Influence of operational excellence on the business model: A case study

Master thesis presented to obtain the degree of Master of Science in Commercial Sciences

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under the leadership of
Prof. Dr. J. Verrue
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Name students: Mattias Boterdaele and Thys van de Luijster.
Preface

Dear reader,

As last year students at UGent, studying business administration at the Faculty of Economics and Business Administration, we have come to a critical point in our academic career. We must prove that we are able to research and process information in order to contribute to the scientific community. This results in a master thesis we are proud to call our own. We would like to thank you in advance for reading this thesis as a whole, without prejudice. The subject matter we chose concerns business models, which is a part of the Strategic Management field of study. We found the influence of operational excellence techniques on the business model particularly interesting. Both concepts will be explained later on as we move through the thesis, onto the actual research.

Primarily, we would like to thank our promoter: Mr. Johan Verrue, and his assistants Mr. Laurens Vandeweghe and Mrs. Hanne Boelaert for helping us over the course of this project with their insights and useful tips. Secondly, without the time and input of the interviewees this research would not have been possible. A big thanks goes out to all people who contributed their time and effort for helping us out.

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August 2014.
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## Glossary

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<tr>
<td>AAA</td>
<td>Alkylalkanolamines</td>
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<tr>
<td>BM</td>
<td>Business Model</td>
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<tr>
<td>BPM</td>
<td>Business Process Management</td>
</tr>
<tr>
<td>Capex</td>
<td>Capital Expenditures</td>
</tr>
<tr>
<td>COO</td>
<td>Chief Operating Officer</td>
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<tr>
<td>CPT contracts</td>
<td>Cost Pass Through</td>
</tr>
<tr>
<td>DMAIC</td>
<td>Define, Measure, Analyse, Improve, Control</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
</tr>
<tr>
<td>EVP</td>
<td>Executive Vice President</td>
</tr>
<tr>
<td>IBC</td>
<td>Intermediate Bulk Container</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>MEOH</td>
<td>Methanol</td>
</tr>
<tr>
<td>MPS</td>
<td>Master Planning &amp; Scheduling</td>
</tr>
<tr>
<td>OE</td>
<td>Operational Excellence</td>
</tr>
<tr>
<td>OEE</td>
<td>Overall Equipment Efficiency</td>
</tr>
<tr>
<td>OTIF</td>
<td>On Time In Full</td>
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<tr>
<td>PhD</td>
<td>Doctor of Philosophy</td>
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<tr>
<td>RCA</td>
<td>Root Cause Analysis</td>
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<tr>
<td>S&amp;OP</td>
<td>Strategy and Operations Planning</td>
</tr>
<tr>
<td>SIC</td>
<td>Short Interval Control</td>
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<tr>
<td>TQM</td>
<td>Total Quality Management</td>
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<tr>
<td>UCB</td>
<td>Union Chimique Belge</td>
</tr>
<tr>
<td>VC</td>
<td>Value Chain</td>
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<tr>
<td>VP</td>
<td>Vice President</td>
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Abstract

This article presents an overview of recent work by scholars and professionals on business models and operational excellence. The aim of this case study research was to find how a firm’s BM, VC, and BPM were linked to OE, and secondly how OE as a business model element is linked with the other business model elements. Research into these links can be useful for higher management looking into implementing operational excellence techniques. Starting from the framework of Johnson, we first mapped the business model of our case: Taminco, one of the biggest producers of amines and derivatives. Using company records, participant observations, and open or semi-structured interviews of the EVP of supply chain, purchasing and IT, the COO, and employees within the Sales department we gathered all necessary information to map the value offering, profit formula, key processes, and key resources. The second part consisted of investigating two operational excellence projects within Taminco and finding out how these influenced the business model. We found that these OE projects do influence the business model elements quite a bit.

Keywords: Business model(s), strategy, value creation, value chain, operational excellence, lean management, Six Sigma.
Chapter 1

Introduction

A first glance at the company page on the website of our case quickly brings us to what it is all about: business models. However, taking a good look at the provided picture confirms what most authors describe: most companies do not know what their business model is. Very often business models get confused with strategy, value chains and more, but the question remains: what is a business model?

Business models and operational excellence are recent fields of study within the academic literature. Business model research coincides with the emergence of the Internet and the ‘dot-com’ firms in the mid 90’s and became more widespread since then (Zott et al., 2011; Shafer et al., 2005). Business models cover several domains but are mostly found within strategy, information systems, and e-business (Zott et al., 2011; Osterwalder et al., 2005).

One of the main gaps we found in the literature is how certain components within a business model react to a variety of strategic choices such as the implementation of continuous improvement and lean manufacturing. This brings forward the second field of study in our research namely: operational excellence. Operational excellence is an emerging concept, getting more and more attention from professionals. We will focus our attention on how a firm’s BM, VC, and BPM are linked with OE and how OE as a BM element impacts the remaining BM elements.

The aim of this research is to gain a better understanding into the dynamics of the business model and its components. Firms with a better understanding of their business processes and how certain choices reflect on the different components of the BM could gain invaluable insights on BM design. These insights can lead to competitive advantage by effectively and efficiently targeting certain BM components to improve value creation or to reduce costs. Studies have shown that firms that choose an operational excellence strategy are trying to lower transaction costs and deliver higher quality products (Treacy & Wiersema, 1993). We will study the influence of OE on the BM by using the framework of M. W. Johnson et al. (2008) applied to our case. The two main research questions are:

1. How are a firm’s BM, VC, and BPM linked with OE?

2. What is the impact of operational excellence as business model element on the remaining business model elements?
To answer these questions an embedded single case study is proposed (Yin, 2009). Two operational excellence projects will be discussed and researched with regards to the business model. The research itself is exploratory by nature since no research into the matter has been conducted to date, this will allow us to build new theory from our case study research. Firms thinking about investing in operational excellence or trying to improve the implementation of operational excellence projects in order to stay ahead of the competition could potentially benefit greatly of this research. As such, primarily members of higher management and strategic decision makers within companies will benefit from this research.

Our research was constrained within time and resources, this led our focus to one pilot case and two projects. Generalisability is limited to the context of our case. Limitations with regards to obtaining the right information included finding the right people within the organisation with deep knowledge of the business model elements of Taminco as well as the operational excellence projects. Measuring the impact of these projects is very difficult since organisations are dynamic, with a constantly changing environment. This paired with the multiple variables influencing firm performance make it almost impossible to accurately pinpoint the impact.

To date there is no consensus amongst authors about what a business model is. Zott et al. (2011) stated that most definitions just overlap, which leads to a range of different meanings and interpretations depending on the author. In general, two main schools of thought are found: first of all there are the authors that describe the business model as a holistic view of what a firm does and how it does it. In that case, the business model represents the strategic choices made by that firm throughout its existence (Osterwalder et al., 2005). Secondly, there are those authors such as Richardson (2008) and M. W. Johnson et al. (2008) who believe that the notion of value creation and capture should be at the center of business models.

We will elaborate on some of the common misconceptions such as the difference between a business model and strategy as well as the difference between a business model and business (process) modelling. Authors seem to use these concepts interchangeably while a distinction definitely has to be made. Secondly, a comparison is made between business models and value chains. While both are strategic tools and partial overlap is present, there are some points of difference. The business model serves more as a strategic and tactical tool that is focused on value creation for all parties involved while a value chain is more concerned with the value creation within the focal firm (Zott & Amit, 2009; Porter, 1985).

Broadly, most BM components can be placed in four categories. The four categories are: customer value/offering, key resources, key activities and processes, and the financial components. Within each of these categories we will elaborate on the most common components as well as their purpose. Lastly, some of the most cited business model frameworks will be discussed and compared. These will include the frameworks of Osterwalder et al. (2005) and M. W. Johnson et al. (2008). Although not a single framework exists that is widely accepted by academics, gaining insights into them is helpful in understanding the logic behind business models.

"Nobody can do as good as you do, but anyone can do better.” Quoted by Johan De Saegher, COO of Taminco, when talking about operational excellence. The quote refers to the fact that everyone can always find points of improvement even though no one can actually do as good as you. Operational excellence is all about finding new ways of doing business, continuously improving systems and processes in order to have higher quality, reduce costs, increase safety.
Operational excellence exists since the 20th century but has been evolving ever since. It started with the standardisation of processes and momentarily focus has changed to mass collaboration (Opexgroep, 2011).

Duggan (2012) defines operational excellence as followed: "When each and every employee can see the flow of value to the customer and fix that flow before it breaks down." The main methodologies that are part of operational excellence include Lean, Six Sigma, Business Process Management, Balanced scorecards & Dashboards, and ISO.

Lean will be primarily focused on reducing waste sources (Hicks, 2007). Six Sigma on the other hand is aimed at eliminating defects (Hahn et al., 1999). Balanced scorecards and Dashboards are mainly used as strategic tools to measure, monitor, and communicate strategic plans & goals and to deliver information relating to the health of the business (Lawson et al., 2006). Lastly, ISO are used as standards for external quality assurance and works with types of certifications (Zhu & Scheuermann, 1999). Following the literature review of operational excellence will be the limited literature tying business models and operational excellence together.

What can you expect: the second chapter will consist of the literature review concerning business models. We will explain the different methodologies that are incorporated in our case study research for example: the framework of M. W. Johnson et al. (2008). We will start with the origin of the business model followed by different definitions of a business model and where to place the concept within the business literature. Next are the most important components found in a business model as seen through the eyes of different authors. Lastly, we elaborate on some of the most important frameworks that are being used today.

The third chapter will be the literature review of operational excellence. Operational excellence as a whole is still in its infancy years thus only limited academic research is available. However, an abundance of practical research and methods are present and are being used by many big consultancy firms. We will work similar as in chapter two, starting with the origin of operational excellence and moving on to the definitions. To conclude this literature section we will discuss the most important operational excellence frameworks such as lean management and Six Sigma and their impact on the business model.

The fourth chapter will concern the case study research into the subject matter and link the theoretical knowledge to our case study. This includes the research questions, the selected case, and the research approach that was followed. Linked to chapter four is chapter five, which will be the results. Chapter five will consist of three big sections: firstly, the mapping of the business model of our case. Secondly, two specific operational excellence projects will be explained in detail. Lastly, the link between these projects and the business model of our case will be researched in order to answer both research questions.

Lastly, we will share our conclusions concerning the concluded case study research and discuss some possibilities for future research.
Chapter 2

Business models

2.1 Origin

The business model is seen as a recent development in the business literature, it became more widespread in the mid 90’s and has been gaining momentum ever since. The appearance of the business model coincides with the emergence of the Internet and the ‘dot-com’ firms (Zott et al., 2011; Osterwalder et al., 2005; Shafer et al., 2005; Hacklin & Wallnöfer, 2012). A quick search of the term ‘Business Model’ in the LibHub database of University Ghent is in line with this trend. The notion ‘business model’ emerges in the 90’s, starting with next to no citations in academic journals to around 4000 from 2013 onwards (cfr. infra).

![Figure 2.1: The emerging business model concept](image)

2.2 Definitions

At this moment in time, there is no single definition of what a business model is. However, Magretta (2002) attempts to generalise business models as “Stories that explain how enterprises work.” Essential in order to have a good business model is that the proposed business model answers the following questions: who is the customer and what does he value, and furthermore: how does the organisation put this value into profit by capturing it (Magretta, 2002).
Zott et al. (2011) stated that most definitions just overlap, which leads to a range of different meanings and interpretations depending on the author. Before, the business model has been used as: "A statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a framework, a pattern, and a set" (Zott et al., 2011, p. 5). Another striking point was pointed out in the research of Osterwalder et al. (2005) namely: the difference between the view of business-oriented and technology-oriented people describing the concept.

Business models cover several domains but are mostly found within strategy, information systems, and e-business (Zott et al., 2011; Osterwalder et al., 2005). Within the definitions found amongst different authors there are some general trends that keep recurring. There are two categories of definitions: first of all, there are those who describe a business model as a holistic view of what a firm does and how it does business, which reflects the strategic choices of that firm. Secondly, there are those definitions that emphasise the activities and the value creation and capture (Zott et al., 2011).

Most authors seem to agree that a business model focuses more on the external collaboration between different parties such as customers and suppliers, which makes it mainly value-oriented/customer-oriented (Zott et al., 2011; Osterwalder et al., 2005). Yet, there are those who define the business model as an enterprise model, which in its turn is more inward looking. Teece (2010) notes that "Businesses need to be more customer-centric, especially since technology has evolved to allow the lower cost provision of information and customer solutions" (p. 1). These new communication methods and IT technologies made possible the development of new kinds of organisational forms and ways to create value (Zott & Amit, 2001; Osterwalder et al., 2005; Mendelson, 2000).

Morris et al. (2005, p. 2) lean toward the first category and define a business model as follows: "More than the sum of its parts, the model captures the essence of how the business system will be focused." Zott and Amit (2008) define the business model as "A structural template of how a focal firm transacts with customers, partners, and vendors" (p. 3). Hacklin and Wallnöfer (2012) and Osterwalder et al. (2005) describe a business model as the reflection of a firm’s strategic choices. This representation of a company’s strategic decisions embodies the core logic for creating and capturing value (Hacklin & Wallnöfer, 2012). Or as Osterwalder et al. (2005, p. 5) put it "A business model is a conceptual tool containing a set of objects, concepts, and their relationships with the objective to express the business logic of a specific firm."

A clear example of the second category is the work of Richardson (2008) who built a business model framework around value creation and capturing. Three major components are found within the framework: a value proposition, a value creation and delivery system, and value capture. M. W. Johnson et al. (2008) employ a similar definition: "A business model consists of four interlocking elements that, if taken together, create and deliver value.” The work of Teece (2010) is found in the second category as well and defines a business model as: how a firm tempts customers to pay for the value it creates, and how it turns these payments into profits. Gambardella and McGahan (2009) consider the business model as ”The organisation’s approach to generating revenue at a reasonable cost, while incorporating assumptions on how it will create and capture value”, and Casadesus-Masanell and Ricart (2010) think more of a business model as the logic of a firm and how it operates, while creating value for the firm’s stakeholders.
In the literature review of Morris et al. (2005), the authors tried to categorise the different types of perspectives. Three categories of definitions were found: economic, operational, and strategic and they are hierarchical in aforementioned order. At the lowest level, "The business model is defined in terms of the firm’s economic model" (Morris et al., 2005, p. 1).

A definition that belongs to this category is: "The business model is a statement of how a firm will make money and sustain its profit stream over time" (Morris et al., 2005, p. 2). Moving on to the operational level, the focus of the model shifts towards internal processes and design of infrastructures enabling the firm to create value. The strategic level consists of definitions that emphasise organisational boundary-crossing interactions, growth opportunities, and market positioning. Morris et al. (2005, p. 2) propose the following definition based on their literature study: "A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets."

Comparing these definitions shows us that strategic elements are prominently present, and that certain elements keep recurring in all definitions such as a firm's value offering and the customer interface/relationship (Morris et al., 2005). Shafer et al. (2005) found multiple recurring components within the business literature as well, such as value creation and capture, the core logic of a firm, and the value network. For our research purposes we will stick with the definition of Osterwalder et al. (2005) and look at the business model as the result of all the strategic choices made by a firm, in our case Taminco. These strategic choices will be a main part of our research study since our aim is to understand the impact of operational excellence techniques on the business model.

### 2.3 Business model placement

There are some common misconceptions when people talk about business models. Very often they use the notion business model for similar but different concepts. Some confusion for example exists around the difference between a business model and strategy or around the difference between a business model and business (process) modelling. Lastly, we will compare two strategic tools namely: the business model and the value chain.

#### 2.3.1 Business model versus strategy

Authors seem to use both business models and strategy for what they believe gives firms a competitive advantage (Osterwalder et al., 2005). Business models and strategy are most definitely linked with one another but there is a distinction (Seddon et al., 2004). The classic view on the subject comes from Porter (1979) who states that strategy is how a firm defends itself against the competitive forces. Magretta (2002) distinguishes the business model as: "A system that shows how the pieces of a business fit together while strategy also includes competition.” Casadesus-Masanell and Ricart (2010) make the following distinction: whereas the business model incorporates the logic of the firm, strategy is the choice of business model a company will use to compete in the marketplace. Competition seems to be the common denominator in most definitions. Not all authors agree with this view, some understand the business model as ”An abstraction of a firm’s strategy that may potentially apply to many firms” (Seddon et al., 2004). According to Richardson (2008), a company’s business model should define and organise the activities in such a manner that it executes a firm’s strategy.
The activities need to be allocated to provide the firm with a competitive advantage as well as the possibility to capture its share of the created value.

Osterwalder et al. (2005) added to the discussion by including business model implementation and execution as an integral part of a firm’s strategy as opposed to a business model, which explains more about the way a business works as a whole. The difference between the model itself (the concept) and the implementation (the form in reality) is an important issue (Osterwalder et al., 2005). Firms can have a perfectly sound business model on paper but without a good implementation, success becomes less likely. Good business models can be implemented wrong and fail, the same way a weak business model can succeed due to strong implementation and management (Osterwalder et al., 2005).

Zott and Amit (2008) researched the effects of strategy on firm performance. They established that a firm’s market strategy differs from its business model and that both concepts influence the performance of a firm. This is a possible explanation why some companies perform better than others. The product-market strategy is how a firm chooses to position itself against its competition in its respective market space (Zott & Amit, 2008). According to Porter (1996) today’s market environment is too dynamic for a static tool such as positioning. Competitors can quickly adapt and copy any market position, thus making competitive advantage a temporary situation.

2.3.2 Business Model versus Business Process Model

Following the definition of Aguilar-Savén (2004): "Processes are relationships between inputs and outputs, where inputs are transformed into outputs using a series of activities, which add value to the inputs."

While a business model is more about how a firm creates and captures value, business process modelling is more about representing these processes into a business process model. This is done to map the current state of processes (current state) and find out where improvements are possible (future state). Business process modelling is found at the operational level of a firm as opposed to the business model which is situated on the tactical and strategic level (Rainbird, 2004). To create this value, an in-depth understanding of the business processes is mandatory, this in order to successfully implement the business model (Solaimani & Bouwman, 2012). Business modelling pursues the common understanding between a firm’s stakeholders regarding what is exchanged & offered with whom. Secondly, it tries to clarify how the processes should be completed and who is responsible for completing them. Another point of differentiation includes the focus of the concepts: business models center around value creation. Components are only present in the business model when they hold some sort of value towards the multitude of stakeholders. In contrast, concepts in business process modelling relate primarily to how processes should be done. Therefore, objects are only shown if they are inputs or outputs of activities. This results in objects that might not be present in the business model while they are present in the process model and vice versa (Gordijn et al., 2000).

To illustrate that business models are distinct from both previously mentioned concepts, figure 2.2 as stated by Solaimani and Bouwman (2012) shows that there definitely is overlap between business models, strategy, and business processes. However, the business model is a distinct entity in the business literature that differs from both concepts but is nonetheless linked.
2.3.3 Business model versus value chain model

Business models and value chains are situated on the strategic and tactical level. They can be used as strategic management tools and to find opportunities to gain competitive advantage (Kippenberger, 1997). The value chain was first described by Porter (1985) and represents "The set of activities within a company that, if taken together, create a product or service" (G. Johnson et al., 2011). By comparing both the value chain model and the business model, we can clearly see that both constructs partially overlap. Both models seek the activities and those components necessary to deliver a product or service. By identifying these key components, companies are able to differentiate themselves from other companies with different models. In this respect, both models state the strategic position of the company.

The central notion of both models are those activities needed to create a service or product, that contribute to delivering value. However, a firm’s business model aims at creating value for its customers, partners, and the focal firm itself (Zott & Amit, 2009). While on the other hand, a firm’s value chain analyses the value creation at firm level (Zott & Amit, 2001). In that aspect, usually not all value creating activities that are found within a business model are found within the value chain. The value chain model does not include factors such as strategic partnerships, customer relationships and other components that create value for customers and partners. A value chain only gives a view of the company’s value creating business processes (Rainbird, 2004) while a business model includes boundary-spanning activity systems (Zott & Amit, 2009). As such, the value chain becomes part of the business model’s key processes.

To illustrate both models we placed Porter’s value chain next to Osterwalder’s business model framework (cfr. Annex 1). As we can clearly see in Porter’s value chain it are the activities that are predominantly present as functional units. If we take a look at the framework of Osterwalder, we can see that the offer is central and that all other building blocks are supporting this offer. As such the business model is more customer focused while the value chain is more product/service oriented.
2.4 Business model components

Various authors have described the components present in a business model. Some focused on a few while others tried to include all components they found within a business model (Richardson, 2008). A great deal of these components are incorporated in business models by different authors. However, between the multitude of business models these authors described, there seems to be a big variation in components. Zott et al. (2011) summarise that business models in e-businesses consist of a value proposition, a revenue model, and a network of relationships all in one. M. W. Johnson et al. (2008) propose the following components that are generally found in a successful business model: the customer value proposition, a profit formula, and key resources and processes. In their framework Osterwalder et al. (2005) make use of nine 'building blocks': a value proposition, a target customer, a distribution channel, client relationships, a value configuration, core competencies, a partner network, a cost structure, and a revenue model. Hamel (2000) puts it simple and states that a business model consists of four basic components: a core strategy, strategic resources, the value network, and the customer interface.

Broadly, we can divide these components in four categories: firstly we have the customer value or offering. Within this category we find all components that drive value creation and capture such as the target customer, value proposition or offer, and customer relations. A second important category are the key activities and processes such as the production process. Thirdly, there are the key resources such as patents and machinery. Lastly, most authors have a distinct category that includes the financial aspects of a business such as the cost structure, the revenue model, and margin model.

2.4.1 Customer value or offering

The central and most frequently named concepts within the components concerning business models are value creation and capture. The latter however, will be discussed as part of the financial aspects.

Zott and Amit (2001) found four possible sources that could create value. This is the overall value created in the transactions, not only the value it holds for the firm but the value for customers and other participants in the transaction as well. These sources are: novelty, lock-in, complementarities, and efficiency.

**Novelty:** While introducing new products, services, or marketing have been the traditional way of creating value through innovation, e-businesses also innovate in the way they do business. By connecting previously unattached parties and creating new markets, e-businesses found another way to create value. First-mover advantages are an integral part in the discussion of e-business innovation. These advantages range from developing brand awareness to the possibility of pre-empting resources. Zott and Amit (2001) note that novelty is linked with lock-in in two ways. First of all, e-business innovators can attract and retain customers with the brand they already developed. Secondly, to be successful in markets with increasing returns it is essential to be the first in that market. A relation is also found between novelty and complementarities, sometimes the innovation lies within the combination of resources and capabilities. Lastly, there is an important link between novelty and efficiency for example: the reduction of information asymmetry due to new ways of communication (Zott & Amit, 2001).
Lock-in: Lock-in occurs when customers are motivated to repeat their transactions, which in turn can lead to an increased transaction volume. Secondly, there is lock-in when strategic partners have the incentive to maintain and improve their association with an e-business, which increases the customers’ willingness to pay and lowers the opportunity costs. Value is thus created by preventing customer and strategic partner migration to competitors. Three possibilities are found to lower a company’s churn rate.

1. Loyalty programs.
2. Dominant proprietary standards.
3. Trustful relationships with customers.

Customers and partners can be retained due to efficiency and complementarities which create lock-in, while conversely lock-in can have positive effects on its efficiency and complementarities as well. If the relative gains to these parties grow, the incentive to stick with the established network increases. The importance of the relationships between these value drivers as sources of value creation cannot be underestimated (Zott & Amit, 2001).

Complementarities: Greater value is achieved by selling a group of goods instead of selling the goods separately. This value grows due to the expected increase in revenue. Zott and Amit (2001) found that vertical as well as horizontal complementarities exist. An example of vertical complementary goods are for instance the after-sales services, an example of horizontal complementary goods are razors and razor blades. Combining on-line and off-line offerings can create value as well.

The possibility of buying on-line while still being able to return the goods to a bricks-and-mortar outlet is an example of these complementarities (the so called click-and-mortar). Efficiency and complementarities are interchangeably connected as shown in figure 4.1: efficiency makes exploitation of complementarities in e-businesses possible. IT made transaction costs decrease, which in turn made otherwise non-viable opportunities possible. Efficiency however can in turn be affected by complementarities as well. Customers can reduce search costs by having access to complementary goods (Zott & Amit, 2001).
Efficiency: Value can be created by enhancing efficiency: when transaction costs per unit decrease, then efficiency increases, which in turn leads to higher value. Augmented efficiency can be achieved by reducing information asymmetry for e-businesses and off-line businesses both. Better information reduces the search and bargaining costs for prospective customers. E-businesses can increase their transaction efficiency by reducing distribution costs, which allows individual customers and groups of buyers to benefit from scale economies due to aggregated demand and bulk purchases. In short, information technology allows for greater efficiency by reducing transaction costs (Zott & Amit, 2001).

Next to this central notion of value, the first important component that belongs within the customer value proposition is the target market or target customer. Most authors include the target customer or market as an integral part of the broader value proposition. M. W. Johnson et al. (2008) for instance place the target customer within the Customer Value Proposition or Petrovic et al. (2001) describe a market model as the relevant environment in which businesses operate. This delineates the scope and clearly defines which customers are served by the company and those who are not targeted. It is of no use to talk about value creation for customers if the firm does not know who the targeted customers are (Richardson, 2008). The segments a company chooses to target for offering value to are the target customers (Osterwalder et al., 2005). This is what Yip (2004) calls the nature of the customer.

After a firm has chosen their intended customers, a second piece of the puzzle is what will they be offered. This is the reason why customers will value the proposed offering of a firm. According to M. W. Johnson et al. (2008) this customer value proposition is the way a company creates value for its customers by offering a higher level of satisfaction or by offering a solution that is better than the already existing alternatives. Richardson (2008) translates the value proposition as: "What the firm will deliver to its customers, why they will be willing to pay for it, and the firm’s basic approach to competitive advantage.” The value offering is not limited to products or services, as Petrovic et al. (2001) state: the value model employed by a firm are those core product(s), service(s), and experience(s) as well as other value-added services that are delivered to the target customers. Chesbrough and Rosenbloom (2002) include technology and define the value proposition as followed: "The value created for users by the offering based on the technology.” The main idea of the value proposition is: how will the firm create value for its customers.

These were the components that most authors included within what we call the (customer) value proposition. Some authors include strategy within the value proposition as well, although the number of authors doing so is limited. Chesbrough and Rosenbloom (2002) and Morris et al. (2005) for example add competitive strategy as an integral part of the business model.

2.4.2 Key activities/processes
A second big group of components are the key activities/processes. Petrovic et al. (2001) describe a resource and production model, the former explains how elements are used for the transformation process while the latter describes how these elements are combined in the transformation process from source to output. Chesbrough and Rosenbloom (2002) include components such as the value chain: which is required to create and distribute a firm’s offering, and the value network: which links suppliers and customers. These key processes allow companies to deliver value in such a way they can easily be repeated and increased in scale.
Where one author calls these components the key activities or processes, others use terms like core competencies, capabilities, or connected activities (Afuah & Tucci, 2001; Hamel, 2000; Yip, 2004). The core competency building block describes the needed competencies to execute a firm’s business model (Osterwalder et al., 2005).

In essence this includes all elements present within a company that create value for the customer. These components vary from firm to firm: while after sales services for one company may be key essential, it may not be the same for another company. These activities can include the production set-up of a company, sourcing, pricing, training, and marketing.

2.4.3 Key resources

Key resources are often the drivers for the key processes mentioned above. M. W. Johnson et al. (2008) define key resources as the assets that are part of a company such as people, brand, intellectual property rights, technology, and facilities necessary to deliver value to the customers. However, they have to be key resources within the company that help deliver value to the customer and the company. This implies that generic resources that do not add to the competitive advantage of a company are not relevant within the business model (M. W. Johnson et al., 2008).

2.4.4 Financial aspects

The third big category include all financial aspects. No matter how great a product a firm may sell or how great the customer value may be, none of this matters when a firm is not able to capitalise on its success. Great business models need a good and supporting cost structure and profit model to be able to capture a portion of the created value (Richardson, 2008).

As mentioned before, creating value is not enough for a company. Firms have to find a way to successfully capture the value they create. When a firm is not able to capture the exchange value but instead it is the resource owner that captures that value, firm benefits will decrease. Bowman and Ambrosini (2000, p. 9) argue that "Value capture is determined by the bargaining relationships between buyers and sellers." Customers have greater bargaining power when there are close substitutes present and switching costs are low. If a firm is dependent of the resource supplier, the latter is capable to capture a larger portion of the value (Bowman & Ambrosini, 2000). This is where the revenue model comes into play, the revenue model has to provide a profit margin over its costs to ensure the firm’s viability (Richardson, 2008).

M. W. Johnson et al. (2008) use the profit formula as mechanism to capture portions of the created value. The profit formula translates how a company creates its value by creating value for its customers. Part of the profit formula are the revenue model (or price*volume), the cost structure (the direct costs, indirect costs, and economies of scale), the margin model ("Contribution needed from each transaction to achieve desired profits"), and the resource velocity (how fast must the inventory be turned over) (M. W. Johnson et al., 2008).

According to Richardson (2008) the revenue model shows what firms receive in exchange for their services. These are the revenue sources or put differently: the different ways the firm receives money. Next to the revenue model there exists an economic model which covers costs, margins, and other financial aspects.
These two models coincide with the profit formula M. W. Johnson et al. (2008) put forward. Elements of the formula are: the revenue model, the cost structure, the margin model, and the resource velocity (cfr. supra). While the profit formula is not entirely the same as the revenue model, both concepts definitely overlap. Afuah and Tucci (2001); Chesbrough and Rosenbloom (2002); Osterwalder et al. (2005); Yip (2004); Zott et al. (2011) use similar concepts in their work.

Petrovic et al. (2001) use a revenue and capital model which represent the financial aspects of the business model. These components illustrate how a firm is compensated for its services and how money is used with respect to assets and liabilities. Chesbrough and Rosenbloom (2002) use similar components such as cost structure and profit potential. These elements incorporate the financial aspects for supporting a company’s activities and continuity over time.

2.5 Frameworks

With all this research into the components of a business model at their disposal, some authors tried to conceptualise the business model into a framework. This makes it easier to comprehend and visualise the different relations that make a business model.

Richardson (2008) developed a clear and simple framework without discarding the essential components found in the cited works. The framework was built around the notion of value. Three primary components are used in the framework: the value proposition, value creation and delivery system, and value capture. These components capture the firm’s logic of strategic thinking about value, which is to create value for its customers and capture more value than its competition.

The value proposition consists of the offering, the target customer, and the basic strategy to convince customers and to gain competitive advantage. The value creation and delivery system is divided into resources and capabilities, the organisation (value chain, activity system, and business processes), and the position in the value network (links to suppliers, partners, and customers). Lastly, value capture exists of the firm’s revenue sources, and the economics of the business (Richardson, 2008).

Morris et al. (2005) propose three levels of decision making: a foundation level, a proprietary level, and rules. These levels are present to reflect the multiple managerial purposes. The foundation level concerns basic decisions and allows general comparisons. The proprietary level enables the development of unique constructions between decision variables to obtain competitive advantage. The third level provides guidance and discipline to business operations.

Within the foundation level, six decision areas are found: how will value be created, who will it be created for, what is the firm’s source of competence, what is the firm’s competitive position, how will they make money, and what are the time, scope, and size ambitions. This level is generic and can capture the business model of most firms. The proprietary level however is strategy specific, it is very difficult to replicate by competitors. The guidelines of the rules level make sure that the elements from the foundation and proprietary level are reflected in the strategic actions (Morris et al., 2005).
Osterwalder et al. (2005) found nine building blocks that were mentioned by at least two authors. They defined the BM as: “A conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams” (Osterwalder et al., 2005, p. 17). The nine blocks are: key activities, a partner network, key resources, an offering, customer relationships, customer segments, distribution channels, a cost structure, and revenue flows. The reason Osterwalder et al. (2005) tried to identify these common components was to create one widely accepted model/framework that can be used by managers, stakeholders, and others to understand, analyse, manage, and prospect the business logic of the firm. These components are structured within the framework in such a way that four categories emerge (cfr. supra). Centrally there is the offer, while left the key resources and activities are positioned and on the right side there is the link between the company and the market environment. Underneath these three blocks is the fourth and last block: the financial support base.

Although this framework is very detailed, some components could be considered as one block. Offer and target customer is such an example. Since most firms use different offers for different customer segments, each with their own relations, it might be a good idea to put these components in one block much like the proposition of M. W. Johnson et al. (2008). M. W. Johnson et al. (2008) found four components that are part of a successful business model: a customer value proposition, a profit formula, and key resources and processes. The key processes and resources and the profit formula are more internal, the customer value proposition is external.

If we compare the framework of M. W. Johnson et al. (2008) with the framework of Osterwalder et al. (2005) we can see that both frameworks are not that different from one another. Although both frameworks have a varying number of components, the categories are more or less the same. The customer value proposition of M. W. Johnson et al. (2008) corresponds to the offer, the customer segments, the distribution channels, and the customer relations in the framework of Osterwalder et al. (2005). Both authors put forward key resources and activities/processes as part of the business model as well as a revenue model and the cost structure of the firm. The difference between both authors lies in the fact that most building blocks mentioned by Osterwalder et al. (2005) fall under one of the four components of M. W. Johnson et al. (2008).
Chapter 3
Operational Excellence

Many business consultancy firms like Deloitte, PwC, and Mobius offer operational excellence services together with strategy and customer value. Although only limited research is available within the academic literature, some authors such as PEX network and Davis (2013) described their findings in their reports. Davis (2013) investigates the general trends on how companies approach operational excellence and how it can be used to support the strategic objectives.

3.1 Origin

Opexgroep (2011) found three distinct stages of operational excellence within their research as showed in figure 3.1.

Figure 3.1: Operational excellence origin (Opexgroep, 2011)
Operational excellence originates in the 20th century and its main focus is standardisation (Opexgroep, 2011). Russell (2005) defines standardisation as "The process of articulating and implementing technical knowledge". Within organisations, standardisation can create "intra-firm and inter-firm efficiencies." This is attained by facilitating economies of scale and promoting interoperability between complementary products (Russell, 2005). Standardisation led to specialisation in jobs and operations. Management planned the tasks and delivered clear instructions on how to perform them (Taylor, 1910). Industrial application of these principles of high levels of predictability and little or no variety, led to mass production (Opexgroep, 2011).

From the 70’s on, focus shifted towards product diversity and its integration in the production process (Opexgroep, 2011). This second stage, operational excellence 2.0, introduced mass customisation to the customer through flexible processes. The challenge is to offer these customised products or services in high volumes at reasonably low costs (Da Silveira et al., 2000).

More recently, focus changed to mass collaboration. Before, management focused on shareholders’ interests, which created a distance between a company’s management and its customers. However, now customers need reliable products and services which offer true customer value, this forms the foundation for all market strategies (Opexgroep, 2011).

German research center DFKI elaborates on the fourth industrial revolution (see figure 3.2), which is based on cyber-physical systems and collaborative devices (Russwurm, 2013). This transparency that is created through collaboration increases the importance of corporate reliability, making customer value the most important item on the agenda. Companies need to ensure that the customer gets exactly what he expects. It is operational excellence that can deliver this high level of reliability throughout the company’s activities (Opexgroep, 2011).

![Figure 3.2: Industrial revolutions according to Russwurm (2013)](image-url)
3.2 Definitions

Duggan (2012) defined operational excellence as “When each and every employee can see the flow of value to the customer and fix that flow before it breaks down.” Management of a company where operational excellence is present, no longer needs to focus on running the operations. Instead, they can focus on so-called offensive activities or activities that grow the business. To accomplish operational excellence, robust value streams are necessary. Within these value streams, mechanisms must present to self-heal when interruptions occur (Duggan, 2012). Treacy and Wiersema (1993) on the other hand, state that operational excellence is a strategic approach for the production and delivery of products and services. A company that chooses this approach is looking to reduce costs and optimize processes. The ultimate goal is to “Provide customers with reliable products or services at competitive prices and delivered with minimal difficulty or inconvenience.” This can be reached through minimisation of intermediate production steps, reducing transaction costs, and optimising business processes (Treacy & Wiersema, 1993). Ballantyne et al. (2010) note that operational effectiveness and operational excellence can be used interchangeably.

The Process Excellence Network did some research on operational excellence and states that at the most fundamental level, process excellence is not about the methodology, but is all about improving the way that a company creates and delivers value to its customers. A process is defined as “An activity through which something tangible or intangible, is transformed into something else” (Davis, 2013).

3.3 Frameworks

Operational excellence is related to some methodologies/frameworks. It does not matter which methodology or framework is used, the underlying aim is always the same: improving business performance (Davis, 2013).

![Operational excellence frameworks](image)

Figure 3.3: Operational excellence frameworks (Davis, 2013)
The most popular methodologies are Lean Management, Business Process Management, Balanced Scorecards & Dashboards, ISO, and Six Sigma (Davis, 2013). These are the top 5 frameworks that are used today which we will discuss more in detail, except for ISO since this is irrelevant for our research. Davis (2013) found that of these most-common methodologies, Six Sigma is losing ground to more pragmatic approaches that better fit the business situation and need.

### 3.3.1 Lean management

Lean management is a manufacturing philosophy which originated within a few Japanese companies, of which Toyota is the most famous. The main principles include overall reduction of waste (Hopp & Spearman, 2004) and just-in-time production methods (Arnheiter & Maleyeff, 2005). Since the late 1970’s, lean management is an important driver for improving business performance (Emiliani, 2006). Arnheiter and Maleyeff (2005) state that the main goal of lean manufacturing is eliminating waste, so that all activities along the value stream create value.

Waste is defined as: all activities that do not add value as perceived by a company’s customers (Emiliani, 2006). Emiliani (2006) does not only focus on non-value-added activities, but also stresses the importance of non-value-added behaviour. Depending on the author, seven or eight sources of waste exist. Hicks (2007) defines the ‘seven deadly wastes’: overproduction, waiting, transportation, process losses, inventory, movement, defects and off specification products. Kilpatrick (2003) added unused talent as the eighth waste.

Within the literature review of Pettersen (2009) and Shah and Ward (2003) both authors summarised the research of lean management pioneers and then defined the main goals of lean production. Both radical improvement activities and continuous improvement are utilised to reach the goal of minimising waste (Arnheiter & Maleyeff, 2005). On the other hand, Pettersen (2009) found continuous improvement to be the major characteristic of lean. Lean enables continuous improvement because reduction and subsequent elimination of buffers will highlight the problems that exist in the process (Pettersen, 2009). To enable the principle of continuous improvement, respect for people must be present (Emiliani, 2006).

Another important concept within lean management is pull production, seen as a special case of just-in-time production (Pettersen, 2009). Within a pull system, production starts based on customer orders or to replace consumed production (Inman, 1999). Pull strategy introduces the make-to-order approach to fulfil customer needs. It emphasises small batch sizes and single piece batches. Lean management requires short set-up and change-over times and a focus on waste removal is needed (Inman, 1999). Benefits of a pull system are flexibility, and responsiveness to changes in customer needs or market preferences (Emiliani, 2006). Pull systems require higher inventories and do not look at future demand: they replenish the past demand. When accurate demand forecasts can be made, push systems gain importance over pull systems (Inman, 1999).

Lastly, failure prevention, production levelling, and standardisation are central characteristics of lean production (Pettersen, 2009). Lean management focuses on reduction of variability at every opportunity, which implies both product quality and task time. This includes standardised work procedures, partnerships with suppliers, and lead time reduction. Lead time reduction improves replenishment times, which results in lower inventory (Arnheiter & Maleyeff, 2005).
Lean management also applies to indirect and overhead activities through policies and procedures, with the goal to optimise performance (Arnheiter & Maleyeff, 2005).

**Impact on Business Model**

Multiple authors argue the main focus of lean is to reduce waste (Pettersen, 2009). Yet, by looking at the goals of lean, this statement does not last. The main goals are either internally or externally focused, the former being cost reduction driven while the latter aims at improving customer satisfaction (Pettersen, 2009). To the question what is more correct, Pettersen (2009) quotes Bicheno (2004): "Lean is more than a set of tools" to argue the more philosophical approach. On the other hand, the more practical approach focuses on waste reduction tools (Pettersen, 2009).

Lean management leads to customer value: each step in the process is seen as a service step, where customer value is added with minimal waste (Arnheiter & Maleyeff, 2005).

### 3.3.2 Business Process Management

Business Process Management is considered as the next step after work flow was introduced in the 90’s. Work flow can be described as "The automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another for action, according to a set of procedural rules" (W. M. P. van der Aalst et al., 2003). While work flow lays the focus on software to support the execution of a process, Business Process Management focuses more on supporting the business processes using methods, techniques, and software. The aim is to design, enact, control, and analyse operational processes (W. M. P. van der Aalst et al., 2003). Every business can be seen as a system involving a number of complex, concurrent operations. These processes cover production, marketing, accounting, financials, which in turn consist of other complex, concurrent processes (W. van der Aalst et al., 2000).

Armistead (1996) found ten principles of managing business processes (see table 3.1). He stated that: "Business process management only works when attention is given to people, processes, and systems in the context of the organisation structure and organisational culture."

<table>
<thead>
<tr>
<th>Armistead’s ten principles</th>
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<tbody>
<tr>
<td>(1) Designate a process champion</td>
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<tr>
<td>(2) Know the process</td>
</tr>
<tr>
<td>(3) Understand the linkages</td>
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<tr>
<td>(4) Work on the trade-offs</td>
</tr>
<tr>
<td>(5) Teach others about the process</td>
</tr>
</tbody>
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Table 3.1: Principles of managing business processes (Armistead, 1996)
Impact on Business Model

In section 2.3.2, we placed the business model versus business process modelling. The business model is situated on the tactical and strategic level, where business process modelling is found at the operational level (Rainbird, 2004). The importance of understanding the business processes is mandatory to successfully implement the business model (Solaimani & Bouwman, 2012).

Zott and Amit (2009) define the activity system in the business model as "A set of interdependent organisational activities centred on a focal firm, including those conducted by the focal firm, its partners, vendors, customer, etc." The activity system does not only create value with its partners, but also for the firm itself (Zott & Amit, 2009).

Business process models are used more and more for organisational purposes like process re-engineering, certification, activity-based costing, and human resource planning (W. van der Aalst et al., 2000). The main driver for business process redesign is cost reduction, which they even call prevalent to survive. Furthermore, the position of the customer becomes more dominant. To keep customers coming back, the production time needs to be shortened or the quality has to be increased (W. van der Aalst et al., 2000).

3.3.3 Balanced Scorecards and Dashboards

Lawson et al. (2006) define scorecards as "A strategic management tool helping to measure, monitor, and communicate the strategic plan and goals throughout the organisation in a way that it is understood by everyone." Scorecards are focused on achieving strategic goals and thus mainly used by executives and mid-level management (Lawson et al., 2006). The main goal of these techniques is to learn from them and, based on the data, to make good business decisions for the future (Lawson et al., 2006).

Next to scorecards, dashboards are defined by Lawson et al. (2006) as a user interface designed to deliver information relating to the health of the business, typically represented by KPI's (cfr. infra) and links to detailed analytical reports. Dashboards monitor data that is measured frequently, which represent the health and efficiency of an organisation, by focusing on trends, changes, and expectations (Lawson et al., 2006). Dashboards are typically used by all managers within the organisation (Lawson et al., 2006).

Although dashboards and scorecards have different definitions, Lawson et al. (2006) notice 'blurring lines' between both concepts because they often have the same goals and abilities. Well run organisation need both tools since they are complementary (Lawson et al., 2006).

Dhillon et al. (2013) define a Key Performance Indicator (KPI) as "One of the performance measurement tools that assist in monitoring their performance against the target set by the management." Process efficiency and effectiveness are two important drivers to determine business success and are measurable through KPI's (Masayna et al., 2007). Masayna et al. (2007) reviewed the literature and found that KPI's are used to indicate the capabilities, practices, and skills within all levels of an organisation.
KPI’s are mainly focused on critical aspects in organisational performance. These aspects require improvement or must be kept at a certain level to preserve the success of the organisation (Masayna et al., 2007). Lawson et al. (2006) point out different points of view of measurements within the organisation: operational, customer, financial, strategic, and organisational.

Two main pitfalls are crucial in the definition of the KPI: data quality must be assured and the KPI must be well-defined (Masayna et al., 2007). Performance indicators are mostly collected in many complex systems, so the indicators must be perfect measures without errors or problems with the definition and interpretation (Fitz-Gibbon, 1990). It’s a challenge to make sense of the data collected and comparing it to historical data (Lawson et al., 2006).

3.3.4 Six Sigma

The concept Six Sigma originated at Motorola around 1985 and was described by various authors at the end of the 90's (Linderman et al., 2003). Schroeder et al. (2007) mentioned that Six Sigma approaches are very similar to prior quality management approaches. Hahn et al. (1999) define Six Sigma as "A programme aimed at the near-elimination of defects from every product, process, and transaction." Arnheiter and Maleyeff (2005) trace the roots to two primary sources: on the one hand total quality management, and on the other hand the Six Sigma statistical metric model, first used at Motorola (Arnheiter & Maleyeff, 2005).

The name Six Sigma suggests a goal for a statistical model of no more than 3.4 defects per million opportunities in any process, product, or service (Linderman et al., 2003; Hahn et al., 1999). The main difference with total quality management is that an organisation acts more organically in coming up with new improvement ideas. As such, innovation is supported within the organisation. Furthermore, through mechanisms, the implementation is more leveraged (Daft & Lengel, 1986). As a result, Six Sigma and quality management mainly differ because of the organisational implementation rather than the quality tools, techniques, and philosophy. (Schroeder et al., 2007).

Harry and Schroeder (2000) describe Six Sigma as a business process that allows companies to improve their bottom line by designing and monitoring their activities. This goal can be reached by minimising waste and resources while increasing customer satisfaction (Linderman et al., 2003; Hahn et al., 1999). Quality is reached by removing defects. Each component has a lot of important quality characteristics which can be measured. Every product sold includes thousands of opportunities for defects (Harry & Schroeder, 2000). Hahn et al. (1999) mention the focus on both product and process improvement. This continuous improvement process is applied through the Six Sigma performance improvement model, i.e. DMAIC. DMAIC stands for 'Define, Measure, Analyse, Improve, and Control’ (Pyzdek, 1999).

The first step is to define the goals of the improvement activity. These goals might be at strategic, operational, or project level. Secondly, the existing system is measured. Reliable metrics need to be established to help monitor the progress towards the defined goals. The next step is to analyse the system to identify ways to eliminate the gap between the current performance and the desired goal. The fourth step is the design and implementation of the most effective solution to reduce the defect rate. This step often needs several rounds of improvements to achieve the desired process performance (Antony & Banuelas, 2002).
The last step is the control of the new system: by institutionalisation to ensure that the improvement sustains over time, or by verifying if the implementation was successful (Pyzdek, 1999; Andersson et al., 2006).

Blakeslee Jr (1999) called Six Sigma a "High-performance, data-driven approach to analysing the root causes of business problems and solving them." The root cause analysis of defects leads to permanent defect reduction, which is the primary goal of Six Sigma (Blakeslee Jr, 1999).

The most important elements required for Six Sigma implementation are strong leadership, an initial focus on the operations of the company, clear performance indicators (KPI's), aggressive project selection, and selecting and training the right people (Hahn et al., 1999). Antony and Banuelas (2002) mark that a successful introduction and implementation require an adjustment to the organisational culture and employees' behaviour. Six Sigma is the way employees do their job on a daily basis. It all depends on the mindset of people, with their ultimate goal of ”doing things right first time” (Antony & Banuelas, 2002). Chowdhury (2002) states that smart carpenters say: ”Measure twice and cut once.” This is what Six Sigma is all about: getting it right the first time.

**Impact on Business Model**

Arnheiter and Maleyeff (2005) state that ”Six Sigma is a broad long-term decision-making business strategy rather than a narrowly focused quality management program.” This management decision makes everyone in the organisation responsible for the quality of goods produced by the organisation. The focus is on customer satisfaction by delivering better quality. This goal is reached by education and training in statistics, root cause analysis, and other problem solving methodologies (Arnheiter & Maleyeff, 2005).

Hahn et al. (1999) found some key reasons for implementing Six Sigma initiatives. First of all, the financial impact is measured. Projects are selected aggressively by calculating the financial pay-off. Secondly, the understanding and satisfying of customer needs are key. The customer needs and the performance in meeting them is documented, which results in formal customer interactions and evaluations (Hahn et al., 1999).

### 3.4 Link to Business Model

**Customer Value Proposition**

Treacy and Wiersema (1993) found that customer value and relationships can be achieved through the three value disciplines: operational excellence, product leadership, and customer intimacy. Companies with leadership positions have focussed on delivering superior customer value through one of these value disciplines. In the past, the perceived value of a product or service was measured on the basis of the combination of quality and price. Today, the concept of value includes other components, such as convenience of purchase, after-sales service, dependability, and so on (Treacy & Wiersema, 1993).
Morris et al. (2005) also introduced operational effectiveness as an influencing factor in the value creation. Ballantyne et al. (2010) agree with the view that operational effectiveness is part of the value proposition.

**Profit Formula**

Companies using operational excellence techniques are seeking to minimize overhead costs by eliminating non-value-added process steps across the functional and organisational boundaries. The focus is on delivering products or services to customers at competitive prices with minimal inconvenience (Treacy & Wiersema, 1993).

**Key Processes**

Operational processes, meaning all activity chains within an organisation, are recognized as very important. Operational excellence methodologies, such as described above are attempting to make business organisations’ work processes more effective. make business organisations’ work processes more effective (Tikkanen et al., 2005).

Organisational processes are going beyond organisational and functional boundaries, and are defined by Tikkanen et al. (2005) as "The means through which companies are able to realize their core competences, i.e. what they really can perform for the customers".
Chapter 4

Case study research

4.1 Research questions

As stated in the introduction, one of the main gaps we found in the literature is the link between operational excellence and the business model as well as how a strategic choice such as operational excellence implementation influences the business model.

Since there is next to no research into these links, our case study research will be exploratory by nature resulting in a pilot case. This should allow us to explore the influence of operational excellence techniques within the setting of a firm’s business model. The outcome of these interventions have not been discussed to date. We will use an embedded single case study design to investigate how certain operational excellence techniques impact a firm’s business model. It will be a single case due to the time and resource constraints. The units of analysis will be the operational excellence techniques that are (being) implemented at the case (Taminco). We will not be testing hypothesis due to the exploratory nature of our case, however recommendations for further research might be put forward within our conclusion (Yin, 2009).

Firstly, the aim of this research is to find out how the business model, value chain, and business process management are linked with operational excellence. After linking these concepts within the case study research, the aim is to find out how these OE projects influence the business model elements of our case.

1. How are a firm’s BM, VC, and BPM linked with OE?

2. What is the impact of operational excellence as business model element on the remaining business model elements?
4.2 Case

Taminco stands for The Amine Company and is a worldwide chemical company, specialised in producing amines and derivatives as well as formic acid. Taminco originated as a spin-off from Union Chimique Belge when UCB decided to focus on their pharmaceutical activities and divest in their films and chemicals divisions in 2004. In 2006, the U.S. market was entered through the acquisition of Air Products USA. In December 2011, Apollo Global Management, LLC entered into a share purchase agreement, and thus became the majority shareholder of Taminco Group NV. Next to increasing production through acquisitions, various supply contracts were bought as to increase capacity at each of the plants. Today, Taminco operates in 23 countries with eight production facilities.

Taminco is an amines company producing basic amines, including methyldamines and higher alkylamines, solvents, specialty amine derivatives, and other intermediate chemicals. Their amines and derivatives are used by their customers in a plethora of products which are supplied to a number of end markets, varying from personal & home care to oil & gas. As such, Taminco is mainly a business-to-business supplier. The business is divided into three primary divisions, each with its own products and end markets. The three divisions are: Functional Amines, Speciality Amines, and Crop Protection.

As for competition, Taminco’s biggest adversary is BASF. BASF is one of the biggest chemical companies in the world but in this niche of methyldamines and derivatives they are far smaller. In Europe there are about three players with Taminco having around 50% of market share. In the US there are three players as well and Taminco has a market share exceeding 50%. In the US however the biggest competitor: BASF needs all production for internal use, they do not sell on the market. In China the situation is different, there are a lot of players and it is very difficult to expand. Overall, without Taminco there would be a definite shortage in the market.

Integration is important but balancing the products offered by Taminco and those offered by their customers is important as well. BASF for instance has a far more integrated system which in turn implies that they are more in competition with their customers.

Although Taminco operates in a niche market, growth potential is high. First of all there is the organic growth of the world: the world population is growing year after year. Secondly, there is the growth of specific applications, such as shampoo. After basic needs such as food are fulfilled, personal care is next on the list so instead of using shampoo once a week people start using it more than once and as such the need for these amines increases. Within these applications there is a lot of dynamism: some applications are cut from the selection whereas others will arise. These revenue flows are supported by a team entrusted to make sure all breakthroughs of new products and applications are patented if appropriate, this to be optimally covered against competition.

Three main areas are distinguished within the strategy of Taminco: the Taminco touch, profitable growth, and operational excellence. Taminco cares about people and chemistry, this is Taminco’s vision: people and molecules.

The Taminco touch gives a first glance at how it feels to be part of the Taminco family and is all about passion, care, and integrity. Another big part of Taminco’s culture is sustainability: each year the company measures its performance related to their 2020 goals. This is a program with KPI’s in the area of innovation, people & society, and responsible care.
Profitable growth is obtained by acquisitions and partnerships on the one hand, while on the other hand an emerging market presence and innovation drive Taminco’s growth. The innovation model aims to create new opportunities (i.e. applications) for customers and tries to make an impact on the world of tomorrow. Taminco bought a lot of smaller firms that could not compete or that divested in some areas, an example of this is the acquisition of the plant in Leuna and the recently acquired Kemira business. This recent acquisition is a company that produces Formic Acid, so this creates a lot of new opportunities as well. In turn globalisation was an important driver as well, making sure that Taminco was the authority in Amines across the globe.

A third main area is operational excellence. Part of the strategy is about agility: being a flexible company towards its employees and customers. Market focus and customer intimacy is agreed upon by the sales department. Customer intimacy is a big part of Taminco’s operations: on the level of marketing they try to understand the needs of the customer and the market in order to gain the trust of the market leaders in those segments. Timely delivery of premium quality products to meet partners’ needs is the central notion here. In the internal processes, vertical integration and technological leadership are key for the operational excellence program. Taminco tries to integrate, which means that the main molecules are derived. This is a sort of vertical integration, but they remain within their field of competence. These fields are selected based on some macroeconomic trends within the market. Davis (2013) found that interest expansion in operational excellence is the second highest within the chemicals industry with insurance occupying first place and healthcare completing the top-3.

Our case is selected due to the strategic importance of operational excellence within our research as well as the ease of access and intimate knowledge of the company. Since one of the writers of this master thesis has been working at the company for several years, participant observation was possible. Being intertwined with the company culture as well as the predominant presence of operational excellence within Taminco promises to reveal valuable insights through this case study research.

4.3 Research approach

As no widely accepted framework or canvas is put forward within the business model literature, our case study design will combine both a deductive as well as an inductive approach. We will depart from the framework as depicted in M. W. Johnson et al. (2008), which is easy to use without being overly complex and still covers all important components that construct the business model. This makes up the deductive part of our approach. That being said, the second part is the inductive approach, since the framework of M. W. Johnson et al. (2008) is only the starting point of our research. By studying our case in-depth, tailoring the framework of Johnson to fit the needs of our case is possible. By systematically comparing the research data with the theoretical foundations we are able to build a theory which closely fit the data (Eisenhardt, 1989). We evaluated the components against the insights from our research to find which elements and activities to include in the business model and where to position them. This is what Eisenhardt (1989) describes as the sharpening of constructs through comparison of theory and the data emerging from the analysis process. A second and evenly important part of the research was how to link all relevant components of the business model to each other.
First, we constructed a preliminary business model of the firm based on historical data such as the prospectus of the company and other company records as well as participant observations as mentioned before. These participant observations include all informal knowledge gained over the years concerning the company as well as all informal interviews with colleagues and internal documents. The participant researcher submerges himself wholly within the situation and is a part of the researched entity (Saunders et al., 2011). The multitude of data sources allow for data and methodology triangulation providing stronger substantiation of constructs and research questions (Eisenhardt, 1989). The ability to cross-check the results increase the validity of our research.

This gave us a general idea on how to structure our interview with the vice president of supply chain, purchasing, and IT at Taminco. It also was our starting point to see which elements to incorporate within the framework and gave us a first idea of how to structure the business model to fit the needs of our particular case study.

As a second step, we interviewed a few employees with a deep knowledge of the firm in order to obtain the necessary information for the research. The first interview was with the Executive VP of supply chain, purchasing, and IT: Guy Wouters. We followed the approach of Magretta (2002) and let the EVP tell the story of Taminco while keeping our questions to a minimum. This open interview supplied us with information needed to map the business model of our case as well as providing a broad view of the history, competition, and external factors. A second interview was conducted with Johan De Saegher, the COO of Taminco. Here we used a semi-structured interview to survey about the operational excellence techniques within Taminco as well as to ask some of the missing information. Later interviews were conducted to gain deeper insights into one of the operational excellence projects. The first with Piet Van Acker, site manager Ghent concerning C-Grow and the second with Guy Wouters concerning PRISM, the second operational excellence project we will discuss. Since the objective here was to gather as much information as possible concerning the projects, open interviews with some questions to keep the interview on track were used. Lastly, a semi-structured interview with Guy Van den Bossche, Executive VP Crop Protection, helped fill in some of the blanks and provided some depth into some of the value creating elements. Annex 2 is a detailed schematic overview with the positions of the interviewees. The interviews were recorded for transcription in a later phase. The interviews were reproduced word for word in order to reduce observer bias to an absolute minimum. Secondly, the summaries of the interviews were sent back for feedback again in order to further reduce observer bias. A topic list of the semi-structured interviews can be found in Annex 3.

As mentioned before, observer bias is reduced to a minimum by reproducing the interviews word for word and validating the documents by the interviewees. This feedback enabled us to further reduce translation and interpretation errors. As such reliability is consistent throughout the interviews. Since we are working with qualitative data, interpretation errors can occur but are minimised. However, we can not guarantee that no errors remain and that minimal observer bias is not present. The embedded single case study design is well suited to support the research questions in this exploratory research. By using this research design we aim to obtain high methodological validity.
The external validity or generalisability is determined by the strength of the context description (Eisenhardt, 1989). Since only one pilot case has been examined, generalisation is limited. However, within the industry context where Taminco operates, similar operational excellence projects should yield the similar results. Although implementation of such projects will never be exactly the same and business models are different for each company, we assume the impact on the building blocks to be similar.

Following the transcription was the coding of the interview (Saunders et al., 2011). For our qualitative data analysis we followed a Framework Analysis approach developed by Richie and Spencer (1994). Within the framework analysis there are five key stages (Lacey & Luff, 2007).

1. Familiarisation
2. Identifying a thematic framework
3. Indexing
4. Charting
5. Mapping and interpretation

Despite the fact that the general approach of framework analysis is inductive, it allows for including a priori constructs found within the theory as well.

Familiarisation entails the transcription and reading of the collected data. This first step is followed by identifying a thematic framework, which is essentially the initial coding framework developed partially from the theory as well as from the emerging concepts in the familiarisation stage. Throughout the latter stages, this thematic framework should be refined and developed further.

In our case, the following themes were found: Taminco’s history, competition, value offer, key activities and resources, customer segments, revenue/profit, strategic partnerships, and operational excellence. These themes were subsequently applied to the collected data using colour coding corresponding to the various themes as part of the indexing stage. Lastly, the data was collected for each heading from the thematic framework and put together in a summary. The last stage within framework analysis, namely mapping and interpretation as described by Ritchie and Spencer was done by linking the business model with operational excellence through our case. After linking both concepts, interpretation of the results was made possible and allowed to answer the research questions. What we are aiming for is understanding the impact of operational excellence techniques on the business model.

Following the qualitative data analysis, the preliminary framework of M. W. Johnson et al. (2008) was constructed by using the information that emerged from the framework analysis. Combining these insights from the interviews with the theoretical framework of M. W. Johnson et al. (2008) in an iterative process allowed us to construct a tailor-made business model of our case, the result can be found in Annex 5. We will use the business model map of our case to research the link between operational excellence and the business model.
Chapter 5

Results

5.1 Johnson’s business model framework

After transcribing and coding the interviews, the information was transformed into the framework proposed by M. W. Johnson et al. (2008). The result of this exercise is represented in Table 5.1. The second step was to map the business model more in detail. The following paragraphs will clarify the different components in-depth and integrate them with the information collected from our case study research in order to construct a business model framework that is better suited for our case partially based on the work of Verrue (2014).

<table>
<thead>
<tr>
<th>Customer value proposition:</th>
<th>Sale and transportation of high quality, cost efficient amines to all chosen customer segments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit formula:</td>
<td>Margins are based on competition, value, and market landscape. Revenue streams come from the five end markets: agriculture, animal nutrition, energy markets, personal &amp; home care, and water treatment. These markets are chosen based on macroeconomic trends and lead to a turnover of around $1.4 billion. The biggest expenses of Taminco are the raw materials (70%), Capital expenditures (11%), and Energy (7%).</td>
</tr>
<tr>
<td>Key processes:</td>
<td>The key processes within Taminco are the development of new applications and markets. This is made possible by Taminco’s globalisation and integration. Delivering value is supported by the use of operational excellence, risk assessments, margin control, transportation, and packaging. Customer intimacy is a central notion to obtain this value while keeping customer satisfaction in mind at all times.</td>
</tr>
<tr>
<td>Key resources:</td>
<td>Strategic partnerships with clients for new developments together with the business development team that ensures that all innovations are protected and patented are key essential. A second important resource is the marketing department, they choose which customer segments are viable and potentially profitable based on macroeconomic trends. Lastly, there is the production set-up with operational processes and machines that deliver competitive advantage.</td>
</tr>
</tbody>
</table>

Table 5.1: Taminco’s business model representation
Customer value proposition

The customer value proposition within the framework of M. W. Johnson et al. (2008) is the main concept of all four interlocking elements. It represents the value that is offered to the target customer and is the center of the business model framework. Since Taminco serves multiple segments, the value offering is dependent on the segment that is targeted. For instance: while most products are sold via contracts to industrial clients, most sales within Agriculture are sold directly to the customer or to regional distributors. Since firms generally have a multitude of target customers or segments this quite often implies multiple value offerings as well. As such, we divided the customer value proposition in target segments, with their respective value, delivery, sales, and pricing as part of the so called offering (see Table 5.2). This will be the starting point of our tailor-made framework. This made possible the mapping of the five end markets of Taminco linked together with their customised value offering.

Taminco offers all targeted segments quality, cost efficient amines, derivatives, and formic acid and develops new applications for those products within the chosen segments. Alkylamines are produced through the reaction of alcohol with ammonia, the result of these processes are the production of methyamines and higher alkylamines. These can subsequently be further reacted with other chemicals to produce a variety of derivatives. The chemicals formed by these reactions can be used for any number of applications, for a detailed description see Annex 4. Quality is ensured by maintaining the zero defects norm, and customer requirements are translated into the specifications to obtain high customer satisfaction levels. Customer satisfaction is measured by the number of complaints within the complaint handling system. The amines are used in 120 different applications varying from herbicides to shampoo. Pricing is dependent on market conditions such as the number of competitors, how intense the competition is, and the added value of the products.

Since Taminco is the number one amines producer in the world with an average market share around 50-60%, transaction efficiency is at its highest due to economies of scale and delivery that is taken care of by Taminco. This combined with the fact that the market for amines only involves two or three major players leads to lower information costs for customers (Zott & Amit, 2001). These elements lead to increased value of Taminco’s products compared to its competitors.

The end markets, namely agriculture, animal nutrition, energy markets, personal & home care, and water treatment are chosen by the marketing division based on macroeconomic trends and because of the high added value of the products within these segments. These amines are mainly intermediate products used as input for the final products of Taminco’s customers and are mostly sold to industrial clients. Products for crop science form an exception where most products are sold directly to the distributor or end user. Products are transported globally which is all taken care of by Taminco. Products are delivered in tank containers, rail cars, IBC’s, or drums. Delivery of the products adds value to the products due to complementarities (Zott & Amit, 2001). Instead of having to invest time and money to search transport of the products, this service is dealt with by Taminco.

Table 5.2 clearly shows the different links between the elements of the value offering and the target segments. Whether a company has many different customer segments or just one target customer, the framework can be adapted accordingly while retaining the essential interactions.
### Customer Value Proposition

<table>
<thead>
<tr>
<th>Target customer</th>
<th>Value offering</th>
<th>Sales</th>
<th>Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Cost efficient, quality amines delivered to the</td>
<td>Distributors or directly to</td>
<td>Dependant on competition, value, and</td>
</tr>
<tr>
<td></td>
<td>customer</td>
<td>the customer</td>
<td>market landscape</td>
</tr>
<tr>
<td>Animal nutrition</td>
<td>Transportation of gasses and liquids organised by</td>
<td>Sales contracts with</td>
<td></td>
</tr>
<tr>
<td>Energy markets</td>
<td>Taminco</td>
<td>industrial clients</td>
<td></td>
</tr>
<tr>
<td>Personal &amp; home care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2: Customer value proposition

### Profit formula

The most important element within the profit formula is the cost structure. Since Taminco is a listed company that produces chemicals, there are some elements that influence the cost to business. Safety for instance weighs heavily on the cost side since extra training, education, and safety measures need to be in place. With the acquisition of companies such as Kemira, Taminco has the opportunity to increase their economies of scope and cover some of the fixed costs such as a sales director, HR department, and the business development team. Another way to fund new developments is by working together with clients. By doing so, Taminco is certain there will be demand and might sign big contracts as part of partnership agreements. As such, development costs are partially covered and the risk of potential losses decreases.

The biggest expenses are found within the purchase of raw materials, these take up around 70% of the total expenses. Capital expenditures 10%, energy 5%, direct labour 3.5%, maintenance 1.5%, and waste 1% complete the list of top expenses. Being the elements that have the highest cost within the budget of Taminco they subsequently have the highest potential for cost savings. Raw materials are processed and are used in a variety of products with different end markets to serve. Depending on the end market, different margins are imposed. The most important element within the cost structure of Taminco however, are the capital expenditures. These consist of the machines and processes and are at the heart of the customer value creation. These processes and machines are constantly fine-tuned and optimised in order to reduce costs and deliver as much value as possible.

The revenue model is simply put the price * volume. With an installed capacity of over a million tons per annum, Taminco is able to realise a turnover of $1.4 billion divided over its five end markets. As figure 5.1 shows, the divisions Functional and Specialty amines take up the biggest share of revenue with both 44%. Functional amines have two destinations: they serve the needs of external customers that need alkylamines as an integral ingredient in their products and are used in various applications. A second destination is as internal demand to use as building blocks for the Specialty amines and Crop protection. The Specialty amines are alkylamine derivatives that are sold in one of the different end markets. Customers within these end markets are usually leading multinationals in their respective market.
Margin control is one of the strong suits of Taminco. Budgets are always based on margins. It does not matter how much the projected costs are or what the expected revenue will be. Margins are based on the cost price of the products. Margins for the major applications fluctuate around 35% while last year, overall margins ended at an average of 17.8% due to product mix and higher amortisation in the preceding year.

Resource velocity is very hard to determine since Taminco works with continuous production and uses portions of its own output as input for derivatives, little to no stock is available at the plant itself. This is countered with a high level of instantaneous capacity to ensure order fulfilment.

<table>
<thead>
<tr>
<th>Profit formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue model:</strong> Revenue streams from five end markets chosen based on macroeconomic trends.</td>
</tr>
<tr>
<td><strong>Cost structure:</strong> Raw materials, Capex, Energy, Direct labour, Maintenance.</td>
</tr>
<tr>
<td><strong>Margin model:</strong> Different margins for the different end markets based on competition, value, market landscape, and cost price.</td>
</tr>
</tbody>
</table>

Table 5.3: Profit formula

Table 5.3 gives the overview of the profit formula of M. W. Johnson et al. (2008) applied to the case of Taminco. The revenue model that generates the turnover and next to it the cost structure with the key expenditures needed to create and deliver value with underneath the margin model.

**Key processes**

As mentioned before, market segments are chosen based on macroeconomic trends and the high added value of the products within these segments. Defining these market segments is an essential part of the marketing department of Taminco. Together with research provided by consultants these market segments are chosen because of the strong exposure to a number of positive, non-cyclical trends. These key factors include the steadily increasing world population, a growing middle class in the emerging markets, scarcity of clean water, and recent developments in oil and gas recovery (shale gas for instance). These factors and deep market research determine the choice for the five primary end markets with an expected average growth of 6% the following years till 2018.
Next to defining the market segments to target, Taminco also develops new markets. Developing new products or new applications of existing products is part of the growth strategy within Taminco. In collaboration with key clients, the product development team helps with developing new products in line with customer needs. The team works closely together with marketing, production, and engineering to make sure all objectives are aligned with the general business objectives. However, it does not stop there: Taminco continuously puts in effort to find more efficient solutions for current problems their clients face. This ranges from improved performance to less toxic and greener solutions. A second part is finding new applications for the existing products. Both types of innovation serve to increase the value of current customer offerings.

These product innovations create a certain lock-in due to the dominant design. Since next to no substitutes are available, switching costs tend to be high. When new products are developed together with partners, lock-in potential is even higher since both parties invest time and money in the development. These strategic partnerships lead to trustful relationships with customers and increases customer retention. They also work both ways, chances are that customers will repeat transactions and renew contracts if everything goes well. By working together, Taminco is certain there will be demand and might work with big contracts. Customers can gain a temporary monopoly to sell these novelties or they could get big discounts as opposed to their main competitors. This allows to partially cover development costs and to a degree certainty of future demand. Some examples: by partnering up, innovations from new solvents for oil and gas treatment as well as safe green organic solvents to bio-active amines for animal nutrition and plant protection have been developed.

Another big part of the key processes within Taminco are globalisation, and integration within their field of competence. This helped Taminco to realise its vision: to be the global leader in amines. Integration and globalisation are no processes as such but are more part of Taminco’s strategy. However these two strategic decisions lead to a specific layout of the production processes in order to deliver a broad range of amines and derivatives. By focusing on alkylamines as well as their associated derivatives, production processes can be optimally integrated. This fully integrated value-chain supports maintaining a low cost position. This is done by optimising energy utilisation, logistics, a limited recycling need such as that of waste water, and a limited number of strategically placed global production units.

A second important process that emerges from this vertical integration is the need for balance between Taminco’s integration and the products Taminco’s customers offer to their clients. If Taminco starts selling a new derivative that is already sold by one of its customers, conflict arises. In order to stay ahead of the competition, Taminco invests a lot of time and effort in customer complaints and risk assessment studies to ensure a high level of customer satisfaction. Key essential is understanding the needs of each single customer segment and earning the trust of market leaders within these segments in order to stay competitive. This is done by the marketing department to help maintain the high customer service levels. Next to ensuring high service levels this creates a deep customer intimacy which in turn makes it easier to understand the needs of the customer. Making sure supplier dependency isn’t too high and making contingency plans for worst case scenarios are examples of these risk assessment studies. All these risk assessments and studies are categorised and taken into consideration depending on probability.
Operational excellence is at the heart of Taminco’s strategy. Not only is it a methodology with its corresponding frameworks, it is a key process as well. Implementing operational excellence techniques such as lean and Six Sigma have a big impact on the value that is created for the customer and the focal firm. Within Taminco, operational excellence is used with the aim of improving operational processes to enhance efficiency and increase product quality resulting in higher customer satisfaction and spans across the entire business model.

Two types of transportation occurs: transportation of gas which mostly involves methylamines, the second is transportation of liquids which are mostly derivatives. Transportation of gas is typically regional since methylamines are very expensive to transport due to the volatile nature and the complexity that transportation of gas entails. Before transportation can occur there is the packaging of goods. While in the past Taminco tried to be as flexible as possible, some degree of standardisation was necessary. Within the key processes there are two types of packaging: first there are those clients who request package sizes conform with Taminco’s offering and secondly those that are not conform.

All segments enjoy the great customer service provided by Taminco and can put their faith in the fact that they are always there to deliver quality products wherever those products need to be. This can be done in one of two ways: either safety stock has to be at the warehouse or the presence of high instantaneous capacity is required. In this case the latter is applicable: an installed capacity of one million tons is at Taminco’s disposal. This together with the global presence ensures delivery no matter which continent since the same product specifications are handled at each site.

A last very important activity is the value pricing, this is a very difficult exercise and incorporates a variety of factors. Elements that affect the pricing are the prices of the competition within that market. Supply and demand are another big factor: since Taminco occupies strong positions in growing niche markets and the relatively small number of suppliers, positive gross margins are attained across most of the product portfolio. Estimated market share is included as well: net margins are important here, sometimes products are sold in lower volumes but to a higher market segment depending on where the net margins are the highest. On the other hand, if there is free capacity on a product line then bigger volumes are supplied under a different name to the market to penetrate the lower price segments. Image and innovation make it possible to price the product as premium. Lastly, for certain types of products, registration is part of the equation. In certain countries permission is required to sell some products, these are mostly products that require big investments and forms a barrier for new market entrants and allows for higher prices.

A second factor that contributes to the positive gross margins of Taminco are the types of contracts. A substantial amount of sales are with CPT Contracts: cost pass through contracts, this implies that prices are automatically adjusted on a quarterly basis to reflect changes in key raw material prices. A second type of contracts that account for a substantial amount of sales are the contracts where the sales prices are renegotiated quarterly. However, for both types applies the fact that adjustments are based on the previous quarter. As such, if prices increase recovery of increased raw material costs will only occur after stabilisation or fall of prices. On the other hand, if prices are falling it is possible to achieve higher gross margins until prices stabilise or increase again.
As shown in Table 5.4, the framework is structured in such a way that the underlying links are clear. Not all processes take place on the same levels. While some processes support the customer value proposition as a whole, others only take place in a part of the value offering. A typical example is transportation, while this is key essential as part of the value offering ‘delivery’, it has little to no impact on the target segments.

<table>
<thead>
<tr>
<th>Key processes</th>
<th>Target customer</th>
<th>Value offering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target segments</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td>Defining market segments, market development</td>
<td>Customer intimacy, New application development</td>
</tr>
<tr>
<td></td>
<td>Value offering</td>
<td>Delivery, Sales, Pricing</td>
</tr>
<tr>
<td></td>
<td>Globalisation, Vertical integration, Balancing integration with customer offerings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operational excellence, Risk assessment, Margin control</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.4: Key processes

Key resources

The elements that make up the key resources of Taminco correspond with some of the elements mentioned earlier as part of the key processes. Partnerships with strategic clients are part of the key resources. Taminco tries to be a partner instead of a competitor with its clients. Forming an alliance to develop a new product or niche is more beneficial than competing with the same product. Working together directly with core customers is a key element of the strategy. This deeper understanding of customer needs enable the business development team and marketing department to identify future demand. This customer-focused approach makes Taminco a more attractive partner and allows for greater penetration of the end markets.

Secondly, there are the marketing and business development departments which are part of the key resources as well. Taminco has its own department for patenting new products and applications to be optimally covered against competition which is the business development department. The marketing department on the other hand clearly delineates which customers are served and what products are offered. These two departments have a key role within the company as mentioned within the key processes.

One of the most important resources within our case however are the raw materials. Taking up 70% of the budget, Taminco continuously tries to find better solutions and different materials to use within their production processes. The key raw materials are methanol, ethylene oxide, ammonia, acetone, acrylonitrile, and acetic acid. These are readily available commodities and are purchased in relatively small volumes. However, to secure the supply of these materials, long term contracts have been closed. By doing so, Taminco tries to limit the increases in price for their main raw materials. As for energy, key sources are electricity, steam, and natural gas which are available and supplied by local producers. The raw materials are purchased from a relatively small number of suppliers, interruption or delays could have serious negative effects on the business.
The machines that are part of the production process of Taminco form one of the main drivers for value. These are constantly reviewed and optimised in order to be as efficient as possible: reducing waste, efficient use of raw materials and energy. Taminco capitalises on their technological leadership to develop these new production processes, products, and applications. Processes are as automated as possible, operator intervention is kept to a bare minimum while processes are standardised to ensure quality at the source. Improvements are found by observing the production process step by step keeping the value stream in mind. Work-floor presence is an enabler: by direct observation engineers can see and find how the processes can be optimised. This process of continuous improvement is supported by scientific management: using data to systematically improve the process at each step of the way. It is the research and development group that is tasked with focusing on improving existing processes, clean technologies, and energy efficiency. To do so, it has a well equipped lab, pilot unit, technicians, and PhD’s to its disposal. By working closely together with customers, the research and development group tries to constantly improve the production process. Not only partnerships with customers help attain this, but also collaboration with several universities such as University Ghent and Leuven as well as other European universities.

Lastly, one of the most important resources within Taminco exists of the patents it holds. Currently, Taminco has 83 patents issued worldwide which range from covering production processes to feed additives. These intellectual properties are developed internally as well as through acquisitions. In case of collaboration with universities, contracts are in place to give full ownership of the intellectual properties developed in the collaboration to Taminco in exchange for royalties or other compensation. Some of the important patents are: the process for the polymerisation of vinyl chloride, an antimicrobial composition, a stabilised bio-available soluble silicate solution, agricultural and detergent compositions containing a tertiary amide as adjuvant or as surfactant, and many more.

<table>
<thead>
<tr>
<th>Key Resources</th>
<th>Target customer</th>
<th>Value offering</th>
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<tr>
<td></td>
<td>Target segments</td>
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<td></td>
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<td>Partnerships with strategic clients</td>
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<td>Marketing</td>
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<td>Business development team</td>
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<td>Patents</td>
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Table 5.5: Key resources

Table 5.5 shows the result of the key resources Taminco owns put into the framework of M. W. Johnson et al. (2008). The key resources span over the entire customer value proposition, this since these components are not strictly appointed to a specific building block within the framework. The key resources block is found at the bottom of the framework since this constitutes the support base of the key processes and customer value proposition.

Annex 5 gives the complete BM map of Taminco within the framework of M. W. Johnson et al. (2008) and is the summary of this research section. This BM map will be the input to illustrate the links between the operational excellence techniques and the business model.
5.2 Operational excellence projects

"Operational excellence, that’s making sure that all valves are closed”. A stunning quote from Guy Van den Bossche: Executive VP Crop Protection at Taminco referring to an incident where raw materials were unloaded and went straight in the sewer. Operational excellence is making sure that all processes are aligned and run smoothly, implying processes are efficient and under constant revision and that all types of waste are prevented.

Despite this silly incident, Taminco actively pursues operational excellence throughout its entire organisation to avoid situations as depicted above, which are rather outliers and do not occur very often. Taminco breathes operational excellence, from operations to customer satisfaction: operational excellence is present. Johan De Saegher, COO of Taminco illustrated the operational excellence charter within Taminco to show how important the concept actually is. The charter exists to bring the Taminco operations to a top-class level and consists of three elements. These elements will allow for a strong and lasting competitive position.

1. Environment, health, and safety
2. High quality products and services
3. Low-cost operations

Environment, health, and safety is the first and foremost element within the operational excellence charter, this is the license to operate. Within all activities it is the objective to ensure the safety and health of all employees, customers, and members of the community while respecting the environment. This is accomplished through risk minimisation, health protection programs, waste reduction, and correct disposal.

The second element within the charter contains a part of the value offering namely the high quality products and services. The norm within the operations is zero defects, this entails that the specifications set is always met. To ensure customer satisfaction, customer requirements are adequately translated into these specifications.

Lastly, operation costs are kept as low as possible while maintaining a high quality. Main factors here are up-time and asset utilisation. To maximise yield, the latest and best available technologies are implemented while reliability engineering allows for high up-times.

As stated earlier, waste reduction and efficient utilisation of assets as well as up-time have the most potential for improvement. These are accordingly the focus of the majority of operational excellence projects within Taminco. A short list of success stories:

- By switching from batch to continuous production in Metam, capacity doubled while reducing costs.
- AAA-capacity Ghent: the original plant was designed to produce 20 tons/day in 1998 and was upgraded with less than 20% of the original capex to 80 tons/day in 3 steps.
- Waste recycle unit for Methylamines in Leuna: 2500 tons/year distillation residue is hydrogenated and distilled to be used as input for the Methylamine unit. Savings 2000 tons of MeOH resulting in $750k/year + $1000k treatment cost saving.
By using a new process, two expensive raw materials were replaced with one cheap raw material, saving around $3 million/year.

Electricity reduction by using variable speed controllers on cooling water pumps and fans in Leuna, saving around $100k/year.

Reduction of own maintenance force through externalisation with contractors.

These and all projects alike have made Taminco the lean, flexible company it is today. In the meanwhile, new projects are planned in the years to come. These operational excellence projects are implemented in order to make Taminco even more efficient while maintaining its high standards. Table 5.6 shows a summary of the potential savings in the major expense categories that are targeted for 2017.

<table>
<thead>
<tr>
<th>Manufacturing Cost and Potential savings by 2017</th>
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<tbody>
<tr>
<td>Efficiency improvement:</td>
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<tr>
<td>Raw materials</td>
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<tr>
<td>Energy</td>
</tr>
<tr>
<td>Direct Labour</td>
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<tr>
<td>Maintenance</td>
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<td>Waste</td>
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<tr>
<th>Engineering Capital Expenditure savings by 2017</th>
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<tbody>
<tr>
<td>Capex</td>
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</table>

Table 5.6: Potential savings (Taminco, 2012)

To illustrate the possible impact of operational excellence techniques on the business model, two projects will be explained in-depth in order to find the link between these techniques and Taminco’s business model. These projects are: C-Grow and PRISM.

**C-Grow**

With the expected demand growth Taminco is facing today, it saw that the current capacity would not be able to follow. Due to low Overall Equipment Effectiveness, inefficiencies, and a lack of performance management, a high potential to improve was available to fill in future demand without having to open new production sites. Consultants analysed the entire, current organisation and found some of the key problems to address.

- Basic performance management and fundamental drivers of a learning organisation were missing.
- The planning process for production activities was inefficient.
- The company had a reactive culture with a high degree of fire fighting.
- The organisation was not result driven and root cause analysis was missing.
- Utilisation of production assets was suboptimal and did not allow for high performance and quality.
These were the key drivers to start the implementation the C-Grow project. To create a high performing organisation, Taminco needed:

- A high quality production process, which is made possible through standardised work and control of raw material specifications and process parameters.
- A basic planning process aligned with production had to be implemented resulting in a stable planning.
- Ownership had to be obtained by defining clear roles and responsibilities while feedback had to be collected.
- A system of structured problem solving and root cause analysis had to be put into place in order to become a proactive organisation.
- To manage and control a continuous improvement culture based on KPI’s that would help create a learning organisation.

To achieve these goals, a DMAIC approach was followed. First, all processes had to be stabilised in order to measure the defined KPI’s. After the stabilisation and KPI choices, Taminco could start with improving the processes. KPI’s are measured on a regular basis and a baseline is agreed upon. At the start of each interval (daily, weekly, monthly) targets are set for the different KPI’s, subsequently all KPI’s are measured and controlled. If certain KPI’s do not reach the targets, root cause analysis helps to find what the cause of the discrepancies is and adjustments are implemented accordingly. The third and last phase is sustaining the process to allow for continuous improvement. Once KPI’s are being measured and targets are being set, the bar is gradually raised with the aim to continuously improve the processes until further improvements are no longer cost efficient.

C-Grow focused on three work streams within the Crop division of Taminco. These three work streams were: production, maintenance, and planning & handling. Each of the work streams were targeted separately since each had its own problems and solutions.

Production:

Within production, the main focus was improving the overall equipment efficiency for the Niro drying towers. After analysing the performance of the four drying towers, base targets and stretch targets for future improvement were chosen. By correcting certain processes and changing products, significant performance improvements for all four lines were obtained. Over the course of several weeks Taminco worked together with a consulting firm to make these corrections and constantly monitored how to improve the technical processes. Niro 1 has an OEE of 90% which is 14% over the stretch target and 15% over the base target. Since the focus was primarily on Niro 2 due to the shortage of capacity, an OEE of 108% was noted which is 25% above target. Niro 4 and Niro 5 respectively attained an OEE of 86.4% and 64.8%. These OEE performance improvements led to an additional cumulative production of almost 1.900 tons compared to the baselines (see figure 5.2).
Secondly, in order to pro-actively attack the problems at hand, structured problem solving and root cause analysis had to be implemented (figure 5.3). Short Interval Controls paired with loss registration deal with the identification of the main issues of lost capacity. Starting from hypothesis, data is collected to gain insight in the different problem areas. This data collection helps support the root cause analysis and leads to improved fact based decision making. The insights that emerge from the data collection are used to update process making sheets and standard operating procedures and will eventually lead to a standardised process with one way of working. These daily/weekly controls are a big step into finding root causes. By creating multidisciplinary teams, all knowledge within the firm is used to find the real causes. Actions are identified and logged and are then completed in a timely fashion. These actions and conclusions are documented for future problems and help the firm to become a learning organisation.

![Figure 5.2: Additional production (Taminco, 2014b)](image1)

![Figure 5.3: Structured problem solving (Taminco, 2014b)](image2)
A third important driver was to reduce change-over time by using change-over instructions. The change-over time is the time needed to prepare the machines for producing a different solution. This includes time to rinse, prepare, and fill the tanks. The change-over process has been split up in internal and external activities and are subsequently optimised. Change-over time has been reduced up to 68% for some products resulting in a better, more streamlined process.

Lastly, procedures have been put in place to implement a non-conform process. Improvements that were implemented were: integrating departmental procedures with process flow as well as alignment of the communication flow.

Maintenance

Within maintenance mainly the planning & scheduling process has been improved. Planning files are used to make the weekly planning and are linked to SAP. These weekly planning files are then drilled down to a daily planning. The weekly and daily planning are sent to production every week and daily meetings between maintenance and production are planned to update the daily maintenance planning. To ensure the optimisation of the planning, engineering has been involved in the weekly planning process. In order to improve planning efficiency, a stable planning was the first and foremost goal. Clear KPI’s as well as targets were set for schedule compliance of Electricity, Piping & Construction, and Rotating Equipment. To measure the plan stability, first time right of the notifications was measured. Notifications arriving at maintenance have to be structured, complete, and ready to use immediately. While the first time right was somewhere around 50% at the beginning, percentages of 70% - 80% were measured at the end. Results of the increased planning stability include less rework, and less waste of time and resources because the maintenance team for instance could not do their job due to miscommunication with production.

Root cause analysis are conducted on a regular basis to track deviations in the planning. Actions are logged and progress is tracked during the weekly maintenance meetings. Secondly, feedback from technicians helps to understand the processes and are used as input for SAP to further improve the planning.

Planning & handling

The last work stream within the scope of the project was planning & handling. Here, clear planning rules were implemented to ensure that there was only one integrated way of planning. Secondly, by using an integrated planning system, the number of meeting attendees was reduced from 20 to around 7 people. For the major packaging lines, OEE’s are tracked, deviations are discussed, and actions to improve are taken. These are the most important factors leading to a more efficient follow-up of the packaging lines.

To increase resource efficiency at downtime moments, a list of off-line tasks has been put in place. As such, resource utilisation is being maximised.
Another goal was to align the production planning with the resource planning. To do so, a closed loop was put in place between packaging and planning on resource and capacity planning. Clearly defined roles and responsibilities are allocated in the feedback process while resource planning is followed up.

Lastly, within the planning & handling work stream, descriptions of change-overs, and clearly identified and described parameters are implemented leading to one standardised way of working.

**PRISM**

PRISM is the result of the evaluation of the supply chain processes at Taminco. The study was held by Möbius and resulted in the PRISM blueprint, which describes the desired planning process. The project was split up into two parts: first the PRE-PRISM project to introduce basic planning concepts in the Taminco organisation to get the users familiar with an integrated and automated planning concept. Secondly, the PRISM project to implement a global Sales and Operations Planning work process. The aim of the project was to implement an integrated supply chain steering framework in order to preserve high levels of customer satisfaction. The framework has been designed to be as lean as possible to sustain high levels of internal and external flexibility.

After analysing the current supply chain, processes, and systems the consulting team of Möbius found several issues that PRISM will address:

- Taminco’s EU and US supply chain are not aligned.
- The production planning processes are not aligned.
- There are many different planning tools and processes.
- Other supply chain processes including internal processes are not aligned.

The new planning system that will be put in place will allow for enhanced visibility of actual/planned demand and supply information. By focusing more on planning, more efficient planning and production & logistic processes will be attained.

The project included both divisions: functional chemicals and agro-sciences and covered EU and US operations. The objectives of PRISM were:

- Define Taminco’s S&OP work process based on the study of Möbius.
- Create an organisational structure able to support the S&OP work process.
- Work with the planning tool to define and build the S&OP tool.
- Implement the S&OP process and tool within Taminco.

Four work streams for improvement were defined: Demand forecasting, Strategy & Operations Planning, Master Planning, and Scheduling.
Demand Forecasting

Until recently, demand forecasting software was not available at Taminco. The process of aligning supply with demand was more a financial budgetary exercise where the aggregated amounts were chosen and subsequently drilled down into smaller units, based on percentages for each unit and gut feeling. After breaking down these units, products could be sold in bulk, packaged, prepared for export and much more. This detailed breakdown was not available, resulting in a very poor understanding of what needed to be produced.

This planning method was no longer feasible for an organisation as Taminco. The planning was too rudimentary to support the growth and complexity of a big organisation. This resulted in the implementation of a demand forecasting system, going from a push system to a pull system based on customer demand. As such, marketing can quickly adapt to changing customer preferences and the evolving market environment while ensuring customer satisfaction and flexibility.

Strategy & Operations Planning

The second phase is establishing a S&OP process which is currently being implemented. The aim is to model a long term production planning (around 18 months). Part of the process includes mapping the available resources, the demand forecasting, and how to make the plan for the following months. By doing so, it is possible to identify issues early on and quickly resolve the issues if possible.

An important factor to keep in mind is to have one clean data set. At this moment, all different departments have varying definitions of for instance capacity or production. First of all, unification and standardisation are in order to keep all departments in line while employing the same definitions. A perfect example of this is: if production is asked how much can be produced they might say 20 tons daily. Does this mean they can make 140 tons in a week, not necessarily because a day might be needed to clean the installation so in fact only 120 tons can be produced in a week. These kind of misunderstandings and communication problems are to be eliminated by installing a S&OP process with one common language and clear definitions for all employees to understand and follow. Secondly, roles and responsibilities have to be assigned: who has to do what and who is responsible.

Once all roles and responsibilities are clear and the employees are actively involved and support the process, an efficient operations plan will anticipate future issues such as capacity shortages, seasonal problems, and how to cover those periods. These issues might be solved by increasing the purchases, extra production, holding more inventory, investing in capacity expansion.

By implementing the S&OP process, the short term planning will become less complex as well. This due to the decrease in variation and because most deviations will already be included within the planning.
Master Planning

Thirdly, there is the Master Planning, which basically is a derivative of S&OP but with a time bucket of two to three months and thus far shorter. At the higher level of S&OP, the planning has been made long before the master planning, this intrinsically means that readjustments will have to be made. Precautions will be included within the S&OP for the time frame of the master planning. However, until the master planning has to be drafted up, the situation might change: new customers or growth potential might increase sales. This will be different from the initial forecast due to variations in certain factors. Production will have to keep up to ensure the delivery of these new clients. The master planning deals with these short term issues and constraints over a time period of two to three months. The information that is included in this plan needs to be more detailed than within the S&OP.

Scheduling

The last work stream within the scope of the project is Scheduling. This is mainly steered and executed by production. This is the planning on weekly or daily basis: for instance by the end of the week 100 tons need to be produced. It is entirely up to production how to fit the planning as long as the 100 tons are produced by the end of the week. This is the most granular level of the planning with the shortest time bucket. This planning is more transactional and is derived from the higher echelons and steered by an ERP system.

Main goals

With the implementation of PRISM, the main goal is to work more efficiently, more harmonious and standardised in order to supply the customer. Demand forecasting is not to discipline customers. Undisciplined customers are good, that shows that they need the organisation. Demand forecasting however is used to better understand what the customers need and when they need it even before the customer knows it himself. The second part then is to connect the corresponding price-tag.

The project has a big influence on customer satisfaction. A number of KPI’s are connected to each process to see how the processes are running. Forecast accuracy needs to be high or the company risks potential shortages and will not be able to deliver its customers. This is monitored by measuring the number of On Time In Full deliveries. At this moment in time, these measurements are not available at Taminco and could potentially decrease customer satisfaction.
5.3 Interpreting the results

Now that we have mapped the business model of Taminco and we elaborated on two operational excellence projects, it is possible to link certain techniques such as lean and Six Sigma to the business model and understand their impact.

The influence of operational excellence is twofold, operational excellence as a methodology can be linked to the business model as a strategic tool but it is an element of the BM as well which operates on the operational level of the business influencing other BM components.

We found that operational excellence is strongly connected with the operational levels. Implementation of lean or Six Sigma predominantly changes the business processes at the operational level and is better known as business process redesign which is part of business process management. By modelling the business processes at operational level, process analysis can root out the non-value-adding steps and find points of improvement. Six Sigma for instance is used to analyse the current processes and eliminate issues within those processes. As such, operational excellence is aimed at improving a firm’s value activities (those activities that add value to a product and are technologically and strategically distinct) within its value chain (Kippenberger, 1997). As described within the business model literature, a value chain is a set of activities within a company that, if taken together, create a product or service (Porter, 1985). In that respect, it becomes part of the extended activity system as described by Zott and Amit (2009). While a firm’s activity system is "The set of interdependent organisational activities centred on a focal firm, including those conducted by the focal firm, its partners, vendors or customers, etc..." the value chain is limited to the set of activities within the focal firm (Zott & Amit, 2009). In that regard, operational excellence as operational tool is what binds a firm’s business process management together with its value chain as part of the broader concept business model.

Despite operational excellence being at the operational levels of the business, it can also be a key process within the business model, which is at the strategic level. In that way, operational excellence is the link between how managers can follow a certain strategic direction by modifying the key processes within the firm to take advantage of growth opportunities (Rainbird, 2004). By fully understanding the value activities within the firm, sensible decisions can be made with regards to business model design in order to follow the chosen strategic direction (Rainbird, 2004). Taminco applies operational excellence throughout its firm. By constantly improving its existing business processes it aims at obtaining superior customer satisfaction while maintaining a low cost operation which is the strategic direction of Taminco. This concludes the answer to how OE is linked with the BM, VC, and BPM.

Secondly, we tried to understand the impact of operational excellence as a BM element on the remaining BM elements. While operational excellence is an integral part of Taminco’s business model, it is interdependently linked with the remaining business model elements as well. Implementing new operational excellence techniques will irrevocably affect the other BM elements. By studying two operational excellence projects, we gained insight as to how these projects are linked within the business model and what their impact is.
Operational excellence influences all BM elements but starts within the key processes themselves. Since the main driver for OE is to design business processes to be as efficient as possible while maintaining high quality standards, it are those key processes that are influenced by implementing OE projects such as lean.

By redesigning and improving the current operational processes, Taminco is able to use its drying towers within its integrated system of amines and derivatives. Modifying the production process and machinery is a key enabler of this integration process. Secondly, by increasing the efficiency of the installations, less energy and raw materials are needed resulting in notable cost reductions and increasing the value of the product. The increase in capacity due to the process improvements impact the value pricing as well. More capacity implies cheaper products and the ability to penetrate lower price segments.

By installing a planning & scheduling process, maintenance has become a stable and efficient process. Instead of losing valuable time and resources, the planning process enables efficient intervention of maintenance, reducing maintenance related costs considerably. By introducing a planning & handling system, customers can have their products packaged according the conform package sizes or to some degree non-conform package sizes. This OE project had a lot of impact on the packaging process within the organisation and allowed for a better work flow and subsequent cost reductions.

The introduction of PRISM had a big impact on the business model of Taminco as well. With the introduction of a demand forecasting model, the marketing and business development department have a new tool at their disposal to better understand customer needs. This has an impact for the development of new applications and the value pricing. Since a better understanding of customer needs is obtained, the business development team has a better chance of developing the right products for the right target segments. Secondly, value pricing is dependant on the demand as well as the type of products. New product innovations and the knowledge of customer demand are drivers that influence value pricing. Lastly, customer intimacy and satisfaction increase by knowing what the customer wants before he wants it. The S&OP and Master Planning & Scheduling programs are used to ensure delivery of products, and measures complaints in order to prevent them. This in turn has a big impact on customer intimacy and satisfaction.
Chapter 6

Conclusion

We have presented a summary of recent work within the fields of business models and operational excellence. Important components that are found within business models as well as the most cited frameworks were explained. The framework of M. W. Johnson et al. (2008) formed the starting point of our research. Evenly important were the plethora of operational excellence techniques. We presented the most common techniques that are used today such as Lean, Business Process Management, Dashboards & Scorecards, and Six Sigma to improve overall organisational efficiency.

During our case study research we mapped the business model of Taminco, a worldwide chemical company specialised in producing amines and derivatives, by using the framework described by M. W. Johnson et al. (2008). However, during the preliminary application of the framework we found that some alterations were necessary. Henceforth, we adjusted the framework to optimally fit our case. The result of this business model mapping can be found in Annex 5. The information needed to map the business model of Taminco was obtained through a series of interviews with high level employees at the firm as well as company records and participant observations. To optimally grasp the extent of the framework, a textual representation is needed to gain deeper understanding into the business model and its interdependencies.

The second part of our case study research was to explore the implications of operational excellence on the business model of a firm. Two operational excellence projects were explored in-depth in order to answer our research questions. The information concerning these projects was collected via interviews with two high level employees at Taminco. These projects were linked to the business model of Taminco to see how these projects influenced the business model as well as where.

The main goal of our research was to explore the link between both concepts and to see how they were intertwined. We concluded that although it is very difficult to measure the extent of the impact, there definitely is a link between operational excellence and the business model. We found that OE links the operational levels of the organisation (BPM) with the higher strategic levels (VC and BM). Secondly, while most operational excellence techniques definitely influence the cost structure of an organisation, they are firmly intertwined with the key processes and resources as well. We described the interdependencies between operational excellence as a BM element with the remaining BM elements from the perspective of our case.
Since a Master thesis is constrained within time and resources, we focused our research to one pilot case and two projects within our embedded single case study design. As such, external validity is limited to the context of our case. A second limitation is the project information. To obtain the right information on the right project is a difficult task, however since we had a participant observer finding the right people within the organisation was a lot easier. Measuring the impact of operational excellence techniques is extremely difficult due to the dynamic nature of an organisation and its environment. There are a multitude of variables that influence the results of these projects within an organisation, making it difficult to accurately pinpoint the impact.

Interviewees were chosen based on their deep knowledge of the firm and the operational excellence projects. The interviews were transcribed word for word and the summaries were returned to the interviewees for validation. As such we tried to minimise observer bias. Multiple sources of information were used for data and methodology triangulation if possible in order to reduce observer bias and increase the reliability of the research.

Our research is limited to the projects explained above and the information we obtained, implications of other operational excellence techniques do not fall within the scope of this study and might be the subject for further research. Since our research only consists of one case within one industry, extra validation of our research would strengthen the evidence and form the basis for theory building. Secondly, conducting research into the matter within other industries could result in insights across industries.
References


Harry, M. J., & Schroeder, R. (2000). Six sigma: the breakthrough management strategy revolutionizing the world’s top corporations. DOUBLEDAY.


Chapter 7

Annex

Annex 1: Comparison value chain and business model

Figure 7.1: Porter’s value chain model (Fadeev, 2014)

Figure 7.2: Osterwalder’s business model framework (Fitman, 2013)
Annex 2: Corporate Operations Structure

Figure 7.3: Operations structure Taminco (Taminco, 2012)
Annex 3: Topic list interviews

Biographic information:

- Respondent’s full name
- Respondent’s job title

Business model mapping:

- General information of Taminco’s business model
- Important elements that create customer value
- Most important resources
- Most important processes
- Cost structure and profit formula

Operational excellence techniques:

- Operational excellence within Taminco
- Operational excellence projects
- Impact and results of operational excellence projects
Annex 4: Taminco’s operations overview

Figure 7.4: Operations overview (Taminco, 2014d)
Annex 5: Taminco’s business model

<table>
<thead>
<tr>
<th>Customer Value Proposition</th>
<th>Target customer</th>
<th>Value offering</th>
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<tbody>
<tr>
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<td>Target segments</td>
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<td>Revenue streams from five end markets chosen based on macroeconomic trends.</td>
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Marginal model: Different margins for the different end markets based on competition, value, market landscape, and cost price.

Table 7.1: Taminco’s business model within the framework of Johnson