delivery (CSD) and Technology Service Delivery (TSD) and involves the maintenance and upgrades of the IT solutions after they have been built and implemented. Both the Build- and Run-phases involve a lot of contact and coordination with external partners since major parts of the projects are outsourced in terms of development and maintenance. Furthermore, external partners are large IT consultants with a majority of their programming, development and maintenance resources located in India, which puts even higher requirements on coordination and communication.

4.1.1 A Typical Process in the IT Organization

As the structure of the IT organization has been explained, it is considered useful to outline the dynamics and interactions during a typical IT project within AstraZeneca IT. The overall purpose of AstraZeneca IT is to support the business side with information management. This is done by managing IT systems and solutions, on an individual project basis, as well as on an IT portfolio basis. Every IT project is initiated with an information need in one of the primary or enabling functions. For example, in a typical project there is a research group within R&D that is currently working on developing a new drug. In order to manage, store and analyze the data that is needed for executing a specific study, the research group needs support from the IT organization. Many studies have unique requirements and information needs that cannot be supported by general applications, which leads to the initiation of a project. The part of SET IS that is working closely to R&D is called R&D

Information (RDI). RDI becomes involved and tries to get an understanding of what the research group needs in terms of IT. As the statement of requirements is composed, RDI has two ways to go. In a smaller project RDI gets in touch directly with external partners to build the system or builds it themselves without involving the central CIS. If the project is larger, involving activities within AstraZeneca on a global scale, the project is passed over to the CIS.

A project that is run by CIS is first passed on to EPD that has to consider not only the statement of requirements coming from RDI, but also the guidelines that is set up by S&A. EPD then develops a plan and budget for the project, which further involves relations with external partners. CIS has developed agreements with four external partners, which are Accenture, Infosys, Cognizant and IBM. As the IT solution is built it is implemented in the R&D organization and the responsibility is passed over to the Run-phase, namely the organizational IT units called CSD and TSD. In this final phase the IT solutions are maintained and managed by delivering status reports and upgrades over the product lifetime. Since large parts of the IT solution is developed and built by an external partner, the maintenance is also handled this way. Therefore, a main task for CSD and TSD is to handle the coordination with the external partners, communicate status reports and upgrades internally and react upon deficiencies. This is continued as long as the customer, in this case R&D, wants to keep the system running. At the end of the product lifecycle, the customer initiates a wish to phase out the IT solution since it is not useful anymore.

4.2 The Current Business Model of AstraZeneca IT

As input for the analysis framework, the interview data around the Business Model of AstraZeneca IT will be structured according to the nine elements of the analysis framework based on Osterwalder and Pigneur (2010). Figure 8 provides an overview of this business model.

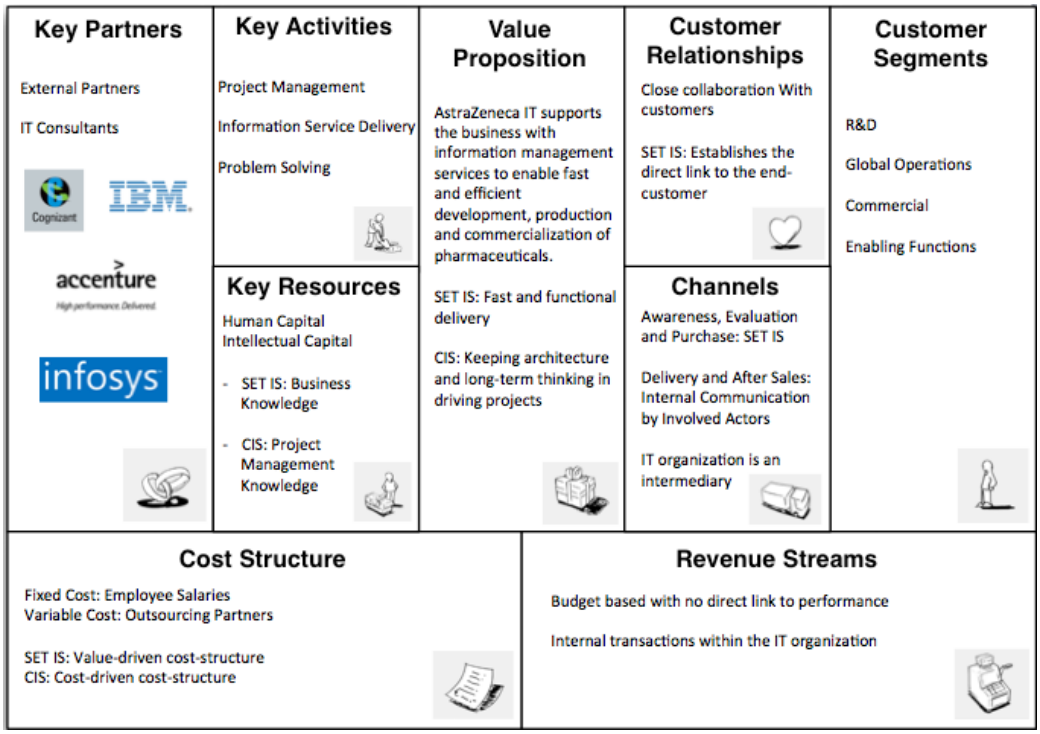


Figure 8. Business Model Canvas for AstraZeneca IT (own illustration).

4.2.1 Value Proposition

The employees of AstraZeneca's IT organization tended to have a consistent view of what was the purpose of the overall IT organization. As a synthesis of the expressed views, the Value Proposition can therefore be summarized as follows:

AstraZeneca IT supports the business with information management services to enable fast and efficient development, production and commercialization of pharmaceuticals.

Even though this is representative for the view of the overall IT organization, small differences in perspective can be noted when comparing SET IS and CIS. In SET IS a lot of emphasis on fast and functional delivery was expressed, while CIS also tended to mention the importance of the organization in securing a long-term solution of IT architecture and the alignment of IT solutions thereafter.

4.2.2 Key Partners

The key partners of the IT organization are mainly the four outsourcing partners Accenture, Cognizant, IBM and Infosys. These actors work as partners with contracts to handle the delivery of AstraZeneca IT's solutions. However, depending on the complexity of the systems, the degree of supplier involvement varies as well. For SET IS this has meant that other smaller and more flexible IT consultants are sometimes hired, without consulting the CIS channel. The large size and more standardized competencies of the outsourcing partners, together with the fact that most programmers are located in low-cost countries such as India, do not always fit well with the way for example RDI needs to work when driving IT projects for research purposes. AstraZeneca IT is therefore heading more towards a multi-sourcing strategy when it comes to key partners, broadening the amount of contracted partners.

4.2.3 Key Activities

The key activity for AstraZeneca IT is to manage projects and deliver applications to the business, represented for instance by the operating model Plan-Build-Run. Furthermore, problem solving is an essential activity for the overall task of the IT organization since it includes everything from specifying what needs to be done, find the best way to do it and build the IT solution in the most efficient way. Knowledge management therefore becomes a key activity since it involves building, developing, maintaining and sharing knowledge within the IT organization. Knowledge management is important for AstraZeneca IT in order to store and spread knowledge from previous projects when new challenges arise and further to benefit from current products and research information as a project is initiated.

4.2.4 Key Resources

Human capital in terms of employees and intellectual capital of knowledge are key resources within the IT organization at AstraZeneca. The knowledge however differs somewhat between SET IS and CIS. The close relationship with the end-customer, which leads to a high extent of business knowledge, is a key resource for SET IS. On the other hand, the great knowledge base and experience in project management and infrastructure is the key resource for CIS.

4.2.5 Customer Relationships

The overall strategy in terms of customer relationships within AstraZeneca IT is to be close to the end-customer, in this case referring to the business side within AstraZeneca as end-customers. The

opinion that it is important to be close to the customer is shared among most respondents, but there are different degrees of customer intimacy between SET IS and CIS due to that CIS is a centralized organization.

4.2.6 Channels

Since AstraZeneca IT is internalized within AstraZeneca, the channels also have an internal character. The IT organization manages the contact with the end-customer on one side and the external partners on the other side. Therefore they could be seen as an intermediary between the business and the technology. Updates and status reports are sent from the external partners, handled internally by the AstraZeneca IT and communicated to the end-customer.

SET IS is the main contact area towards the end-customer in terms of building awareness and providing support in evaluation of technical requirements. CIS however has the main responsibility of ordering the IT solution. The delivery and after sales of IT solutions are mainly handled through digital information in terms of status report, digital conferences and e-mails coming from involved internal actors.

4.2.7 Customer Segments

The current customer segments of AstraZeneca IT can be divided into the four areas in the value chain that needs IT support in delivering business value; R&D, Global Operations, Commercial and Enabling Functions. R&D needs IT solutions in order to gather, sort and analyze data in relation to different medical studies. Global Operations need IT solutions to handle operations management issues such as time reporting and production and capacity planning. Commercial needs IT solutions in order to gather information about for example sales forecasts and follow-ups. The Enabling Functions, for example Human Resources and Finance, need IT solutions for administration purposes.

4.2.8 Cost Structure

The main costs for AstraZeneca's IT organization consist of salaries for employees, which could be seen as a fixed cost, and costs for outsourcing of projects, which could be seen as a variable cost. Osterwalder (2010) further discuss how a cost structure can be seen as cost-driven or value-driven. From this point of view the cost structure of the IT organization at AstraZeneca is dual, in which SET IS is value-driven while CIS is cost-driven. SET IS focuses on getting most functionality and speed in developing IT solutions while CIS is established to keep total costs down by enabling economies of scale and scope in building IT solutions.

4.2.9 Revenue Streams

Since the IT organization within AstraZeneca is a support function to the activities in the value chain, it does not have its own revenue stream. This also means that the revenue model is not directly linked to performance, which was highlighted by many of the respondents.

Traditionally, AstraZeneca has seen the IT organization as a free resource. However, after implementing the new operating model and CIS, AstraZeneca has started to make the usage of the IT resources more transparent by using internal transactions. The end-customer, for example the research group at R&D, first sets up a budget for RDI each year, which can be seen as the revenue base for the IT organization. The units in SET IS then have their own budgets and if a project is run through CIS there will be internal transactions so that the customer that orders the IT solution also has to pay for the work. As an example, some employees in the Build organization have monthly

performance goals stating that they should debit between 60 and 80 percent of their working time on projects for SET IS.

The different departments within CIS also have their own budgets for work that cannot be immediately tailored to specific projects. For example, S&A is working with guidelines and architecture of the whole IT organization, which creates costs that no customer is directly responsible for.

4.3 Discovered Problems within the IT Organization

A number of areas with improvement potential regarding the way AstraZeneca IT operates were revealed during the conducted interviews. The problems are summarized in Figure 9 and described in more detail in this chapter.

Problem Area	Summary of Problem
Incoherent Understanding of IT Strategy	Lack of understanding for mid- and long term strategy and planned activities for how to reach intended future state
Dispersed Organization	Different business logic of SET IS and Corporate IS pulls the organization in two directions
Gaps and Overlaps in the Operating Model	Lack of clear responsibilities in handovers over organizational boundaries and to external partners
Information Management	Limited overview of applications leads to unnecessary duplication and that valuable data is hidden
Performance Measurement	Challenge in how to measure value compared to costs Hard to measure qualitative aspects leads to high reliance on quantitative measures in projects

Figure 9. Summary of discovered problems.

4.3.1 Incoherent Understanding of IT Strategy

During the interviews a concern was raised about the lack of a clear and communicated strategy of AstraZeneca IT. Strategy in this sense refers to the mid- and long term overall goals and mission of the AstraZeneca IT as well as planned activities for how to achieve these goals.

A specific issue that was raised continuously during the interviews was the discussion over AstraZeneca's overall involvement in IT. Many respondents felt that there was no clear strategy around what activities AstraZeneca IT should be responsible for and what activities should be outsourced. An example that was brought up by some of the respondents was the rationale in current efforts on cutting costs in the Run-phase just because this is currently more costly than the Plan- and Build-phases. It was questioned how this can be decided based on only cost, since the strategy regarding what is the most value adding function of the IT-organization is currently unclear and this needs to be decided before deciding where to reduce costs. Some respondents also meant that the organization tried to perceive themselves as delivering information services, but in practice the strategy is still very oriented towards delivery in the form of more product-like applications and not information services. Another example was when one respondent discussed how initiatives in the operating model are starting from below, when strategic initiatives should be initiated from the top and be spread down.

4.3.2 Dispersed Organization

The issue that was most widely discussed during the interviews was how the IT organization had two very different ways of functioning, which seemed to pull the organization in two different directions. The SET IS department has all focus on the end-customer and believes that collaboration and flexibility are key ingredients as projects are executed. The CIS department instead strives to formalize the process to maintain distinct phases in the operating model steps of build and run. CIS is further working with synergies, long-term thinking in the construction of projects and portfolio management. This slows down the process and makes it less flexible, which leads to fewer incentives for SET IS to utilize CIS when running projects. An employee at CIS explains:

"Centralization, Structure and Globalization has resulted in that the core business perceives us as slow and not delivering. Instead it becomes more attractive for business to go to other partners, who are working in the agile way that we did 10 years ago."

The great amount of formal steps and decision points in the operating model has shown to be working well for certain projects but for R&D it tends to be worse suited. Longer lead times in executing projects together with the formal steps that inhibits flexibility are main problems meant to be related to the usage of CIS. Especially the RDI organization has shown to have less fit with the CIS operating model since developing a drug requires many changes and tests to be made continuously throughout projects. The Plan-Build-Run model of CIS is instead based on that a specific *Statement of Requirements* is presented before the project enters the Build-phase, which contradicts the way RDI needs to operate. An employee at RDI explains:

"It is often meaningless to go to Corporate IS, since we can do it ourselves and it often results in more expensive and less functional products when Corporate IS is involved. In Corporate IS you need a clear Statement of Requirements, which is something that is hard to do for us since we do not know exactly what we want to have in the beginning."

Employees in CIS expressed a feeling that AstraZeneca IT is too decentralized while employees in SET IS thought that it is too centralized. Both ways of working has its direct benefits and drawback which were outlined by one of the respondents:

"A decentralized structure means that you save money by running projects faster, but a centralized structure leads to that you can have a better overview of the research information which means that you can save money by not having to do as many expensive studies all over again."

A general opinion, shared by both SET IS and CIS employees, was that information needs are really hard to translate into technical requirements on a piece of paper, which makes it desirable to be close to the end-customer both during the initial phase and the Build-phase.

4.3.3 Gaps and Overlaps in the Operating Model

In each project there will be handovers between different phases in the operating model. These interfaces have not been working optimally according to most respondents. A lack of clear responsibilities, roles and communication channels between different parts in the IT organization within AstraZeneca IT and its outsourcing partners has led to gaps in the interfaces of the operating model.

To begin with, roles and responsibilities between SET IS and CIS are perceived as partly unclear. The fact that no respondent could describe a clear decision logic for when an IT solution should either be built locally by SET IS or run through the CIS organization exemplifies this. In general, larger projects are handed over to CIS while smaller projects are to be run locally. However, there was no unified understanding of what the determining criteria was.

In CIS, a gap also exists between the Plan- and Build-phases. During interviews with employees within the EPD department of the Build-phase, there were concerns about the abstraction of the guidelines created by the S&A group in the Plan-phase. These guidelines were perceived as good on an overall level but have shown to be hard to operationalize in practice, for instance not taking the implementation into already existing IT solutions into account.

The next handover is when the IT solution has been built and is handed over from EPD to TSD and CSD that manage the Run-phase. Respondents working in the Run-phase expressed a lack of information transfer from the Build-phase. As employees in the Run-phase do not fully understand the architecture and logic behind the systems and applications since this knowledge kept by individuals in the Build-phase, it makes the systems harder to run and maintain.

One of the most significant gaps, as expressed by the respondents, was the handover to external partners. Some respondents meant that there is a lack of understanding of requirements between AstraZeneca IT and external partners, which leads to suffering functionality. Almost all respondents mentioned that AstraZeneca IT suffers from too many wills when running projects. This has lead to that too many project managers wants to drive the projects in a particular way, which makes the process slower. This is especially true for the interface between AstraZeneca's IT organization and the external partners where this results in overlaps. One respondent from CIS explains:

"We are not letting go of our outsourcing projects to an extent that would be good. We are inferring too much with the work that our partners do and try to steer this in too much detail. Outsourcing is done in order to get rid of a problem, not to monitor it."

Many respondents referred to the cause of this problem as two-sided; first that some partners needed monitoring and help in order to deliver on time, but also that AstraZeneca IT has not yet reached the maturity needed to become a professional purchaser of outsourcing services. It was also mentioned that the core capability of the partners is to handle standardized software projects, but that AstraZeneca IT is outsourcing projects that needs a lot of continuous changes which make them unsuitable for this kind of outsourcing. It also has to be mentioned that using the term *partner* referring to the outsourcing partners was sometimes questioned. The term partnership was perceived as involving mutual goals and mutually beneficial decisions for both parties, while the reality with some of the partners were seen as too focused on monetary issues.

These gaps in the operating model has lead to that it is hard to find who is responsible for doing what and that sub optimization occurs. One respondent found an issue in that problems were escalated downwards or sideways in the organization instead of upwards, decreasing the level of accountability. Some respondents also meant that the organization is suffering from what can be described by the expression *too many cooks spoil the broth*, which means that projects for instance have too many responsible project managers which also leads to a lack of accountability.

4.3.4 Problems with Information Management

One problem stemming from the fact that projects have been executed locally without involvement from CIS is that IT systems and applications are not communicating with each other. They are built and used to support a certain medical study and then it is forgotten. This has two drawbacks in terms of information management. First, applications are not built with a long-term perspective and are not thought of as useful for future studies. This has further drawbacks in that there is no one with a good overview of all applications, specifications of systems and a good understanding of their functionality. This leads to that new solutions are built without a thorough screening of what already exists. One employee at CIS exemplifies:

"It could be that we have over 20 applications to support the same task. Then we could probably just get rid of most of them."

The second problem with re-usage is not so much about the software itself, as it is about the data that is contained within these applications. Since old studies contain information that might be extremely valuable for a future study, much of these strategic synergies are lost since applications are not communicating with a central database and they are not well described or searchable. One respondent from CIS explains:

"We are not good at using already existing systems & applications. Some are just put in a "box" and data is hidden in applications that are not used. This is related to that many systems are built on site, for example in RDI."

4.3.5 Performance Measurement

During the interviews a lack of rationality in performance measurement was identified. As previously described in the business model of AstraZeneca IT in this chapter, most respondents had a similar view of what the main purpose of the IT organization was. Even though there was a common view of the purpose of the IT organization, measurements reflecting the performance and business drivers of the different departments were not always perceived as clear. This was mainly due to the qualitative nature of customer satisfaction, which is hard to measure. Even though customer satisfaction information is continuously sent out it has been biased. One respondent at CIS explains:

"When measuring customer satisfaction, mainly people that are less satisfied take part in the evaluation."

Instead respondents meant that positive word of mouth was the best measure of success, hence indicating that the end-customer is satisfied. However, in terms of management information some quantifiable data is strived for which can sometimes create problems according to one respondent at CIS:

"We cannot be measured on profits as a regular organization. We therefore need other measures. Our key measures can lead to sub-optimizing when for example both quality and time are important. Quality is less tangible and hard to measure which means that people will steer based on time since this is tangible."

In general, measures of how the IT organization creates value in relation to its costs were perceived as unclear. Some respondents meant that there is a great challenge in how to actually measure provided value, as there is a tradeoff between costs and provided value.

5 Analysis

The analysis is based on the empirical data of the current business model of AstraZeneca's IT organization, which will be analyzed with the use of the analysis framework of the four business model typologies.

5.1 AstraZeneca IT Compared to the four Business Model Typologies

A comparison between AstraZeneca IT and the four business model typologies is outlined below. Due to the characteristic of AstraZeneca IT as an internal organization, revenue streams are currently not directly comparable with any of the four business model typologies and have therefore been left out in this comparison. The implications of the lack of traditional revenue streams will however be discussed in the next chapter.

5.1.1 Creators

The Creator business model is based upon selling products, which is something that AstraZeneca IT also does in form of systems, applications and information storage tools. As with the Creator, customer value is hence dependent on the performance that customers can achieve by using the product and this value is transferred via the product itself (Stabell & Fjeldstad 1998).

Looking at AstraZeneca IT's cost structure and key resources, there is a heavy load on intangible factors such as intellectual and human capital while the Creator has most of its costs in physical resources (Stabell & Fjeldstad 1998). This difference is partly dependent on that the IT organization is outsourcing the maintenance of the physical IT infrastructure to external partners, hence mainly having project management responsibilities demanding low utilization of physical assets.

The CIS operating model with Plan-Build-Run has many similarities to the Creator. Plan, Build and Run contribute in different ways to the final outcome and each activity has different economics, similarly to the disaggregated activities in a value chain (Stabell & Fjeldstad 1998). Like in a value chain of a Creator, CIS is emphasizing that activities should be performed in a sequential manner where the output of one activity is the input to the next one (Stabell & Fjeldstad 1998). When comparing with primary activities for Creators; inbound logistics can be seen as the task of the Plan department which receives and stores product inputs in the form of requirements, operations is the task of the Build department which makes sure that external partners transform the product into the right form and outbound logistics is the task of the Run department which distributes the product to buyers. Another key activity for Creators is post-purchase service which is performed by the Run department of AstraZeneca IT.

The sequentially performed activities at AstraZeneca IT are however disturbed as the Build department tries to steer external partners in detail to make sure they deliver exactly what has been specified. This result in many iterative rounds of information flows, which in turn leads to that projects often take longer time than specified. Speed is according to Ahmad and Dahfr (2002) an important business driver for the Creator and this is also stated to be the case for CIS, but this is often not fulfilled due to the iterative information flows.

The CIS organization has an important task in AstraZeneca IT to ensure that systems and applications that are built fit with the IT architecture. The IT architecture can be compared to the assembly lines in a factory as customization of products in both cases only are allowed to the degree that will fit

with the infrastructure (Stabell & Fjeldstad 1998). There is also a need for detailed requirements in order to make a project fit as well as possible with the current operating model of AstraZeneca IT. This can be compared with the Creators effort in standardization to make their products fit current production processes. As with the Creator, the operating model allows for a repetitive way of working where the capability to deliver value is embedded in processes, such as different project management models (Christensen, Grossman & Hwang 2009).

The parts of AstraZeneca IT that builds and delivers products to customers have a limited level of customer intimacy. This depends on that requirements from customers are collected by SET IS and then sent away to CIS. The only relation the departments that finally determines the functionality of the products have with customers is through the distribution channels of the finalized products. The limited customer intimacy in the Build and Run departments together with the fact that these departments are looking for standardization, is one reason for why SET IS sometimes determines to build the products themselves. That CIS, like a Creator, has limited customer intimacy and tries to standardize the products to fit into the IT architecture would have functioned well if customers seek to satisfy needs through rather standardized products. The reality is however that there is a demand for customized solutions, hence making end-customers experience standardization as problematic.

To sum up, AstraZeneca IT has more emphasis on human and intellectual capital than is the case with a typical Creator. It can furthermore be said that the Plan-Build-Run model of CIS have clear similarities with the Creator as activities are intended to be performed sequentially and that standardization is important. This model is however not a full representation of how AstraZeneca IT actually conducts business today as the step between the Build department and external partners is characterized by iterative rather than sequential information flows.

5.1.2 Distributor

According to Weill et al. (2005) a Distributor is a physical intermediary between the end-customer and the Creator of the product. AstraZeneca IT could be seen as having a similar function but with one main difference; while the Distributor takes ownership of the product from the supplier and then distributes it to the end-customer, AstraZeneca IT is characterized by interaction between SET IS and the end-customer, interaction between SET IS and CIS and the interaction between CIS and external partners. A main problem with comparing AstraZeneca IT to a Distributor is thus that the actual value creating activity of the Distributor is the delivery of the product. This product-focus of a typical Distributor is not representative for explaining AstraZeneca IT, since value is created in different steps through interaction between actors.

Key resources and costs of a distributor are focused around supply chain management, inventory and planning systems, managing the flow of products. In some ways this can be compared to managing the flow of information that is a main goal of AstraZeneca IT. There is however a large difference in that resources of a Distributor are optimized around the transportation and storage itself rather than altering the product, while AstraZeneca IT has much more focus on customizing the functionality of the product for the end customer.

The Distributor typically aims to deliver products that customers want as quickly as possible. For AstraZeneca IT, this has a certain difference since business does not order a standardized product that is distributed through AstraZeneca IT. Instead they order an information management need that has to be resolved through AstraZeneca IT. This most often lead to that AstraZeneca IT cannot ensure

delivery of a pre-known product. This further puts requirements of the type of customer intimacy in AstraZeneca IT's business model that cannot be explained by simply viewing them as a Distributor.

To sum up the similarity between the Distributor and AstraZeneca IT is low, since AstraZeneca IT is much more involved in the value creating process as they translate requirements themselves and make these requirements fit with the IT Architecture before delivering products. Furthermore, AstraZeneca IT does not take ownership of products.

5.1.3 Broker

The Broker business model is in many ways an applicable representation of AstraZeneca IT. AstraZeneca IT has a function as a mediator between buyers and sellers, where the business side needs solutions to their information management issues and external partners have the technological competence to solve them. Weill et al. (2005) discuss how the Broker does not take ownership of the product but instead take fees from the buyer and seller. In the case of AstraZeneca IT, the firm is however not an independent actor since it works in the best interest for their buyer, while only having a contracted relationship with the seller.

The comparison between AstraZeneca IT and a Broker shows a difference in that network externalities defines the value proposition of the Broker. AstraZeneca IT however works with a defined set of customers and a defined set of external partners, which limits the benefits of network externalities. Katz and Shapiro (1985) discuss how positive network externalities are occurring since the value of becoming a member is increasing with the number of other members. If this would be applicable to AstraZeneca IT, it would require a business model in which they sold their IT solutions to other customers as well, not only internal departments, at the same time as they opened up their contracting partnerships to an unlimited amount of suppliers. The limited amount of external partners that is offered through the CIS organization today might also be contributing to that SET IS avoid going through CIS in some cases. The current business model could however still be compared to that of a Broker but with a limited set of buyers and sellers.

A main similarity between AstraZeneca IT and the Broker is the focus on providing the infrastructure and handling the transaction between customers and sellers. Maintaining and servicing the infrastructure as described by Thompson (1967) can be compared to the way CIS operates in the sense that they provide an operating model for driving a project and linking and connecting actors.

Thompson (1967) describes the Broker as not involved in transactions in terms of creating the product. AstraZeneca IT differs from the typical Broker since a big part of the activities are centered on projects of how to build products. The typical Broker business model would be more applicable if AstraZeneca IT had less involvement in building the IT solutions, but functioned more as a mediator between the business side and the external partners.

To sum up AstraZeneca IT has strong similarities to the Broker as it is a mediating function between customers and external partners. AstraZeneca IT however cannot be fully regarded as a typical Broker the organization extends the mediating role to performing a higher level of creation themselves.

5.1.4 Landlord

Landlords focus on matching problems with its problem-solving resources. CIS within AstraZeneca IT has a significant similarity to this since the operating model is intended to drive projects and solve problems for the end-customer. Project management knowledge is therefore a significant resource for AstraZeneca IT in general and for CIS in particular.

According to Stabell and Fjeldstad (1998) the Landlord attracts customers that need a solution to a problem that cannot be solved using own resources. This is very applicable to AstraZeneca IT that has the technical capability to translate business needs into technical specifications and build and drive projects. The organization therefore has great similarities to a Landlord, for example a consultancy firm, which has its main costs in human and intellectual capital. This similarity is also exemplified in the way Build-phase employees have goals on a percentage of their time to debit in projects, which is very similar to a Landlord where the customer pays based on time. The customer knows what information needs and information problems they have, but they do not know how to solve it. In this sense AstraZeneca IT has to match the problems or requirements to the problem-solving resources within the operating model. Just like a Landlord, AstraZeneca IT furthermore has customers with high demand for customization.

According to Stabell and Fjeldstad (1998) knowledge management is a key part in a Landlord business model since complex problems require skilled and flexible human resources. This is also true for AstraZeneca IT that operates in the project format and usually needs to leverage on what has been done previously. Christensen, Grossman and Hwang (2009) further emphasize the importance of firm-level learning across projects. Compared to a typical Landlord, knowledge management and communication across projects appear to be less developed within AstraZeneca IT.

A Landlord relies on having tacit knowledge needed to deliver solutions within the organization. In other words the problem-solving firm is the one that delivers the solutions itself. When it comes to AstraZeneca IT they use tacit knowledge to solve problems by exactly specifying how external partners should build the products. The use of external partners to such a great extent is a main difference compared to the usual Landlord.

Treacy and Wiersema (1992) emphasize the importance of customer intimacy when operating as a Landlord, since solving unique and specific problems requires a thorough understanding of them. This is the function that SET IS has within AstraZeneca IT. However, the problem-solving part of AstraZeneca IT has a larger distance to the end-customer, which has been expressed as a concern within the organization.

To sum up, SET IS is similar to a Landlord as their main task is to translate the requirements from customers. This is also true for CIS in the sense that they are acting as problem solvers of how products should fit into the IT architecture. There are also further tendencies that CIS wants to function as a Landlord, but today lacks the high level of customer intimacy and knowledge management capabilities of a typical Landlord.

5.2 Business Modeling of Current Situation

A significant insight with the first part of the analysis is that AstraZeneca IT has two very different ways of working internally in terms of CIS and SET IS. This contradicts a single overall business model for AstraZeneca IT since the organization has been clearly divided into these two separate

organizations. The fact that AstraZeneca previously has had a decentralized IT organization and recently implemented the more centralized CIS has created a dispersed organization, which motivates an explanation of separate business models for CIS and SET IS.

Factors that characterize SET IS are decentralization, customer intimacy, focus on business knowledge, speed, flexibility and iterative project management where customers, internal technical competence and external partners are working closely. Factors characterizing CIS are centralization, overall portfolio management, cost reduction and structured and standardized project management where Plan, Build and Run are distinct separate phases.

SET IS within AstraZeneca IT mostly functions as a translator of business needs into technical requirements. The close customer intimacy, interaction and business knowledge that are required in this way of working make SET IS hard to illustrate as a Distributor. The lack of actual creation and standardization in products and services make SET IS less similar to a Creator as well. The Broker is not the best description either of SET IS according to the business typologies since the Broker in general has no customer intimacy in solving specific problems but rather provides the infrastructure for connecting the customer to the supplier. Therefore, according to the analytical framework of business model typologies SET IS should currently be seen as a Landlord; a consultancy firm that has the business side of AstraZeneca as its main client.

CIS has shown to strive towards delivering solutions that are tailored to customer needs, much like a Landlord as well, but tends to build IT solutions as a Creator. The inflexible operating model has not shown to be well suited for the iterative process that characterizes a Landlord. CIS currently seems to aim to be a Landlord, but is still run as a Creator in terms of the operating model Plan-Build-Run, which makes the current situation best described as a hybrid between a Landlord and a Creator. This clinch between two different business models can be seen as an explanation for experienced problems. The fact that SET IS needs to operate in a flexible manner with high customer intimacy while CIS pushes for standardization leads to different rationales in creating, capturing and delivering value. It is for instance clear that the aim is to be a Landlord in the way time is debited the customer, but the IT solution delivery is more based on processes in the same way as for a Creator.

Another interesting observation is the role of external partners in AstraZeneca IT's operations. Even though external partners are not part of the internal IT organization at AstraZeneca, the interface and stance towards them must be considered a part of the analysis. In the current way of operating AstraZeneca IT has outsourced the main part of the Build process, striving to use the expertise of partners to get away from activities of programming and dealing with technical details. This indicates a stance towards utilizing external partners as Landlords. However, there is still a conflict in the high degree of involvement of AstraZeneca IT in what the external partners do. In addition to this the interviews revealed that the partners seldom have a role as advisor in projects, adhering only to requirements posed by AstraZeneca IT without questioning own suggestions. This leads to that external partners are currently functioning more as Creators.

In summary, AstraZeneca IT's business model in relation to business model typologies can be viewed in terms of two business models, SET IS and CIS, and two interfaces, one towards the customer on the business side and one towards the external partners. This is illustrated in Figure 10.

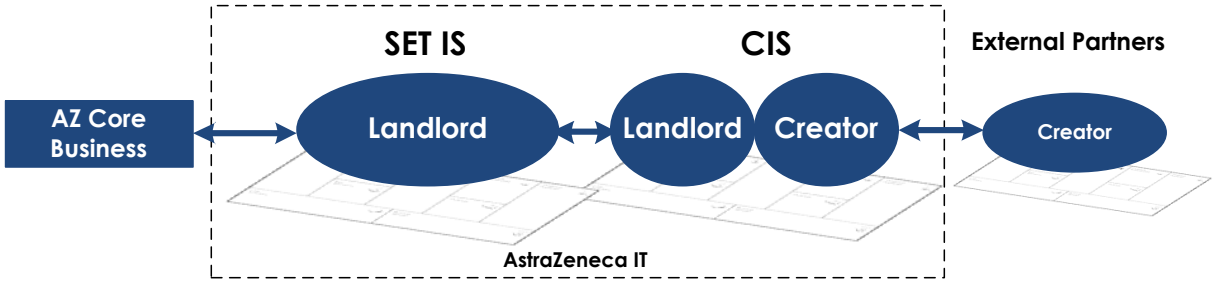


Figure 10. Business model typology representation of AstraZeneca IT's current business logic (own Illustration).

One thing that should be remembered is that AstraZeneca IT could have been explained with a single business model, something that was done during the data collection phase and the first part of the analysis. However, in this part of the analysis it has been discovered that an explanation and illustration of the whole of AstraZeneca IT as one business model typology is difficult due to the difference in how SET IS and CIS operate.

6 Discussion and Conclusions

This chapter is initiated with a discussion over a proposed business model for AstraZeneca IT in terms of business model typologies. The purpose is then fulfilled by concluding the lessons that have been learned as well as the challenges that have been found in business modeling for internal IT. The chapter is then finalized with a discussion of ideas for further studies.

6.1 Discussion of a Proposed Business Model for AstraZeneca IT

With background in the empirical data of experienced problems in AstraZeneca IT and the analysis of the current business model, it is interesting to discuss a new representation of AstraZeneca IT in terms of business model typologies. This new and proposed business model typology representation is outlined in Figure 11 and further discussed below.

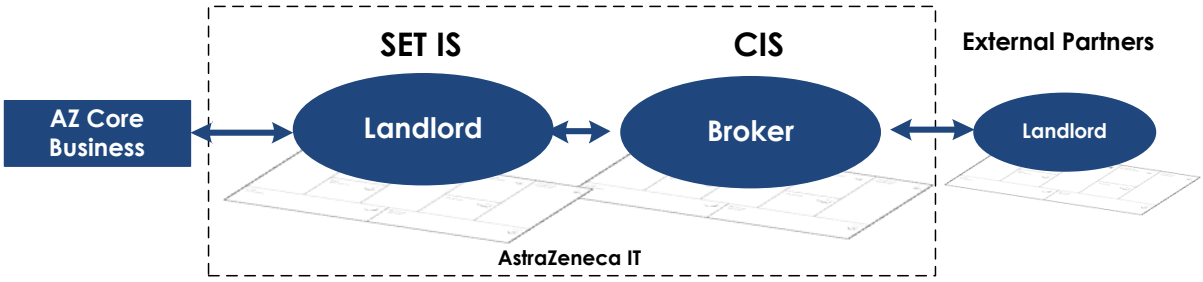


Figure 11. Proposed business model typology representation of AstraZeneca IT (own illustration).

In the new proposal SET IS is still best represented by a Landlord due to the nature of their business. As found through the previous analysis close interaction with the end customer is key since every solution is unique. SET IS can thus be described as a consultancy for the end customer in which the business information needs are input factors that need to be translated through SET IS.

What is more interesting in this discussed proposal is the business model of CIS. In the current model, CIS is illustrated as mixture of the Landlord and the Creator. This has led to gaps and overlaps in the operating model, both towards the external partners and SET IS, but also internally between the Plan-Build-Run phases. In the new business model typology illustration CIS is a Broker, which brings more clarity into the complex situation.

Currently there are two steps where technical requirements are developed in the operating model. First, they are translated by SET IS based on the customer needs. Secondly, these technical requirements are weighted and re-developed by CIS based on guidelines in the Plan-phase. In the proposed new model, these guidelines are considered in the first step already, hence by the Landlord SET IS. The Broker, CIS, should still develop these guidelines and communicate them to SET IS, but is not involved in re-developing these guidelines again before requirements are sent to external partner. The Broker, as described by the typology, develops and maintains the infrastructure, which in this case consists of S&A guidelines and principles. The Broker further maintains contacts with suppliers and external partners and provides all necessary information needed to match buyers and sellers.

Project management is still a core function of CIS but the involvement in solving technical problems is handed over to their external partners and suppliers. This is an important observation since the current view of external partners is that they are Creators. In the proposed model external partners

should be treated as problem solvers, hence motivating the partnership and showing trust in their capabilities. A view of external partners as Landlords should therefore be adopted.

6.1.1 Implications for Current Problems

The *Incoherent understanding of IT Strategy* is a problem that is based on the absence of a clear and well-communicated vision. Business models are not the same as strategy, but can be seen as a way to outline and describe a strategy in more detail which makes business modeling an action to overcome the problem. Which specific business model typology is chosen is not important here, it is rather the action to develop and enforce a clear business model. With a business model in place AstraZeneca IT can outline activities and relationships in order to eliminate confusion in the organization. This is also a valuable basis for planning strategic actions, which for instance can be broken down in the nine business model dimensions of Osterwalder (2004). This can for instance include key activities that are needed to go from application provider to a more information-focused organization, but also contribute to a more clear outsourcing strategy by considering the role of key partners.

The fact that AstraZeneca IT suffers from a *Dispersed Organization* has been a key aspect of the overall study. This has led to the insights that viewing AstraZeneca IT in terms of two separate, but interdependent, business models is beneficial. The fact that AstraZeneca IT consists of two sub-organizations is not a problem itself but rather the inefficient interaction between these two. A description of these organizations as different business model typologies can help to spread a common understanding of activities and relationships between SET IS and CIS. If CIS takes the role of a Broker, this can also help to mitigate the problem that SET IS sometimes perceives them as an obstacle due to their high demands on specification of requirements. Instead, the full focus of CIS will be on supporting SET IS in finding appropriate external partners and align projects with the IT infrastructure of the company, as well as still being responsible for the daily delivery and maintenance of applications. From a management perspective, the different logics of these two business model typologies thus serve as a basis for deciding key activities of each organization.

Gaps and Overlaps in the Operating Model have been identified in several parts of AstraZeneca IT. The business model approach is an effective tool to outline roles, responsibilities and communication channels to bridge the gaps and eliminate the overlaps. One example of this is the illustration of CIS as a Broker and external partners as Landlords. This clarifies that the role of CIS is to set guidelines for the IT infrastructure, provide relations with external partners and have the responsibility for the Run-phase. However, CIS role is not to intervene too much in the actual project execution of external partners. Since these are seen as Landlords, it is up to their technical expertise to solve problems and come up with improvement suggestions. This knowledge of external partners is not utilized if they are treated like Creators.

The problems AstraZeneca IT faces in terms of *Information Management* is mostly tailored to the interface between SET IS and CIS. The two forces, CIS pulling projects towards a centralized and seemingly slow process and SET IS pulling projects towards the fast-track while losing the overall and long-term perspective, leads to that no one has an overall view of applications and data. A business model may help in streamlining AstraZeneca IT by dividing roles and focusing on the interface between the two sub-organizations. This should be done by encouraging, or forcing, SET IS to run projects through CIS and simplify and speed up project management in CIS. This is where the new

proposed business model typology illustration becomes extra useful. On a typology level CIS is proposed to act as a Broker in which they provide value for SET IS by handling the IT infrastructure around projects and enable a comprehensive selection of suppliers and external partners. A multi-sourcing strategy would therefore be necessary since SET IS has needs that cannot always be satisfied by the four external partners AstraZeneca IT currently has. The value for the organization of turning to CIS with projects is therefore based on the capabilities CIS has in matching the project with the right partner, based on requirements in speed, flexibility and cost. In this model, more responsibility is given to SET IS in terms of translating business needs into technical requirements and take into account the guidelines developed by CIS. In this way, overlaps between SET IS and CIS that slow down the process is eliminated since the technical specification is done in one step. CIS will further not be a bottleneck since they are less involved in the project specification and building phases.

The final problem area identified is that *performance measurement* in AstraZeneca IT is insufficient. Currently, there are many different performance measures in AstraZeneca IT and these might be anything from budget fulfillments, chargeback rates and number of projects conducted. Just as a free market company is measured by profits, AstraZeneca IT would ideally have one single quantifiable measure that reflects their performance. The main business driver for AstraZeneca IT is said to be customer satisfaction and the measure should then reflect this. In this case, the measure might be built on customer surveys, follow-ups and equivalent measurements. Customer satisfaction further contributes to customer loyalty, which is important to uphold an efficient way of working between the business side, SET IS, CIS and external partners. Most important however is that AstraZeneca IT outlines internal business drivers and develops measures that reflect them. To strive towards having one single measure that reflects the organization further eliminates the risk of information overflow and sub-optimization.

To summarize, there are some major benefits by adopting a Broker business model for CIS while SET IS still acts as a Landlord. Most of all, it leads to that overlaps and gaps are eliminated and that roles and interactions between CIS and SET IS are made clear.

6.1.2 Managerial Implications from the Business Model Typologies

The proposed business model typologies also lead to learning in what should be developed compared to the current situation, which is described here.

For SET IS, the role of a Landlord is something that is much in line with current activities. There is a need to focus on high customer intimacy, where the information asymmetry in IT knowledge between the IT organization and the rest of the business implies a need for close collaboration. Key activities still becomes problem solving and knowledge management to make sure that employees of the SET IS has a sufficient level of understanding for both business and IT demands. With the new proposed typologies, this however means that SET IS need to focus on developing the area of requirements specification as they will have to excel in this area to support the Broker-role of CIS. It is also important for SET IS to encourage the adoption of the guidelines from CIS in an earlier stage of projects.

With a new role as a Broker, a key area to develop is relationships with a higher number of external partners that can meet a wider array of needs than the current four. With this type of multi-sourcing strategy, CIS also needs to focus on improving their capabilities as a purchaser of outsourcing

services. Another focus area is to make the provided guidelines easier to use in practice, supporting the organization in applying them at a project level and SET IS to adopt them in an early stage of project work. Finally, CIS still needs to focus on their capability in delivery and maintenance of application. After all, this is what the AstraZeneca business use on a daily basis and therefore constitutes an important interface against the end-customers.

6.2 Conclusions and Lessons Learned

The purpose of this thesis has been to use business models to describe internal IT and analyze what lessons can be drawn by applying business model typologies to handle complexity in an internal IT organization.

First, an analysis framework was developed in which business model typologies presented by Weill et al. (2005) were structured with help of the Business Model Canvas developed by Osterwalder and Pigneur (2010). This is seen as a main contribution of this thesis since this approach has not been found in previous literature. It has also been a challenging task to develop this framework, since what has been written by previous authors about business model typologies and their characteristics are seemingly diverse.

The empirical data collection has been used to describe the current business model of AstraZeneca IT according to the Business Model Canvas as well as finding a number of problems with the way AstraZeneca IT is currently operating. Based on this data, the current business model was analyzed with the analytical framework in order to find similarities and differences with the business model typologies.

The analysis revealed that the current business model of AstraZeneca IT cannot be described by only resembling it to one business model typology. Instead it was found that AstraZeneca IT is currently best described by different business model typologies, namely the Landlord for SET IS and a mixture of the Landlord and the Creator for CIS. Another interesting aspect is that external partners and suppliers are viewed and treated as Creators.

In order to tackle the problems and handle complexity, the discussion proposed that AstraZeneca IT will have to re-evaluate their current business model. SET IS is still proposed to act as a Landlord but CIS is instead suggested to act as a Broker. With such a change CIS would leave much of the problem-solving activities to their external partners and suppliers, whom are becoming Landlords. This change will have implications for the problems as well as for how different parts of the organization are managed.

Since these results are based on a case study and affected by contextual factors of AstraZeneca IT, the generalizability of the specific results is judged to be rather low. It can however be discussed whether the use of business models to reduce complexity in other internal IT organizations is applicable. For instance the balance between being close to the business with customized solutions and centralization to achieve a better overview and scale is probably common, a situation where this study has exemplified how business models can be useful. The generalizability of the specific typologies for AstraZeneca is therefore considered to be less interesting than the more general lessons from applying the business model concept on internal IT organizations.

6.2.1 Lessons Learned from Business Modeling for Internal IT

This study can be described as an *artificial benchmarking* of AstraZeneca IT by comparing their business model to business model typologies, hence not real companies but simplifications of typical ways to model a business. This has proven to be useful since it keeps a high level of the analysis and identifies the rationale for how a Creator, Distributor, Landlord or Broker operates. One positive insight about using the business model approach is thus that it enables *an outside view of the business* as it challenges the current logic of an internal IT organization. This is very valuable as it serves as a basis for strategic discussion of the role of internal IT. If the aim is to solve operational issues it would however have been more useful to use a more narrow scope, benchmarking only with other internal IT organizations.

Based on the approach in this study, it therefore has to be clarified that the business model is not a tool to analyze the business on an operational level. The strategy lays the basis for the business model, which makes the toolbox for operations management and organization a lower level of analysis. Instead, the usefulness of the business model for this study has lied in *identifying the source of problems on a higher level*, which would probably not have been identified with more operational tools of analysis. For example, knowledge management is one of the most critical aspects of running a consultancy company and if AstraZeneca IT aims to be a consultancy, knowledge management has been inadequate. When the developed business model typology framework was applied, this problem was identified. It would however have been hard to identify this if the analysis was conducted on an operational level.

One important finding when applying the analytical framework was that the *elements of a business model must be coordinated and streamlined* in order to function properly. By using the elements in the Business Model Canvas it could be seen that this was not always the case for AstraZeneca IT. For example, CIS wanted to be a consultancy that was flexible and handled unique and customized projects, but was running their business with a stiff and inflexible operating model. Business modeling for internal IT can thus be used to identify gaps. As this study shows, it can however also be used as an internal communication tool for internal IT organizations to bridge gaps and streamline operations according to their business strategy. This includes d*efining roles and relationships between different actors*.

In the study of AstraZeneca IT, a need to break down the business model into two different business models was identified. An important learning is that business models can be used not only for an organization as a whole, but for sub-organizations as well. AstraZeneca IT's business model is actually a breakdown of AstraZeneca's business model in the same way as SET IS' and CIS' business models are breakdowns of AstraZeneca IT's business model. This was found necessary during the study of AstraZeneca IT since many of the problems identified had their roots in this separation. *Breaking down business models into sub-business models* may therefore be important in order to analyze the problem at an appropriate level.

Viewing the business model as a tool to fulfill the business strategy further enabled a way of *assessing where the business is today and where it should be in the future*. Business models for internal IT can thereby be used to describe the difference between a current state and a future state, serving as a basis for deriving strategic actions.

6.2.2 Challenges with Business Modeling for Internal IT

The breakdown into four typologies by combining the terminology of Weill et al. (2005) and Osterwalder and Pigneur (2010) in this report laid the basis for a comprehensive analysis framework, but it cannot catch all characteristics and combinations of business models. Many authors have tried to explain typologies but they are almost never consistent. A main challenge about using business model typologies in the comparison therefore becomes that *almost all business models are unique*. A distribution company's business model for example may differ in one or many elements but using a typology as explanation can still catch the rationale for how a distributor business model functions. The approach to explain business modeling in terms of typologies however makes the problem apprehensible.

Another challenge is deciding *how many elements that should be included* when analyzing a business model. The Business Model Canvas by Osterwalder and Pigneur (2010) is probably one of the few models considered exhaustive enough to cover most important aspects of a business model, yet simple enough to be used by companies. However, there are more elements that can be considered which would lead to more combinations and more possible explanations of business model typologies. This would have made this type of benchmarking even more challenging.

Another challenge is that internal IT organizations, and internal organizations overall, have some major characteristics that distinguish them from a company or organization in the market in terms of business model. First of all *Revenue streams and performance measurement* differ significantly between internal organizations and companies that are exposed to market competition. A company in the market is *driven by profits* and can therefore measure its success by subtracting costs from revenues. Due to the characteristic of AstraZeneca IT as an internal organization within a larger corporation, revenue streams are currently not directly comparable with any of the four business model typologies.

The *limited number of customers* that AstraZeneca IT serves today also provides a significant distinction from a company exposed to market competition. This type of company is *driven by growth* in terms of continuously attracting new customers while at the same time retaining old customers. This business driver is not present in an internal IT organization if the mission is only to serve internal customers. In the same sense a company exposed to market competition is *driven by sales*, which makes the sales- and marketing function important. For an internal IT function this is most often not present, increasing the difficulty of the comparison.

All these differences make it significantly harder to measure performance and business drivers in an internal organization compared to a free market organization that is driven and measured by sales, profit and growth. This also makes the comparison to business model typologies more difficult, but at the same time these differences might provide the most valuable input as it challenges the current business logic at its roots.

6.2.3 Concluding Remarks

Through comparing the internal IT-organization of AstraZeneca with business model typologies, this study has resulted in suggestions for how AstraZeneca IT can re-evaluate their business logic in order to deal with the complexity the organization faces. This has shown that business models can be a useful tool to challenge the existing business logic of an organization and enable a common understanding of how the organization creates, delivers and captures value. A key contribution of

this study is the analysis framework, which synthesizes theory of business model elements with four business model typologies. This framework is argued to be applicable to any organization that wishes to pursue a business model assessment or re-evaluation.

6.3 Further Studies

A couple of factors have been discovered during the study of business modeling for internal IT that could be studied further. The most interesting challenge that was discovered is related to the differences between an internal organization and an organization exposed to market competition. However there is a need to identify substantial measures representing the business drivers for internal organizations since this tend to steer and control directions of the business. It would be interesting to study how this could be represented in different ways by conducting several case studies of large internal IT organizations and their way of measuring performance and rewarding their employees. A study aimed to measure the balance between costs and provided value for internal IT would therefore be able to provide an interesting foundation for measuring performance in a tangible and accurate way.

Another interesting study would be to analyze the implications of the limitations that an internal IT organization faces due to their embedment within a larger company. It would further be interesting to explore different ways to eliminate these limitations to make internal organizations operate as efficient as if they were their own business. For example Volvo IT operates as its own company, selling solutions not only to Volvo departments but also to other customers. To open up the business models of internal organizations is an interesting aspect, especially for large companies with great potential to capitalize on such a move due to their extensive amount of knowledge and resources.

Except from Weill et al. (2005) and Stabell and Fjeldstad (1998), many business model typologies are currently limited to describing only one dimension of the business model such as revenue streams. The analysis framework in this study can be seen as a starting point towards a more detailed description of business model typologies, but it would be interesting to conduct further research in this area to include more information on what characterizes different typologies. This can also be extended to describe for instance the management information needed to steer different typologies.

References

Ahmad, M. M. and Dhafr, N. (2002). Establishing and improving manufacturing performance measures. *Robotics and Computer Integrated Manufacturing*, vol. 18, pp. 171–176.

Anderson, E., Weitz, B. (1992). The use of pledges to build and sustain commitment in distribution channels*. Journal of Marketing Research*, vol. 29, no. 1, pp. 18-34.

Balakrishnan, R. (2003). *The Toyota Production System - A Case Study of Creativity and Innovation in Automotive Engineering.* University of Bristol: Bristol
Accessible: <http://www.dig.bris.ac.uk/teaching/m_o_i/studen10.htm> 2011-04-25

Betancourt, R. R. (2004). *The Economics of Retailing and Distribution*. Cheltenham: Edward Elgar Publishing.

Borenstein, D. and Betencourt, P.R.B. (2005). A Multi-Criteria Model for the Justification of IT Investments*. Information Systems and Operational Research Journal*, vol. 43, no. Feb. 2005, pp. 1-21.

Bryman, A., Bell, E. (2007). *Business Research Methods*. United Kingdom: Oxford University Press, 2nd edition.

Chesbrough, H. and Rosenbloom, R.S. (2002). The Role of the Business Model in capturing value from Innovation: Evidence from XEROX Corporation's Technology Spinoff Companies*. Industrial and Corporate Change*, vol. 11, no.3, pp. 529-555.

Christensen, C.M., Grossman, J.H. and Hwang, J. (2009). *The Innovators Prescription: A Disruptive Solution for Health Care.* New York: McGraw-Hill.

Christensen, C.M., Johnson, M.W. and Kagermann, H. (2008). Reinventing Your Business Model. *Harvard Business review*, vol. 86, no. 12, pp. 57-68.

Christensen, L., Andersson, N., Engdahl, C. and Haglund, L. (2001). *Marknadsundersökning – en handbok*. Lund: Studentlitteratur.

Denscombe, M. (2009). *Forskningshandboken*. Lund: Studentlitteratur.

Dorf, R.C. and Byers, T. H. (2005). *Technology Ventures – From Idea to Enterprise*. New York: McGraw-Hill.

Dubois, A. and Gadde, L-E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, vol. 55, no. 7, pp. 553 – 560.

Duggan, J. and Sribar, V. T. (2010). *What Is the Penalty for Complexity in Application Portfolios?* Gartner Research: ID Number: G0017487.

Erol, I. and Ferrell Jr. W.G. (2004). A methodology to support decision making across the supply chain of an industrial distributor. *International Journal of Production Economics, vol.* 89, no. 2, pp. 119–129.

Fjeldstad, Ö. (2005). Transforming Value Creation: Implications for Business Models and Business Practices. Presentation in Helsinki. Accessible:
<www.bestserv.fi/files/2nd_isbd/Fjeldstad_120505.pdf> 2011-04-26

Fjeldstad, Ö. and Ketels, C.H.M. (2006). Competitive Advantage and the Value Network Configuration: Making Decisions at a Swedish Life Insurance Company. *Long Range Planning Journal*, vol. 39, no. 2, pp. 109-131.

Gartner (2008). *Gartner Says IT Leaders Must Prepare for the Industrialization of IT.* Gartner Newsroom April 8th 2008. Available: < http://www.gartner.com/it/page.jsp?id=641909> 2011-05-05

Gluhsko, B. (2008). *Business Patterns; Models of Business Organization*. Presentation at University of California Berkeley. Available: < http://courses.ischool.berkeley.edu/i243/s08/lectures/243-07-20080213.pdf> 2011-04-18

Goldberg, L.S. and Campa, J.M. (2010). The Sensitivity of the CPI to Exchange Rates: Distribution Margins, Imported Inputs, and Trade Exposure. *The Review of Economics and Statistics*, vol. 92, no. 2, pp. 392-407.

Gordijn, J., Osterwalder, A. and Pigneur, Y. (2005). *Comparing Two Business Model Ontologies for Designing e-Business Models and Value Constellations.* 18th Bled eConference eIntegration in Action Bled Slovenia, June 6-8. Available: <http://scholar.google.se/scholar?hl=sv&q=Comparing+two+business+model+ontologies&btnG=S%C3%B6k&as_ylo=&as_vis=0> 2011-04-24

Grolik, S., Kalmring, D., Lehner, D and Frigerio, C. (2003). *Analysis of Interrelations Between Business Models and Knowledge Management Strategies in Consulting Firms*. ECIS 2003 Proceedings. Paper 71. Available: <http://aisel.aisnet.org/ecis2003/71> 2011-05-03

Hamel, G. (2000). *Leading the revolution*. New York: Plume

Hammer, M. (1990). Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review,* July-August 1990, pp. 2-8.

Handler, R. A. (2011). *Program Managers Must Understand Complexity.* Gartner Research: ID Number: G00211455

Heffes, E. M. (2003). Gartner sees challenge in handling complexity. *Financial Executive,* December. Accessible: <http://www.thefreelibrary.com/Gartner+sees+challenge+in+handling+complexity.-a0111737886> 2011-05-02

Hopkins, W. (2010). *Top Distribution Industry Key Trends and Issues.* BCG Systems. Available: <http://www.bcgsystems.com/blog/bid/41972/Top-Distribution-Industry-Key-Trends-and-Issues> 2011-04-26

Hutt, M. and Speh, T. (2007). *Business Marketing Management: B2B*. Mason: Thomson South-Western.

Katz, M.L. and Shapiro, C. (1985). Network Externalities, Competition, and Compatibility*. The American Economic Review*, Vol. 75, No. 3., pp. 424-440.

Laffey, D. and Gandy, A. (2009). Applying Stabell and Fjeldstad's value configurations to E-commerce: A cross-case analysis of UK comparison websites*. The Journal of Strategic Information Systems Vol. 18, No. 4, pp 192-204.*

Liker, J. K. (2004). *The Toyota way: 14 management principles from the world's greatest manufacturer.* Madison: McGraw-Hill.

Lin, C., Pervan, G. and McDermid, D. (2005). IS/IT Investment Evaluation and Benefits Realization Issues in Australia. *Journal of Research and Practice in Information Technology*, Vol. 37, No. 3, pp. 235-251.

Magretta, J. (2002). Why Business Models Matter. *Harvard Business Review*, vol. 80, no. 5, pp. 86-92.

Mena, C. H. (2003). *Complexity in Organisations: A Conceptual Model.* Warwick Manufacturing Group, University of Warwick. Available: <http://wrap.warwick.ac.uk/1257/1/WRAP_THESIS_Mena_2003.pdf> 2011-05-05

Miles, M. B. and Huberman, A. M. (1994). *Qualitative Data Analysis (2nd edition)*. Thousand Oaks, CA: Sage Publications.

Osterwalder, A. (2004). *The Business Model Ontology – A Proposition in a Design Science Approach.* Universite de Lausanne, PhD Thesis. Lausanne: Switzerland.

Osterwalder, A. and Pigneur, Y. (2010). *Business Model Generation*. New Jersey: John Wiley & Sons Inc.

Osterwalder, A., Pigneur, Y. and Tucci, C. L. (2005). Clarifiying Business Models: Origins, Present, and Future of the Concept. *Communications of the Association for Information Systems,* vol. 15, May 2005.

Porter, M. E. (1996). What is strategy? *Harvard Business Review*, vol. 74, no. 6, pp. 61-78.

Rushton, A., Croucher, P. and Baker, P. (2006). *A Handbook of Logistics and Distribution Management, 3rd Edition*. London: Kogan Page.

Schafer , S.M., Smith, J.H. and Linder, J.C. (2005). The power of business models. *Business Horizons*, vol . 48, no. 3, pp. 199-207.

Shuen, A. (2009). *Web 2.0: A Strategy Guide – Business thinking and strategies behind succesful Web 2.0 implementations.* O'Reilly: New York

Staats, B. R., Brunner, D. J. and Upton, D. M. (2011). Lean principles, learning, and knowledge work: Evidence from a software services provider. *Journal of Operations Management,* vol. 29, no. 5, pp. 376-390.

Stabell, C. B. and Fjeldstad, Ö. D. (1998). Configuring Value for Competitive Advantage: On Chains, Shops and Networks. *Strategic Management Journal*, vol. 19, pp. 413–437.

Stalk, G., Evans, P. and Shulman, L. E. (1992). Competing on Capabilities: The New Ruies of Corporate Strategy. *Harvard Business Review*, vol. 70, no.2, pp. 57-69.

Svenning, C. (2003) *Metodboken*. Eslöv: Lorentz Förlag.

Teece, D.J. (2009). Business Models, Business Strategy and Innovation*. Long Range Planning Vol. 43, No. 2-3, pp. 172-194.*

The Economist (2009). *Toyota – Losing Its Shine.* Available: <http://www.economist.com/node/15064411?story_id=15064411> 2011-04-26

Thompson, J. D. (1967). *Organizations in Action*. McGraw-Hill, New York.

Tompkins, J. and Harmelink, D. (1993). *The Distribution Management Handbook*. New York: McGraw-Hill

Treacy, M. and Wiersema, F. (1993). Customer Intimacy and Other Value Disciplines. *Harvard Business Review*, vol. 71, no.1, pp. 84–93.

Tushman, N. L. and Nadler, D. A. (1977). Information Processing as an Integrating Concept in Organizational Design. *Academy of Management Review,* vol. 2, pp. 7-16.

WalMart.com (2011). *2010 Annual Report.* Accessible: <http://walmartstores.com/sites/annualreport/2010/worldwide_locations.aspx> 2011-04-26.

Weill, P., Malone, T.W., D'Urso, V.T., Herman, G. and Woerner, S. (2005). Do Some Business Models Perform Better Than Others? A Study of the 1000 Largest US Firms. *MIT Center for Coordination Science,* Working Paper No. 226. Accessible: < http://scholar.google.se/scholar?hl=sv&q=Do+Some+Business+Models+Perform+Better+than+Others%3F+A+Study+of+the+1000+Largest+US+Firms&btnG=S%C3%B6k&as_ylo=&as_vis=1> 2011-04-24

Wik, K. (2009). *New business opportunities for Volvo IT.* Volvo Group Global. Available: < http://volvogroup-qa.volvo.com/group/global/en-gb/newsmedia/corpnews/_layouts/CWP.Internet.VolvoCom/NewsItem.aspx?News.ItemId=70349&News.Language=en-gb> 2011-04-25

Yin, R. K. (1994). *Case study research: Design and methods (2nd edition)*. Newbury Park: Sage Publications.

Zott, C., Amitt, R. and Massa, L. (2010). *The Business Model – Theoretical Roots, Recent Developments and Future Research.* IESE Business School: University of Navarra

Appendix A – Interview Template

Interview with *[NAME], [TITLE]*

Introduction

Can you describe your main role and purpose as [*Title]*? (e.g., responsibilities, main activities, a typical working day)

How would you describe the main purpose of the IS/IT-organization at AstraZeneca?

How would you describe the main purpose of *[Title specific department]* at AstraZeneca?

Which are the main business drivers for your part of the organization? (e.g. time, cost, efficiency, quality)

For your part of the organization, how ould you describe the following elements of your business?
Customer Segments
Value Proposition
Channels
Customer Relationships
Revenue Streams
Key Resources
Key Activities
Key Partnerships
Cost Structure

Do you see the organization as service- or product focused?

Information

Can you describe an overall view of how you receive/gather and share information and the actors that are involved in these activities?

How is your part of the organization measured?

How do you measure end-customer productivity/satisfaction?

In your view, what is the best measure of success for your part of the organization?

Regarding the quality of the information, which information do you see as most reliable and why?

Is there any information that you see as currently missing, that you would like to have more of?

Is your view that common language regarding concepts is used throughout the organization?

How well do you think that the re-usage and synergies of already existing information is working? (Customization vs. standardization, re-using currently existing products, reinventing the wheel)

Is it easy to search and find already existing information? (Applications, taxonomies etc.)

What is currently hindering this kind of re-usage?

Operating Model

Regarding the operating model (Plan-Build-Run) and process that is used for IS/IT here at AstraZeneca, can you describe something that you feel is working really well and why?

If we turn the previous question the other way around, what do you see as the main challenges with the current operating model and processes?

From your perspective, if you would make a comparison of the way that IS/IT is run at AstraZeneca and a more general business, how would you describe it? (Creator, Distributor, Broker, Landlord etc.)

If you would have all the power to change whatever you would like; what would be your top priorities regarding information and the operating model? Why?

Appendix B – List of interviewees

Open Interviews	Plan/Build/Run	Org	Role
1	Plan – CIS	S&A	Enterprise Architecture – Performance
2	Plan – CIS	S&A	Enterprise Architecture – Information
Semi-Structured Interviews	**Plan/Build/Run**	**Org**	**Role**
1	Plan – SET IS	RDI	Head of Business Delivery – CVGI, R&I & GPL
2	Plan – CIS	S&A	Enterprise Architecture – Performance
3	Build	EPD	Requirements Manager – R&D
4	Build	EPD	Head of R&D CoE
5	Build	EPD	Architecture Capability Lead
6	Build	EPD	Project Manager R&D
7	Build	EPD	Solution Architect
8	Run	CSD	Portfolio Lead
9	Manage	OE&C	Head of Integrated Assurance – EPD