A cost benefit analysis in chronic medicine courier pharmacies: A case study

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It all starts here ™

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ABSTRACT

The South African pharmaceutical market is seen as part of the so called "pharmerging" markets, together with countries like India, China and Brazil. These "pharmerging" markets are the fastest growing markets within the global pharmaceutical industry. The distribution of chronic medicine in South Africa is a growing market, as the disease burden in South Africa continues to escalate, with the incidence of chronic conditions growing at a rapid rate.

The study will focus on one of South Africa's pioneer courier medication service providers, with more than twenty years' experience in the healthcare industry. The company will be referred to as Pharmacy X. The mission of Pharmacy X is to provide the right chronic medication, to the right patient, at the right place, at the right time. It is imperative to ensure that a patient receives his/her chronic medication on the scheduled date of delivery to ensure compliance and customer satisfaction.

To achieve a competitive advantage, companies increasingly depend on their supply chain partners to minimize cost and improve business processes. The core value chain activity of outbound logistics has been outsourced by Pharmacy X to several courier companies. This study will aim to understand the importance of the outbound logistics function within the value chain of the company and the costs involved with the outsourcing of the function.

The primary objective of this study was to determine the feasibility of an in-house courier operation in the Bloemfontein area versus the current outsourced courier model. In order to achieve the primary objective of the study, several secondary objectives were set and reached throughout the four chapters of this study. The study applied cost benefit analysis techniques to determine the feasibility of the Bloemfontein courier investment project. All the cost benefit analysis techniques concluded that the Bloemfontein courier investment will be a financial viable operation. The Bloemfontein courier investment will increase shareholder value over the period of the project compared to the current outsourced model.

The contribution of this case study to determine the feasibility of a courier operation investment can be of value to Pharmacy X. The current projected total courier cost of Pharmacy X for the 2013 financial year amounts to more than a third of the total operational cost. The findings within the case study can lead to a greater national roll out of courier operations in order to reduce costs and increase profit margins for Pharmacy X.

Key terms: Outsourcing; vertical integration; core business activity; outbound logistics; cost-benefit analysis; chronic medication

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

NATURE AND SCOPE OF THE STUDY

1. CHAPTER 1: NATURE AND SCOPE OF STUDY

1.1 INTRODUCTION

This study focuses on one of South Africa's pioneer courier medication service providers with more than twenty years' experience in the healthcare industry. The company is referred to as Pharmacy X. The mission of Pharmacy X is to provide the right chronic medication, to the right patient, at the right place, at the right time.

Currently Pharmacy X delivers chronic medication to more than 400,000 patients across South Africa on a monthly basis. Pharmacy X prides itself in the ability to implement sound chronic medicine supply chain systems and controls, to ensure that all their patients receive their chronic medication on time within the scope of Good Pharmacy Practises (GPP).

One of the key activities within the value chain is the final delivery of the parcel to the patient after leaving the production line and the quality assurance process. Pharmacy X decided to outsource the courier activity to numerous locally based courier companies.

Horngren (2009:419) defines outsourcing as the process of purchasing goods and services from outside suppliers rather than producing the same goods or providing the same services within the company.

Courier X is currently performing the bulk of the national outsourced courier services to Pharmacy X. Courier X delivers 52% of the current total national number of parcels distributed on a monthly basis. Within the Bloemfontein Central area, Courier X is responsible for 75% of the outsourced services.

The study will therefore investigate whether investing in a courier operation in the Bloemfontein Central area will reduce cost and increase service levels to patients.

1.2 PROBLEM STATEMENT

According to Thompson *et al.* (2012: 229) a vertically integrated company is one that participates in multiple segments or stages of an industry's overall value chain. In 2004 Pharmacy X vertically integrated backwards within the supply chain by establishing an independent pharmaceutical wholesaler.

The two main cost drivers within the business are salaries and courier cost. Due to the fact that most of the personnel are qualified pharmacists and pharmacist assistants, the scope to reduce salary costs are few. Therefore the management team of Pharmacy X are forced to constantly investigate new alternatives to try and reduce the courier cost involved in the delivering of parcels to patients.

The outbound logistics function is currently outsourced to multiple courier companies. According to Jacobs and Chase (2011:419) activities that have the potential to create differentiation between competitors, must be seen as key strategic activities, and kept under the control of the business and not outsourced to third parties.

This study aims to understand the importance of the outbound logistics function within the value chain of the company and the costs involved in the outsourcing of the function. It is imperative to ensure that a patient receives his/her chronic medication on the scheduled date of delivery to ensure compliance and customer satisfaction.

The study also aims to develop a financial comparison, to compare the cost and feasibility of a Pharmacy X owned courier operation with that of the current outsourced outbound logistics function.

1.3 RESEARCH OBJECTIVES

1.3.1 Primary objectives

The main objective of the study is to investigate and compare the feasibility of an in-house courier operation in Bloemfontein, versus the current outsourced business model.

1.3.2 Secondary objectives

The primary objective will be achieved by the following secondary objectives:

- conducting a literature study on the topics of outsourcing, vertical integration, value chain and cost benefit analysis;
- concluding an empirical study to assess the current cost per parcel charged by Courier X in the Bloemfontein area; and
- assessing, within the empirical study, the nature and significance of the capital investment and operational cost required to move the service in-house.

1.4 SCOPE OF STUDY

1.4.1 Field of study

The scope of the study is limited to the pharmaceutical industry and specifically the courier chronic pharmacy environment. The courier service provider, Courier X is currently delivering 75% of the total number of prescriptions in the Bloemfontein Central area on a monthly basis.

1.4.2 Geographical scope

The study focuses on the courier pharmacy industry in South Africa. The study takes into account all parcels delivered within the Bloemfontein Central area of the Free State Province. Thaba Nchu is a rural community situated 65.4 kilometers from the Central Business District (CBD) of Bloemfontein and will be the utmost point of delivery.

1.5 RESEARCH METHODOLOGY

1.5.1 Literature study

A literature study was concluded on the topics of outsourcing, vertical integration, value chain and several cost benefit analysis techniques, which included text books and relevant scientific articles from journals, magazines and the Internet.

1.5.2 Empirical study

The study was a case study on one of the leading courier pharmacies in South Africa. An empirical study was performed to gather data to address the problem statement and study objectives. The following aspects were taken into account during the empirical study.

Semi – structured interviews

Interviews were held with the Chief Executive Officer (CEO) of Courier X and the General Manager (GM) of another large courier company.

Data collection and analysis

The current accounting and management information system were used to gather historical data regarding costs and efficiencies.

1.6 CONCLUSION

The contribution of this case study to determine the feasibility of a courier operation investment can be of value to Pharmacy X. The current projected total courier cost of Pharmacy X for the 2013 financial year amounts to more than a third of the total operational costs. The findings within the case study can lead to a greater national roll out of courier operations, in order to reduce costs and increase profit margins for Pharmacy X.

Chapter two reflects an overview of the South African pharmaceutical industry with a specific reference to the role that courier pharmacies play within the industry. Chapter two also includes an overview of the South African courier industry with specific reference to the main cost drivers within the industry. Chapter two also shows a competitive assessment of the courier pharmacy industry, and discusses the literature topics of outsourcing, vertical integration, value chain and several cost benefit analysis techniques.

CHAPTER 2

LITERATURE REVIEW

2. CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

To achieve a competitive advantage, companies increasingly depend on their supply chain partner to drive down costs and improve processes (Lai *et al*., 2013:3038). The activity of delivering the parcel to the patient has been outsourced by Pharmacy X to several courier companies for the last twenty one years.

The delivery of the parcel to the patient is a strategic function and in certain ways the face of Pharmacy X to the patient. If not performed with the necessary care and on the agreed date of delivery, it will place Pharmacy X in a negative position, and outside the agreed service level perimeters required by medical aid schemes.

The mission statement of Pharmacy X is to deliver the right medication, at the right place, to the right person, at the right time.

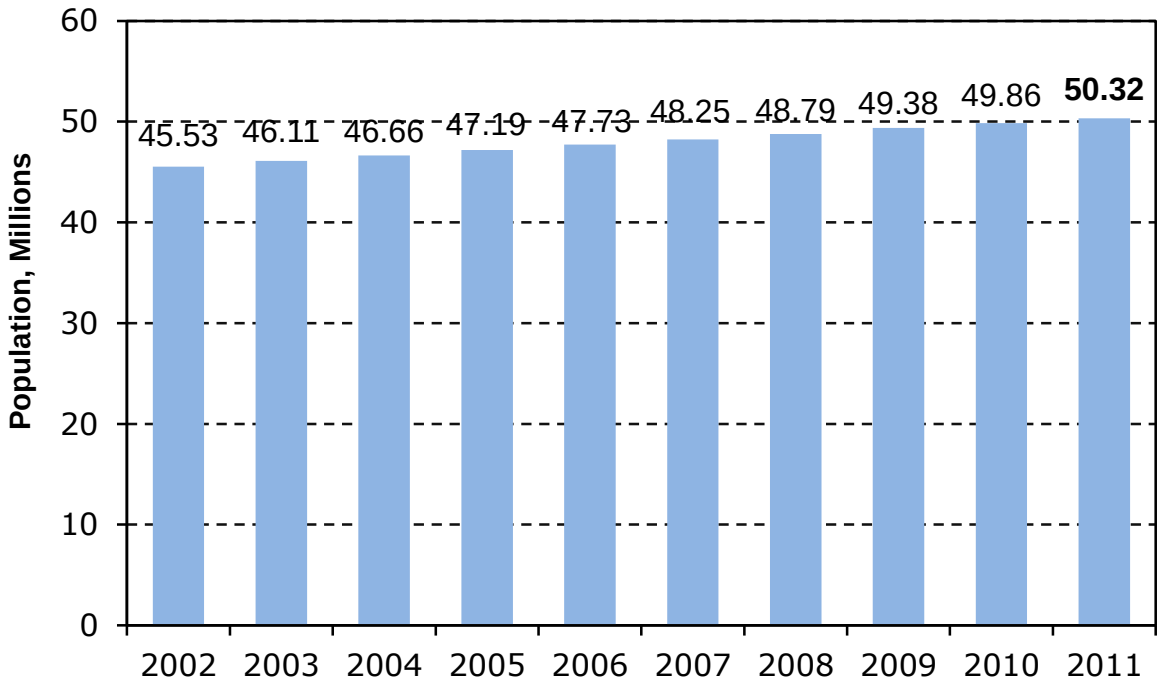
The Department of Health (DOH) produced a Green Paper in August 2011 setting the framework for implementation of a National Health Insurance (NHI) scheme over the next fourteen years. The DOH (SA, 2013c) defines a NHI system as a financing system that will provide essential healthcare to all citizens of South Africa regardless of their employment status and ability to contribute financially to the NHI fund. According to the latest update of the DOH (SA, 2013c), the objectives of the NHI scheme are as follows:

- to improve access to quality health services for all South Africans , irrespective of whether they are employed or not (SA, 2013b);
- to pool risk and funds so that equity and social solidarity will be achieved through the creation of a single NHI fund (SA, 2013b);
- to procure services on behalf of the entire population and efficiently mobilise and control key financial resources (SA, 2013b); and

- to strengthen the under resourced and strained public sector in order to improve the health system's performance (SA, 2013b).

In 2011, the total South African population amounted to just over fifty million people as shown by Figure 2.1 below (Statistics South Africa, 2012:5). During 2011, 70.7 % of households attended public clinics and hospitals as a first option when family members got injured or fell ill (Statistics South Africa, 2012:2). In 2011, 89.8% of the households visiting public health clinics and hospitals facilities made use of their nearest public health facility (Statistics South Africa, 2012:2).

Figure 2.1: South African population in millions

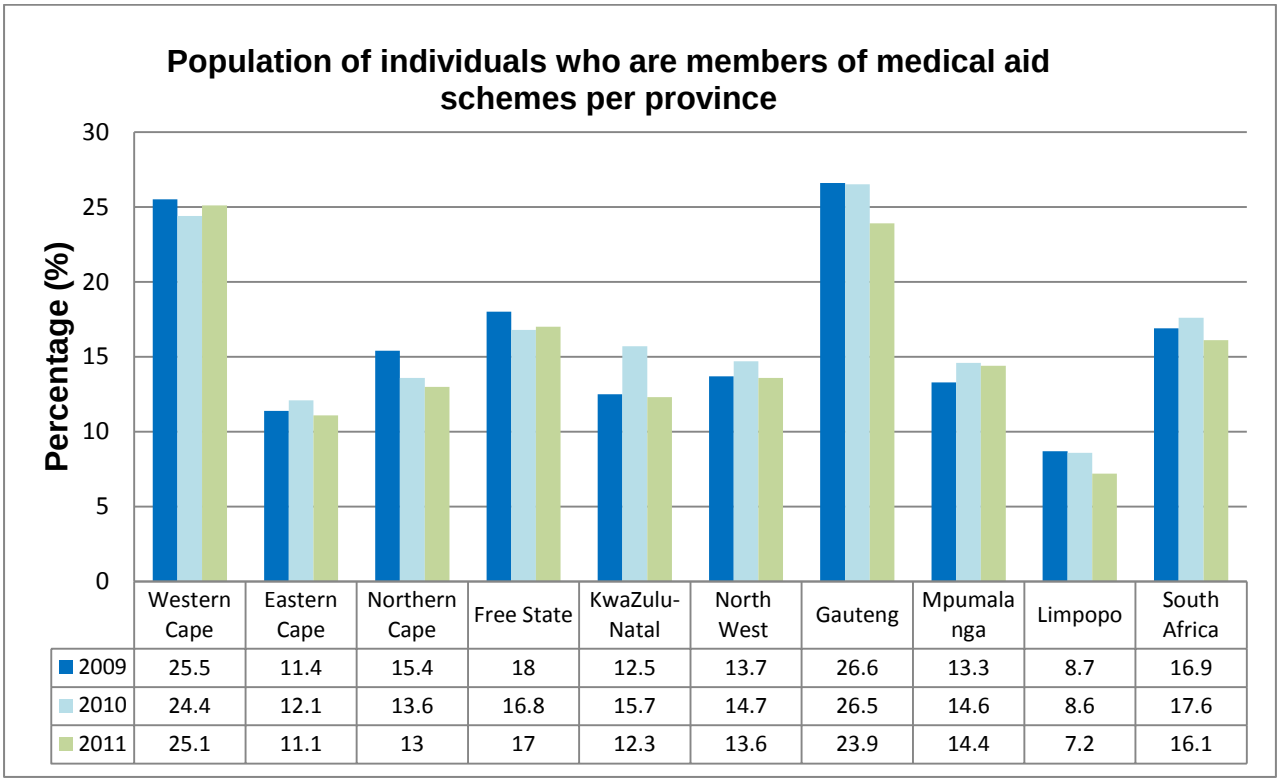


Source: Statistics SA General Household Survey 2011

A relatively small number of South African individuals belonged to a medical aid scheme in 2011. As illustrated by Figure 2.2 below, only 16.1% of individuals belonged to a medical scheme (Statistics South Africa, 2012:82). The concerning factor is that the figure reflects a negative growth compared to the 17.6% in 2010. The Western Cape has the highest percentage of individuals on a medical aid, amounting to 25.1%,

followed by Gauteng at 23.9%. The Limpopo Province has the least amount of individuals on a medical aid with only 7.2%.

Figure 2.2: Population of individuals who are part of a medical scheme

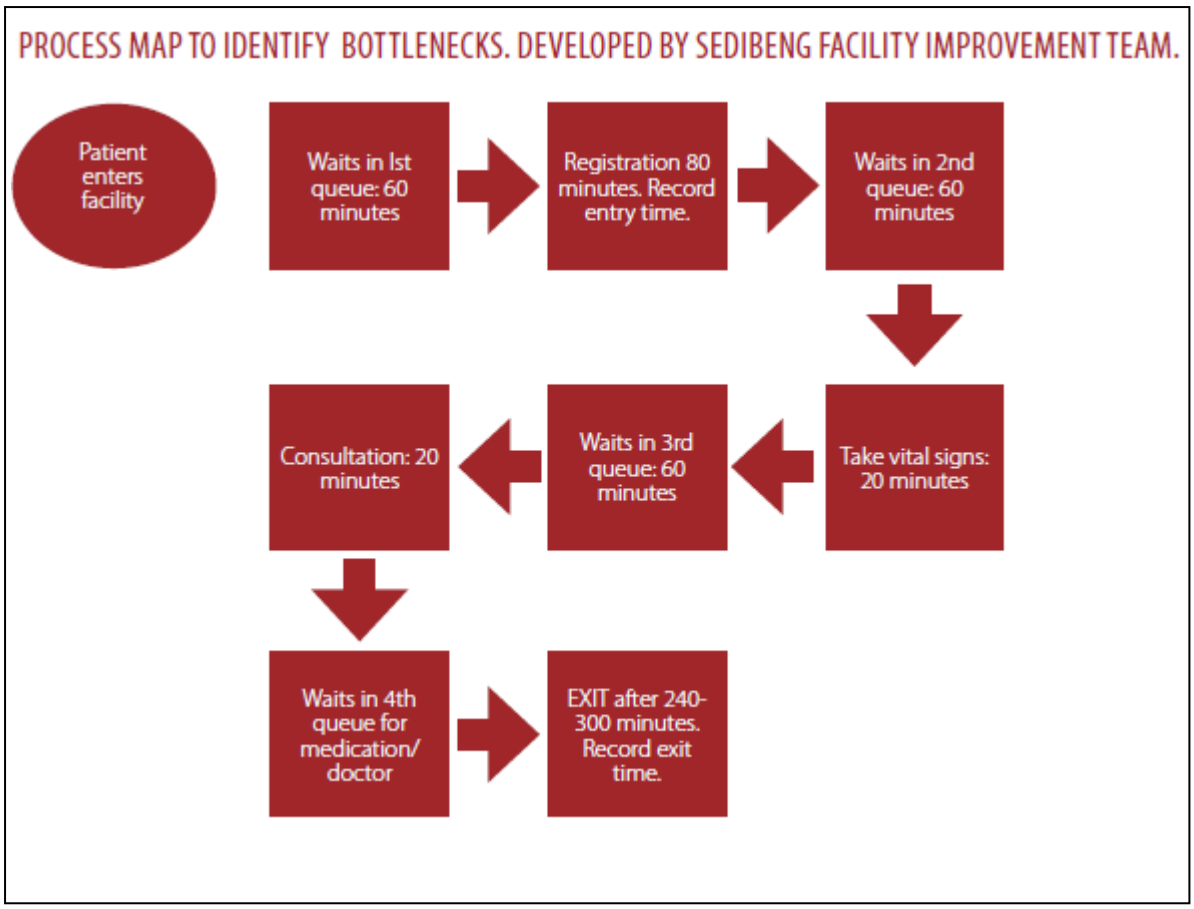


	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo	South Africa
2009	25.5	11.4	15.4	18	12.5	13.7	26.6	13.3	8.7	16.9
2010	24.4	12.1	13.6	16.8	15.7	14.7	26.5	14.6	8.6	17.6
2011	25.1	11.1	13	17	12.3	13.6	23.9	14.4	7.2	16.1

Source: Statistics SA (2011)

NHI is planned to be implemented over the next fourteen years with the first pilot projects in 2013. According to the DOH (SA, 2013c) they have completed audits on all three thousand and eighty eight public sector health care facilities. The biggest concern highlighted by the audit is the waiting time of patients. According to the DOH audit findings, the average patient spends between two hundred and forty and three hundred minutes in a clinic (SA, 2013c). Therefore patients spent on average between four and five hours to collect their medication from the facility as shown by Figure 2.3 below.

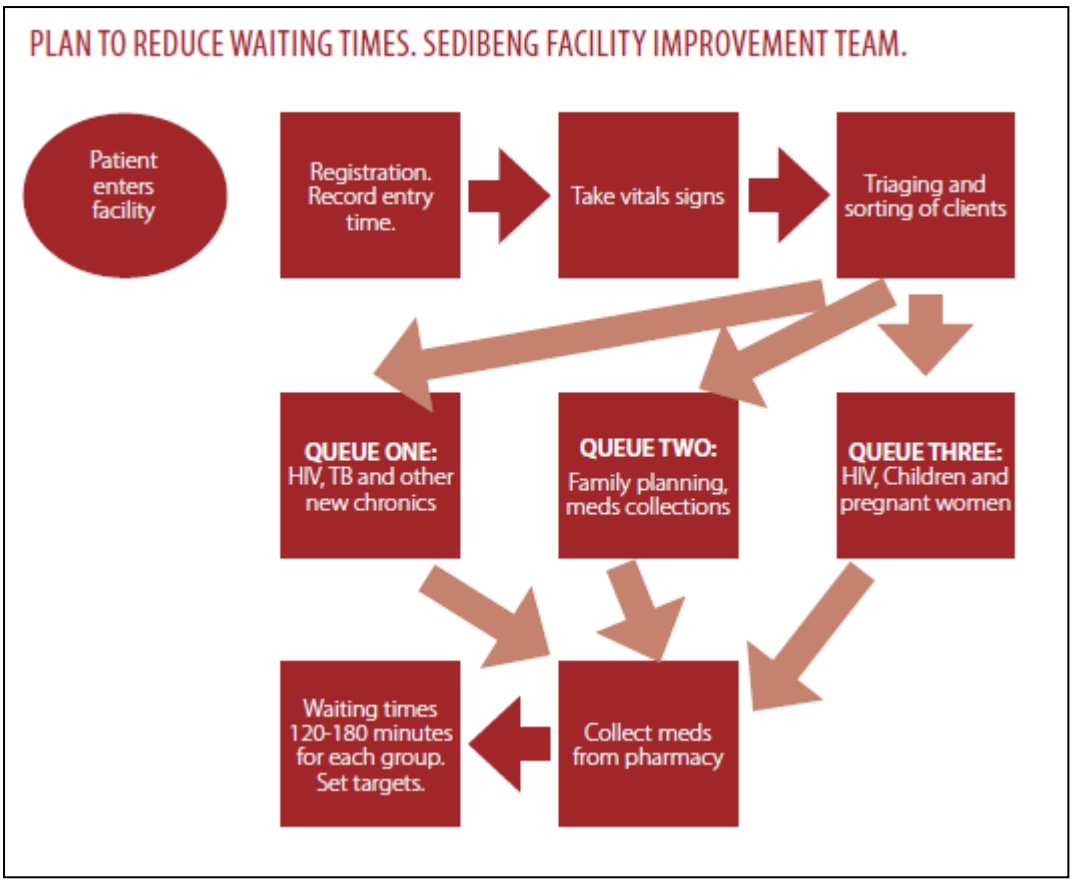
Figure 2.3: Bottlenecks in medicine collection



Source: SA (2013b)

Chronic medicine is high on the priority list of the NHI task team, as it would assist with the decongestion of hospitals and clinics. As shown by Figure 2.4 (SA, 201c), the facility improvement team has already indicated plans to separate the chronic patient collections in order to improve on the waiting time. Figure 2.4 below shows that waiting times can be reduced to between one hundred and twenty and one hundred and sixty minutes, by separating the collection of chronic medicine. It is alarming that after the process flow analysis a patient still has to wait for three hours to collect medicine.

Figure 2.4: Process flow to reduce waiting times of patients



Source: SA (2013c)

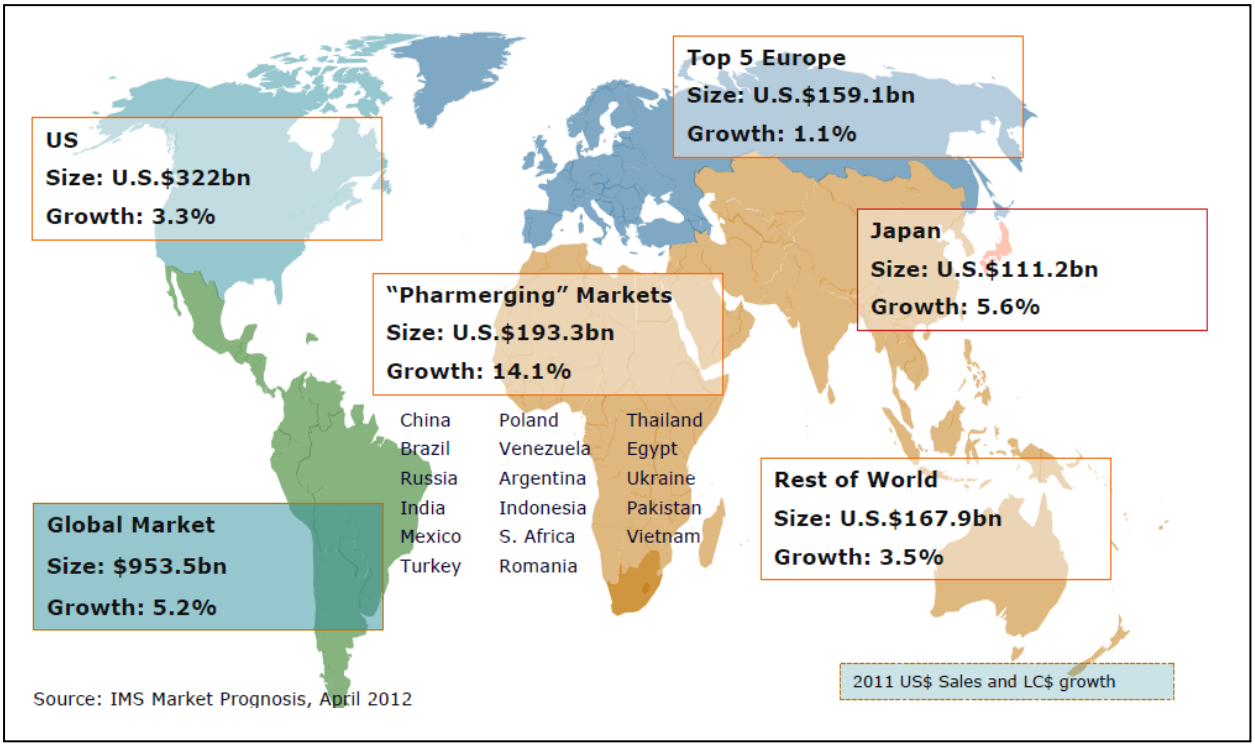
In addition to the congestion challenge, the Minister currently faces insufficient national infrastructure with not enough clinics, hospitals or qualified clinical staff. Due to the long waiting hours, patients need to take a day's leave from their work in order to collect their medication. Travelling to the nearest clinic also has a cost impact on the patient, since they have to pay for transport to reach the clinic.

The Pharmacy X business model supports the strategy of the minister to decongest hospitals and clinics and to make medicine more affordable and accessible. The Pharmacy X business model can take medicine to the door step of a patient. Pharmacy X has the ability and resources to handle large prescription volumes and the capacity to assist the Government with any pilot projects to improve their service delivery. The enterprise resource planning (ERP) system will also assist to enforce patient compliance and ensure accurate record keeping.

2.2 PHARMACEUTICAL INDUSTRY OF SOUTH AFRICA

South Africa is seen as part of the so-called "pharmerging" markets, together with countries like India, China and Brazil. As illustrated by Figure 2.5 below the so-called "pharmerging" markets are the fastest growing markets and reflect an annual growth of 14.1%. The more mature markets like the United States and Europe are growing at 3.3% and 1.1% respectively. The global market is growing at 5.2% and amounts to 953, 5 billion United States dollars per annum.

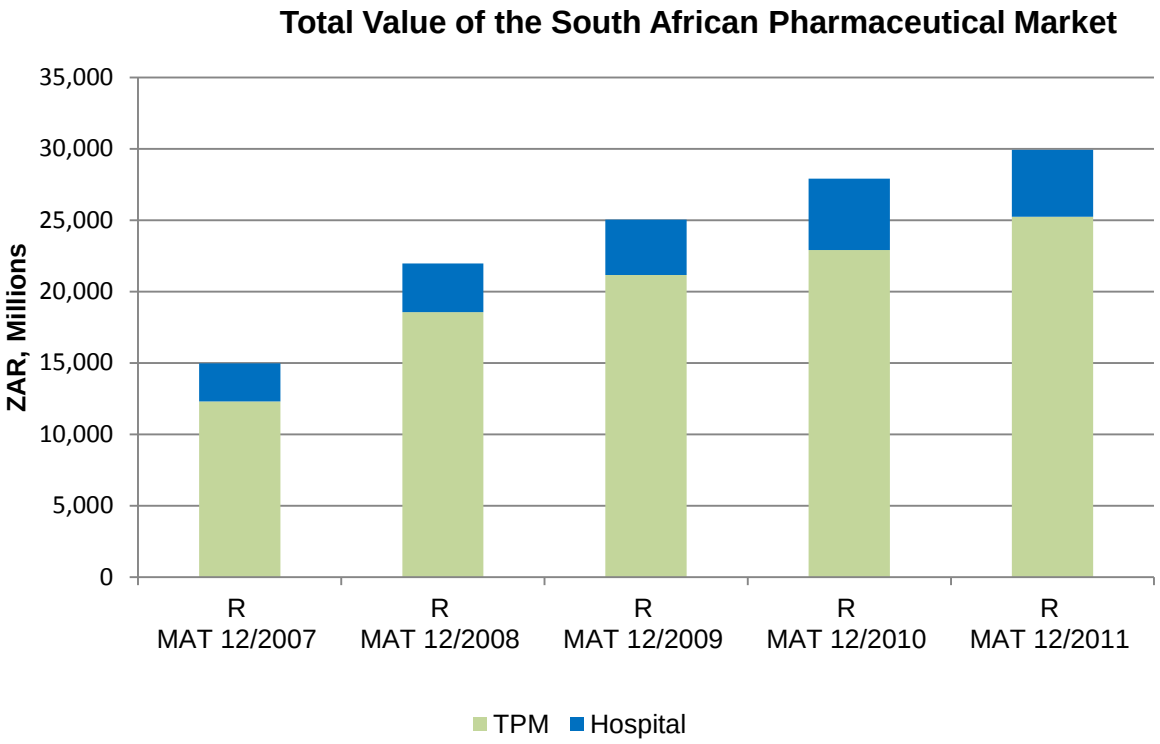
Figure 2.5: International Pharmaceutical Markets and Growth



Source: IMSHealth (2012)

The South African pharmaceutical industry has a total market value of thirty-billion rand per annum, as shown in Figure 2.6 below. The private sector has grown at an 11% compounded annual growth rate (CAGR) and the public sector at a 10% CAGR, over the last 5 years.

Figure 2.6: Total Value of the South African Pharmaceutical Market



Source: IMSHealth (2012)

The two main drivers for future growth in the South African market, as stated by IMSHealth are as follows:

- The gradual introduction of the National Health Insurance (NHI) system, aims to increase healthcare coverage throughout the country;
- HIV antiviral remains a high growth therapy area due to the spread of the disease and the increase in patient access to affordable therapy.

2.3 COURIER INDUSTRY OF SOUTH AFRICA

The courier services industry is a highly competitive industry, consisting of a large number of players. The estimated number of medium to large courier companies within the local market is between thirty and forty. The market also consists of 2000 to 3000 small courier companies (Coetzer, 2012a). Courier delivery services are seen as a

premium service, and are therefore more expensive than the standard mail service providers (Swanepoel, 2013).

The range of services on offer from South African courier service companies have broadened extensively over the past few years, and courier companies are playing a greater than ever role in the supply chain (Coetzer, 2012b). Courier companies help to close off the last mile of the supply chain, by delivering products faster in a climate where the trend is to move products as fast as possible. Therefore the speed of courier services makes the supply chain more efficient and flexible (Coetzer, 2012b). General macro-economic conditions have forced clients to cut costs within their businesses. Courier costs are often seen by businesses as one of their targets to reduce costs (Swanepoel, 2013). Companies do this by moving more towards an economy type of service or horse trading between courier service providers. Clients now go to the market via a tender process, not so much to leave their current courier provider, but to force prices down (Swanepoel, 2013).

According to Vosloo (2013b), the main cost drivers within the industry are:

- third party contracted drivers contributing 24% of the operational costs;
- line-haul and airline companies charging amounts of up to 12% of the operational costs;
- fuel and oil expenses being 3% of the total operating costs; and
- salaries of all staff members making up 20% of the total expenses.

According to Vosloo (2013a), the average net profit before tax for courier companies is currently between 7% and 10%. There are however a few players in the market that are currently achieving a 15% net profit before tax (Vosloo, 2013a).

South Africa is geographically very large and therefore couriers need to travel far to make a single delivery (Swanepoel, 2013a). Due to the high degree of competition in the road-based logistics sector, competitors are forced to consolidate (Ruske *et al.,* 2010:43). Within the fast moving consumer goods industry, companies start to vertically integrate by taking control of their own warehousing and distribution. As a

consequence of the vertical integration, logistics companies in South Africa now not only compete against each other but also against their clients (Ruske *et al.,* 2010:43).

2.4 COMPETITIVE ASSESMENT OF THE COURIER PHARMACY INDUSTRY

Longenecker *et al.* (2007:98) describe a competitive advantage as when an organisation offers a product or service that is alleged by customers to be superior to those of competitors and consequently encouraging an organisation's profitability.

Longenecker *et al.* (2007:98) also state that some of the most common paths that can lead to competitive advantage include distinctions based on price/value, unique service features, notable product attributes, customer experiences and accessibility.

Competitive advantages are typically short-term for the reason that competitors often seek ways to duplicate the competitive advantage. This is why it is essential for a company to develop a strategy based on a new or sustainable competitive advantage.

As Pharmacy X was the first national courier pharmacy in South Africa, which still remains their core business today, they gained a first-mover advantage. The first-mover advantage occurs when an organisation can significantly impact its market share by being first to market with a competitive advantage (Baltzan & Phillips 2010:16).

Unfortunately several competitors entered the market and pursued ways to duplicate Pharmacy X's competitive advantage after them gaining the first-mover advantage. Therefore, it is crucial for the management of Pharmacy X to constantly analyse and review the current strategies and the business model of Pharmacy X.

Organisations use analytical tools like Porter's Five Forces Model to analyse and develop competitive advantage strategies (Baltzan & Phillips 2010:16).

2.4.1 The Five Forces Model

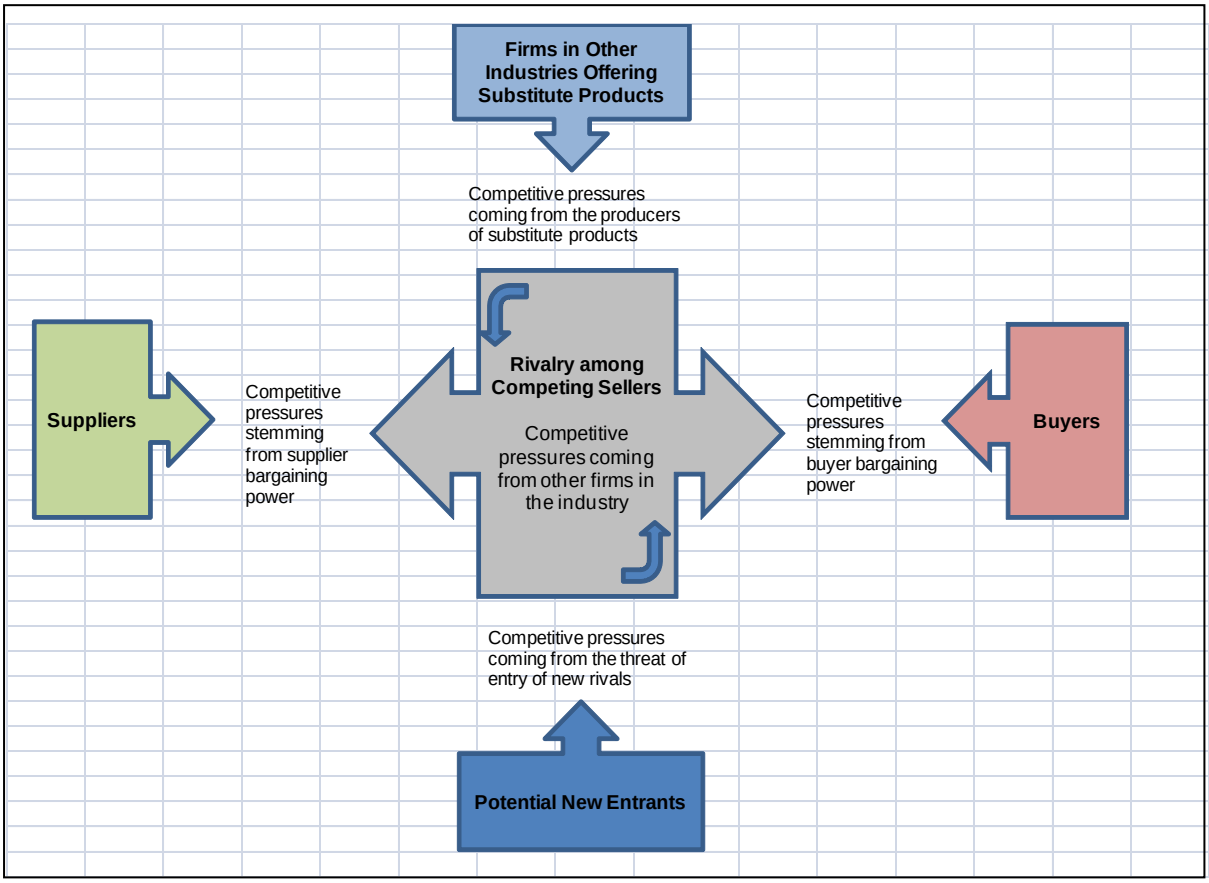
The character and strength of competitive forces functioning in an industry are never the same from one industry to another (Thompson *et al*., 2012:102). The Five Forces Model was developed by Porter, and illustrates that the competitive forces affecting

the industry's profitability, go beyond the rivalry among competing sellers in the market. Porter identified a further four coexisting sources that create pressures within an industry (Thompson *et al*., 2012:102).

As reflected by Figure 2.7 below, the five competitive forces include:

- competition from rival sellers;
- competition from potential new entrants;
- competition from producers of substitute products;
- supplier bargaining power; and
- buyer or customer bargaining power.

Figure 2.7: Porter's five forces model



Source: Thompson *et al*. (2012:103)

Porter's Five Forces Model can assist Pharmacy X to determine and evaluate the strength of each force within the industry. To determine the degree of pressure from

each force within the industry, the author will classify the strength of the force as strong, moderate or weak.

Rivalry among existing competitors (moderate)

Rivalry among existing competitors is very strong. The contracts with the medical aids to deliver medication to their patients are usually tender-based and for a three-year period. All the players within the market actively participate on each tender presented. Patients' cost to switch to an alternative courier pharmacy is very low, if any.

Pharmacy X has the competitive edge when it comes to the availability of capacity and resources to take on any new medical schemes or private patients.

Threat of new entrants (weak)

Although there are risks of new entrants entering the market, it is still very low. The chronic courier pharmacy industry is a very low-margin industry. The initial capital outlay is very high due to the equipment and technology needs of the business model. Companies within the industry need prescription volumes due to the low margins to benefit from the economics of scale principle. Therefore it is very difficult for new entrants to start on a small scale and generate profits. The biggest cost advantage held by Pharmacy X is the technological development behind the in-house developed ERP system.

This system has been developed over the last twenty-one years, and is reflected as an intangible asset on the balance sheet of Pharmacy X.

As discussed above, it is only large pharmacy chain groups with strong balance sheets that will opt for the courier model as an additional option for their patient base.

Threat of substitute products or services (strong)

There are currently not a lot of medical aids opting for the chronic courier pharmacy option. Most of the medical aids still prefer to give the patient the choice whether they want to collect their medication via a retail pharmacy or a courier pharmacy model.

On the other hand, the major corporate pharmacy groups like Clicks and Dis-Chem started with their own courier delivery options to patients. The Clicks Group has launched a courier pharmacy company called Direct Medicines as an added benefit to

patients. Clicks also has a national retail pharmacy network with over three hundred and fifteen pharmacies across South Africa (Clicks, 2013).

Dis-Chem currently owns seventy-one retail pharmacies across South Africa. Dis-Chem started their own courier initiative called Dis-Chem Direct as an alternative delivery option to their customer base of chronic patients (Dis-Chem, 2013).

The biggest anticipated change within the pharmaceutical industry will be the newly proposed National Health Insurance (NHI) system as discussed in the beginning of Chapter two.

Supplier power (moderate)

All scheduled medication in South Africa is regulated and approved by the Department of Health (DOH) and Medicine Control Council (MCC) of South Africa. The pricing of scheduled medicine is further regulated by the DOH, by applying their Single Exit Pricing (SEP) policy. A full explanation of the SEP pricing model will be provided in Chapter three of the study.

There are several local and multi-national pharmaceutical role players in the South African market. Therefore some molecules are highly commoditised, with several generic players in the molecule class. Supplier power fluctuates from product to product and supplier to supplier.

If a product of a pharmaceutical manufacturer is patent protected and there are no generic substitutes available, the power of suppliers is high. If the product patent protection expires and generic players launch their product in the market, the supplier power drops. Two to three generic players will often launch at the same time. The new generic players will reduce the price of the molecule to create market shares.

There are no additional costs involved for Pharmacy X or the patients to switch their purchase to a new alternative supplier, thus weakening supplier power.

Buyer or customer power (strong)

Although there are not many courier pharmacies to choose from in South Africa, customer buyer power is high. Buyer power is high as patients have the option to

choose between a retail pharmacy environment and the courier pharmacy option to receive their chronic medication.

Customer buyer power also increases due to the fact that the product offering is standardised and undifferentiated. Pharmacy X provides scheduled chronic medication to their patients. A patient in possession of a doctor's prescription can collect their medication at any pharmacy within South Africa.

The next section of the study will focus on the literature of outsourcing. The current outbound logistics function of Pharmacy X is outsourced to several courier companies.

2.5 OUTSOURCING

Outsourcing has emerged as one of the most popular and widely adopted business strategies of the globalised era (Jain & Natarajan, 2011:294). Companies around the globe are looking for new approaches to sustain and develop a competitive advantage. According to Jafarnejad *et al*. (2013: 2646) outsourcing can be such an approach, and one of the key strategies that can lead to greater competitiveness. The advantages of outsourcing can be operational, strategic or both (Jafarnejad *et al*., 2013:2646). Since the 1980's there has been a trend of outsourcing amongst organisations and across various industries. Organisations started to outsource basis activities like information systems (IS), but advanced swiftly by outsourcing more strategic and core business functions (Jain & Natarajan, 2011:294-295).

Outsourcing, as defined by Thompson *et al*. (2012:235) involves a conscious decision to give up attempts to perform certain value chain activities internally and instead, to transfer them to outside specialists.

McKenna and Walker (2008:216) define outsourcing as the delegation of non-strategic or non-core tasks, processes, and resources to external organisations or consultants. These outsourced tasks can be better performed by those entities or consultants due to their specialised knowledge, competencies and resources.

With in-sourcing, companies make the decision to keep tasks, processes and key resources within the organisation. Companies do this by contracting with an external

entity or consultant to work within the organisation as part of the "team" but subject to the agreement of the tasks to be performed by the external party (McKenna & Walker, 2008:217).

Burton (2013:37), states that the main reasons in favour of the decision to in-source relate to:

- the protection of the proprietary technology and intellectual property of the business;
- maintain control over critical core production and strategic processes or competencies within the business; and
- minimize risk in the supply chain.

Outsourcing initiatives are the key to a company's efforts to focus on its core competencies, revise entrenched practises and to accomplish significant cost reduction in non-core business processes (Holweg & Pil, 2012:98).

The following advantages and benefits of outsourcing certain value chain activities were identified:

- When an activity can be performed better or less costly by an outside specialist (Thompson *et al.,* 2012:235) - outsourcing allows companies to maximise the return on their internal resources and is a very effective method to reduce cost, free up capital and improve quality and services to the customer (Jafarnejad *et al*., 2013:2646).
- When the outsourced activity is not seen as essential to the firm's ability to achieve a sustainable competitive advantage and won't mitigate its core competencies (Thompson *et al.,* 2012:235) - outsourcing may lead to situations were companies end up relying too much on the outsourcing vendor. If companies outsource strategic and core activities that will create differentiation in the market, they stand the risk of losing their competitive advantage, internal competencies and innovation capabilities (Jain & Natarajan, 2011:298).

- When outsourcing streamlines a company's operations in ways that improve the organisational flexibility and speed of delivering the service or goods to the market (Thompson *et al.,* 2012:235) - supply chains become more flexible, lean and agile, and deliver better value to the customers when organisations outsource activities and processes to outside specialists (Giumaraes & De Carvalho, 2013:139).

- When outsourcing lessens the company's risk exposure to new-generation technology and customer buying preferences. As a company outsources certain services, parts or components, the supplier must bear the burden of rapid new innovation changes or the introduction of new products or services. The company will be able to switch to an alternative supplier if the current supplier cannot provide the required new-generation goods or services (Thompson *et al.,* 2012:236).

- Outsourcing allows a company to speedily and efficiently bring together diverse kinds of expertise and capabilities from multiple outside suppliers, rather than trying to build the competencies from scratch within its own workforce (Thompson *et al.,* 2012:236).

- Outsourcing allows companies to concentrate and apply its resources to its core competitively valuable business activities. If companies focus on these activities that they can do better than an outside supplier, it will improve the overall business performance and enhance customer service (Thompson *et al.,* 2012:236).

The following risks of outsourcing certain value chain activities were identified:

- According to Thompson *et al.* (2012: 236), the greatest risk of outsourcing is that a company will outsource too many, or the wrong type of activities and thereby deplete its own competencies and innovative capabilities.

- Outsourcing also increases the risk of data integrity and data confidentiality (Jain & Natarajan, 2011:298).

- The lack of control and management of the vendor relationship on a contractual, or arm's-length basis alone can lead to unexpected delays, cost overruns and poor realization of the expected benefits (Thompson *et al.,* 2012:236).

- The outsourcing of an activity usually involves retrenchments and layoffs of personnel. Resistance from employee unions can play a major role in the process and decision to outsource (Jacobs & Chase, 2011:418).

Table 2.1 below is a framework to assist management in the decision-making process. Within the below framework, the decision is based on more than just what is "core" and "non-core" to management. The framework applies a continuum that ranges from vertical integration to arm's-length relationships as the basis for the decision-making process (Jacobs & Chase, 2011:418). The framework evaluates the activity by using the following three characteristics (Jacobs & Chase, 2011:418):

- Required coordination. The coordination refers to the difficulty of how well the activity will integrate with the overall business process.

- Strategic control. Strategic control refers to the risk and degree of losses associated with the dismissal of the relationship. There might be several losses as per Table 2.1 below, i.e. knowledge of major customer relationships.

- Intellectual property. The possible loss of intellectual property through the relationship.

Table 2.1: A framework for structuring supplier relationships

	Vertical Integration (Do Not Outsource)	Arm's - Length Relationship (Outsource)
Coordination	"Messy" interfaces; adjacent tasks involve a high degree of mutual adaptation, exchange of implicit knowledge, and learning-by-doing. Requisite information is highly particular to the task.	Standardized interfaces between adjacent tasks; requisite information is highly codified and standardized (prices, quantities, delivery schedules, etc.).
Strategic Control	Very high: significant investment in highly durable relationships, specific assets needed for optimal execution of tasks. Investment cannot be recovered if relationship terminates: • co-location of specialized facilities; • investment in brand equity; • large proprietary learning curves; and • long-term investment in specialized R&D programs.	Very low: assets applicable to business with a large number of other potential customers or suppliers.

Intellectual property	• unclear or weak intellectual property protection; • easy-to-imitate technology; and • "messy" interfaces between different technological components.	• strong intellectual property protection; • difficult-to-imitate technology; and • "clean" boundaries between different techno logical components.

Source: Jacobs and Chase (2011:419)

The next section of the study focuses on the literature of vertical integration. The section specifically emphasises the advantages and disadvantages of vertical integration. The section also includes a discussion on the different types of vertically integrated strategies.

2.6 VERTICAL INTEGRATION

According to Thompson *et al.* (2012:229), a vertically integrated company is one that participates in multiple segments or stages of an industry's overall value chain. The vertical integration strategy of the company can expand the company's range of activities backward into sources of supply and/or forward towards the end consumer.

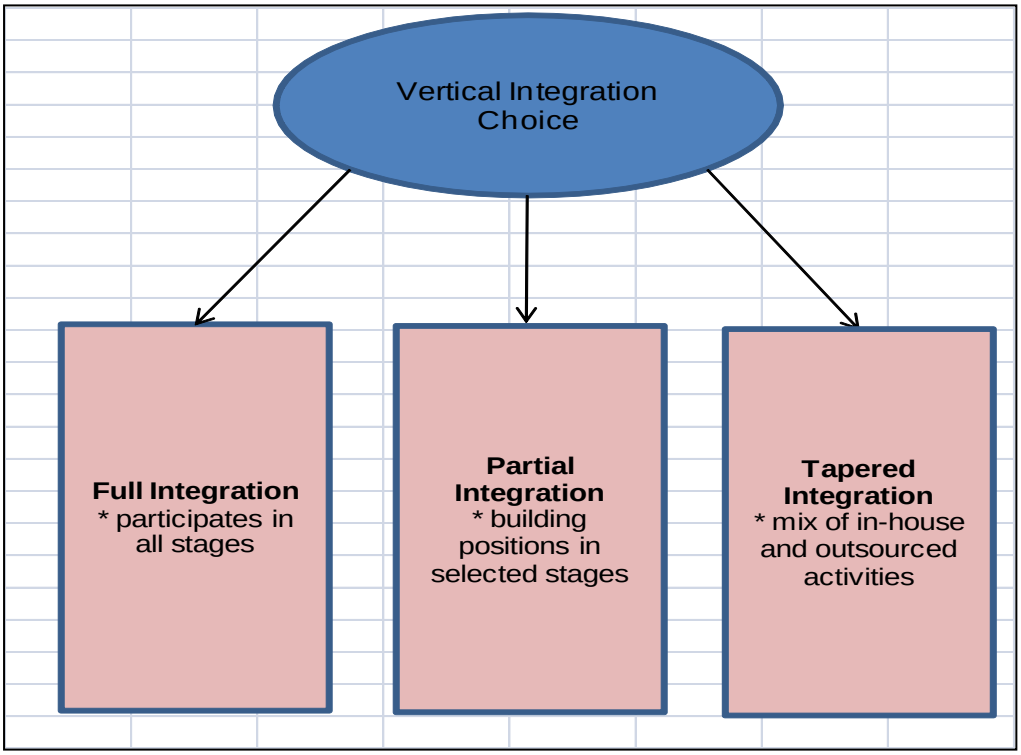
Increasing a company's vertical scope by means of a vertical integration strategy, provides another way to strengthen the company's position in its core business. It is important to make a distinction between "core" and "strategic" activities within the business (Jacobs & Chase, 2011:419). Core activities are key to the business, but do not present a competitive advantage. For instance, the picking, packing and quality control of a prescription in the production line are normal pharmaceutical activities that can be performed by all competitors in the market. Strategic activities are a key source of competitive advantage for the business, such as the procurement and efficient supply of medication from the group wholesaler to Pharmacy X. Strategic activities that

create these differentiations must be kept under control of the business and not outsourced to third parties (Jacobs & Chase, 2011:419).

In 2004 the group that Pharmacy X forms part of, decided to integrate backwards into the industry value chain, and started an independent pharmaceutical wholesaler. The newly established wholesaler exclusively procured medicine from the pharmaceutical manufacturers for Pharmacy X. Previously Pharmacy X had to procure their daily stock needs from various pharmaceutical wholesalers within the area. The backward integration decision in 2004 has been a huge success for the group, as the newly found wholesaler contributed richly towards better profit margins and production efficiencies.

According to Thompson *et al.* (2012:231), the vertical integration investment will only yield a benefit for the company if the investment reduces costs to increase profits or creates a differentiation benefit. As illustrated by Figure 2.8 below, a company can decide on different vertical integration strategies.

Figure 2.8: Vertical integration strategies



Source: Thompson *et al.,* 2012:231

The aim of a full integration strategy is to participate in all stages of the vertical chain (Thompson *et al.,* 2012:231). Companies opting for a partial integration strategy will position themselves in certain stages of the vertical chain (Thompson *et al.,* 2012:231). Companies can also employ a tapered integration strategy which involves a mix of in-house and outsourced activities in any given stage of the vertical chain (Thompson *et al.,* 2012: 231).

Thompson *et al.* (2012:233-234) identified the following drawbacks of vertical integration:

- Vertical integration increases a company's business risk due to the further capital investment in the industry. There is always the risk that the industry's profitability and growth can decline.
- Vertically integrated companies are often sluggish to embrace technological advances or more efficient production methods. Companies that are not integrated, can shop around to obtain the latest and best products and services in the market.
- Vertical integration can potentially result in less flexibility in accommodating shifting buyer preferences when new products and services are available in the market.
- Vertical integration may not allow for smaller companies to realise economies of scale if the production levels are below the minimum efficiency scale.
- Vertical integration often calls for radical new skills and business capabilities to be acquired. Management must be sure that the company will be able to acquire the skills and capabilities needed to operate in the new stage of the vertical chain, before they invest time and money.

The next section of the study focuses on the literature of value chain activities within an organisation. This section of the study discusses the primary and support activities that deliver the product or service attributes that are considered to be necessary to create customer satisfaction and build a competitive advantage.

2.7 VALUE CHAIN

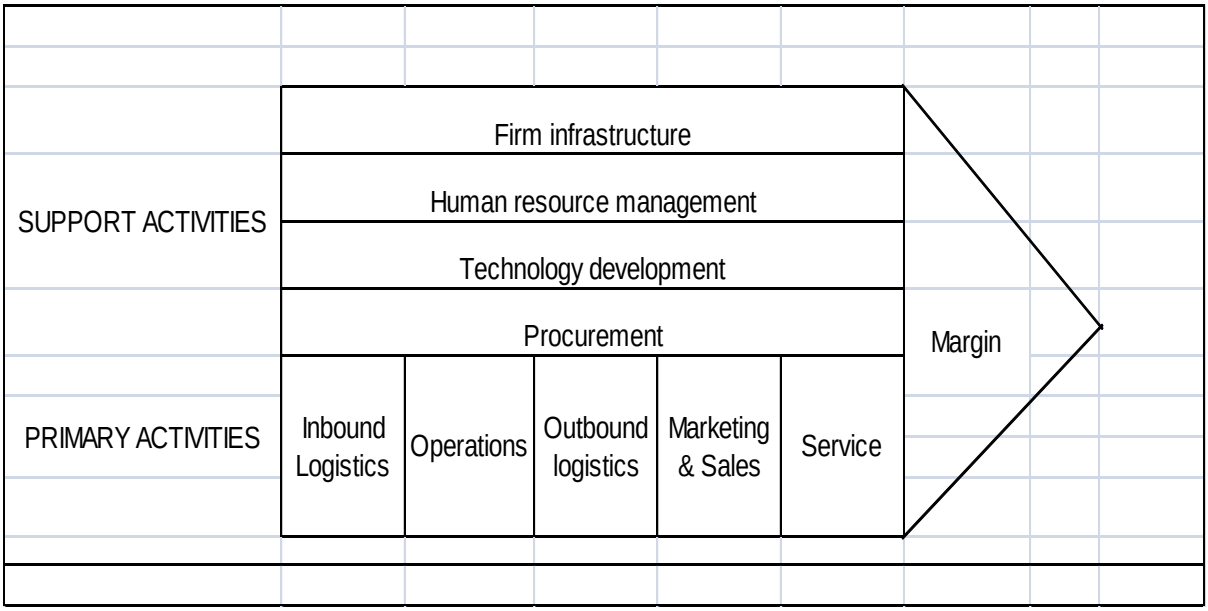
Every aspect of an organisation contributes to the success or failure of the chosen strategy. The business processes of the organisation and the value chain they create play an integral role in the strategy execution. The supply chain of an entity is the network that integrates the planning, production and delivery of services and goods (Acharyulu & Shekbar, 2012:92). The value chain is an extension of the supply chain that includes demand planning, defining of the key markets to penetrate and to determine customer needs and requirements. According to Acharyulu and Shekbar (2012:92), the value chain of the organisation is the next logical step to cut costs and increase return on investment (ROI).

According to Baltzan and Phillips (2010:21), the value chain approach divides a business into a series of processes, with each process adding value to the product or service for the customer. The importance of the value chain approach is to create a competitive advantage by enabling the organisation to provide unique value to its customers (Baltzan & Phillips, 2010:22).

The value strategy of the organisation is the basis for coordinating the processes which result in customer satisfaction. Value delivery therefore comprises all those activities involved in delivering the product or service attributes that are considered to be necessary to create customer satisfaction, and to maintain an on-going, long-term relationship with customers, and in so doing, build a competitive advantage (Walters & Jones, 2001:319).

The value chain is not a new concept. Porter developed a generic value chain model which is applicable to a wide range of entities in 1985. Porter's generic model is shown in Figure 2.9 below.

Figure 2.9: Porter's generic value chain



Source: Jacobs and Chase (2011:492)

Porter's generic value chain consists of both primary and support activities. The function of both the primary and the support activities is to enable the organisation to generate the ultimate objective of a profit margin. According to Thompson *et al.* (2012:157), the principal objective of the primary activities is to create value for customers. The support activities must enhance and facilitate the primary activities to obtain the value for the customers (Thompson *et al.,* 2012:157). Thus, the value chain has an expanded role and becomes an integral component in management's strategy process of the organisation. The value chain will also assist management in the evaluation of the organisation's core competencies, processes and assets, and their response to the opportunities and threats posed by the business environment (Walters & Jones, 2001:320). As shown by Figure 2.9 above the primary activities are as follows:

- Inbound logistics activity. This function is responsible for the activities, costs and assets associated with the procurement, receiving and storing of goods. Inventory and supplier management plays an integral part of the activity to ensure that the goods are readily available when needed by the production activity.

- Operations activity. The operations function includes all activities, costs and assets associated with the input of raw materials that are converted into a finished product.

- Outbound logistics activity. The outbound logistics activity includes all the activities, costs and assets that ensure a successful delivery of the finished goods to the customer or buyer. These activities include the storage of the finished goods, collection and distribution of the finished goods and the management of a delivery fleet and network of buyers.

- Marketing and sales activity. The marketing and sales function serves as a conduit process in the value chain. The function includes all the activities, costs and assets that identify customer expectations and markets to deliver the products or services. The marketing and sales division must also communicate the value proposition to the customers and manage the organisation's relationships with its customers during the entire delivery process.

- Service activity. The service function includes all the activities, costs and assets associated with assisting the customer or buyer after receiving the finished goods. The activities can include technical assistance, installation guidelines, maintenance and repairs of the goods and complaints and query resolution.

The primary activities are facilitated and enhanced by the following support activities:

- Firm infrastructure activity. This activity relates to the organisation's infrastructure capacity planning and available resources. Such activities can include legal, financial and regulatory activities. Other activities can be management of information systems, to assist management with decision-making and quality management systems, and to ensure quality within the value chain activities.

- Human resource management activity. The human resource function includes all the activities, costs and assets associated with the recruitment, employment development and training of staff and all labour related issues.

- Technology development activity. The technology development function includes all the activities, costs and assets associated with research and development of products, technology development and system enhancements.

- Procurement activity. The procurement function includes all the activities, costs and assets related to the purchasing of materials, equipment and services. The procurement activity must create strategic partners and alliances with key suppliers of goods and services. The procurement function must ensure a constant supply of goods and services to the other value chain activities. Efficient procurement of goods will ensure flexibility, and create cost reduction to increase profit and customer satisfaction.

The value chain of a company is a fundamental part of the company's strategic intent and future thinking process to ensure that the company gains a sustainable competitive advantage. An organisation can achieve a competitive advantage by managing its value chain better than other competitors within the industry.

Managing the value chain implies increasing the quality of products, services and processes while reducing costs and increasing revenue, thus increasing the competitive advantages and profits of the company.

The next section of the study will focus on the literature of four cost benefit analysis techniques. The four cost benefit analysis techniques will be applied in chapter three to determine the feasibility of the courier investment project.

2.8 COST-BENEFIT ANALYSIS

One of the biggest challenges that all companies face in these difficult economic times, is whether or not to invest in large capital projects. An investment strategy and ultimately, the decision to make an investment, are based on whether the investment will realise additional returns, greater to the required return rate of the shareholders of the company (Linn, 2011:68). A cost benefit analysis (CBA) can be used to determine whether the favourable results of an alternative are adequate to justify the cost of taking that alternative (Linn, 2011:68).

According to Linn (2010:32), there are various methods to conduct a CBA. Linn (2010: 32) highlights that the late management guru Peter Drucker suggested that companies should look at more than one method to fully understand a proposed investment.

For the purpose of this case study, four analytical methods are discussed in this chapter and applied in Chapter 3, to determine if the courier investment project is feasible. The four analytical methods are:

- Net Present Value (NPV);
- Internal Rate of Return (IRR);
- Profitability Index (PI); and
- Sensitivity Analysis.

To create a better understanding of the NPV, IRR and PI, a practical example is applied during the literature study below. Project A and Project B are equally risky and will be compared to determining which one holds the highest value for shareholders. Table 2.2 below reflects the initial investment amount and future cash inflow for each year over a four year period.

Table 1.2: Net cash flow of Project A and Project B

Net Cash Flow for Project A and B (CFt)					
Project A					
Year (t)	0	1	2	3	4
Cash Flow (CFt)	-1,000	500	400	300	100
Project B					
Year (t)	0	1	2	3	4
Cash Flow (CFt)	-1,000	100	300	400	600
Note: **CF**0 represents the cash flow experienced at the project's inception					

Note: All figures are in South African Rand

2.8.1 Net Present Value (NPV)

The calculation of the present values forms the basis of the Net Present Value (NPV) method of calculation. The present value of all cash inflows is compared to the present value of all cash outflows of the investment project (Seal *et al*., 2009:373). According to Megginson *et al*. (2010:238), the net present value (NPV) of an investment project equals the difference of all the cash inflows and outflows associated with the project, discounted at a rate that is consistent with the project risk.

The discount rate (r) in the equation below represents an opportunity cost for the shareholders. The discount rate (r) represents the shareholders' minimum required rate of return on the investment project under review (Megginson *et al*., 2010:239).

The equation for Net Present Value

$$NPV = \left[\frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \ldots \right] - \text{Initial Investment } (CF_0)$$

Where,

r is the target rate of return per period:

CF_0 is the initial investment at project inception;
CF_1 is the net cash flow during the first period;
CF_2 is the net cash flow during the second period;
CF_3 is the net cash flow during the third period, and so on**.**

The Net Present Value (NPV) calculation of Project A

As shown by Table 2.3 below the NPV for Project A based on a 10% cost of capital is R78.82.

Table 2.3: The Net Present Value (NPV) of Project A

Project A					
r =	10%				
Year	0	1	2	3	4
Cash Flow	-1,000	500	400	300	100
NPV =	**78.82**				

The Net Present Value (NPV) calculation of Project B

As shown by Table 2.4 below the NPV for Project B is based on a 10% cost of capital is R49.18.

Table 2.4: The Net Present Value (NPV) of Project B

Project B					
r =	10%				
Year	0	1	2	3	4
Cash Flow	-1,000	100	300	400	600
NPV =	**49.18**				

The Net Present Value in decision-making

If the NPV value of the project is positive then the project is acceptable since it promises a return greater than the required rate of return. A zero NPV will also be acceptable since it promises a return equal to the required rate of return. A negative NPV will not be satisfactory to the shareholders as it promises a return less than the required rate of return (Seal *et al*., 2009:374).

Both the NPV values of Project A and Project B are positive in the examples above. Therefore both Project A and Project B would have been accepted if they were independent investment projects under review. However if the projects were exclusive from each other, Project A would be ranked ahead of Project B due to the higher NPV of R78.82 versus R49.18. The shareholders' wealth would increase by R78.82 if they decide to invest in Project A, but only with R49.18 if they decide to invest in Project B.

2.8.2 Internal Rate of Return (IRR)

Internal Rate of Return, according to Seal *et al*. (2009:378), can be defined as the interest return promised by an investment project over its useful life. The IRR is calculated by finding the discount rate which will cause the NPV of a project to be equal to zero (Seal *et al*., 2009:379). Therefore the calculation of the IRR simply equates to the yield of the project, and must be compared to the shareholders' required rate of return.

The equation for Internal Rate of Return (IRR)

NPV = 0; or

PV of future cash flows − Initial Investment = 0; or

$$\left[\frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \ldots \right] - \text{Initial Investment} = 0$$

Where,

r is the internal rate of return;
CF_1 is the period one net cash flow;
CF_2 is the period two net cash flow,
CF_3 is the period three net cash flow, and so on ...

The Internal Rate of Return (IRR) calculation of Project A

As shown by Table 2.5 below the IRR for Project B based on a 10% cost of capital or required rate of return is 14.49%.

Table 2.5: The Internal Rate of Return (IRR) of Project A

Project A					
r =	10%				
Year	0	1	2	3	4
Cash Flow	-1,000	500	400	300	100
IRR =	**14.49%**				

The Internal Rate of Return (IRR) calculation of Project B

As shown by Table 2.6 below the IRR for Project B is based on a 10% cost of capital or the required rate of return is 11.79%.

Table 2.6: The Internal Rate of Return (IRR) of Project B

Project B					
r =	10%				
Year	0	1	2	3	4
Cash Flow	-1,000	100	300	400	600
IRR =	**11.79%**				

The Internal Rate of Return in decision-making

If the calculated IRR of the project is equal or higher than the required rate of return, the project is acceptable. The project will be rejected if the IRR is less than the required rate of return.

Both the IRR values of Project A and Project B is more than the required rate of return of 10% in our examples above. Therefore both Project A and Project B would be excepted if they were independent investment projects under review. However, if the projects were exclusive from each other Project A would be ranked ahead of Project B due to the higher IRR of 14.49% versus 11.79%. Project A would create more shareholder wealth than Project B, due to the higher surplus margin gained by Project A between the IRR of 14.49% and the cost of capital of 10%.

2.8.3 Profitability Index (PI)

According to Brigham and Ehrhardt (2006:357), the PI reflects the relative profitability of a project or the present value per one rand of the initial investment required. Megginson *et al*. (2010:257) state that the PI is expressed mathematically as the present value of the project's future cash inflows divided by the original cash lay-out.

The equation for Profitability Index

$$PI = \frac{\text{Present value of future cash flows}}{\text{Initial investment required}}$$

The Profitability Index (PI) calculation of Project A

As shown by Table 2.7 below the PI for Project A, based on a 10% cost of capital is 1.079. Thus on the present value basis, Project A with a PI of 1.079 is expected to produce 1.079 for each R1 of investment.

Table 2.7: The Profitability Index (PI) calculation of Project A

Project A					
r =	10.00%				
Year	0	1	2	3	4
Cash Flow	-1,000	500	400	300	100

Year	Cash Flow	Discounted Cash Flow
1	500	454.55
2	400	330.58
3	300	225.39
4	100	68.30
		1,078.82

	PI =	**1,078.82**	**=**	**1.079**
		1,000.00		

The Profitability Index (PI) calculation of Project B

As show by Table 2.8 below the PI for Project B, based on a 10% cost of capital is 1.049. Thus on the present value basis, Project B with a PI of 1.049 is expected to produce R1.049 for each R1 of investment.

Table 2.8: The Profitability Index (PI) calculation of Project B

Project B					
r =	10%				
Year	0	1	2	3	4
Cash Flow	-1,000	100	300	400	600

Year	Cash Flow	Discounted Cash Flow
1	100	90.91
2	300	247.93
3	400	300.53
4	600	409.81
		1,049.18

	PI =	**1,049.18** / **1,000.00**	**=**	**1.049**

The Profitability Index in decision-making

Brigham and Ehrhardt, (2006:357) state that a project is acceptable if the PI is greater than 1,0. The higher the PI value, the higher the project ranking if compared to other projects or investment decisions. If the PI is below 1,0, the present value of the future cash inflows are less than the initial cash outflow and the investment project must be rejected.

Both the PI values of Project A and Project B are greater than 1.0 in our example above. Therefore both Project A and Project B would both have been accepted if they were independent investment projects under review. However, if the projects were exclusive from each other, Project A would be ranked ahead of Project B, due to the higher profitability of the Project A investment at 1.079 versus the 1.049 of Project B.

2.8.4 Sensitivity Analysis

Investment decisions are based on a range of assumptions due to the uncertainty resulting from the lack of accurate future data. These investment decisions that are based on assumptions will influence the future survival of the company (Sari & Kuchta, 2012:482). A Sensitivity Analysis is an important technique for determining the effects of

changes on the factors or assumptions that are used within the investment analysis. The Sensitivity Analysis will assist to determine which of the input variables will have the biggest effect on the outcome of the investment decision (Sari & Kuchta, 2012:482).

According to Brigham and Ehrhardt (2006:396), a Sensitivity Analysis is a technique that indicates how much the Net Present Value (NPV) will change. The change in the Net Present Value (NPV) is driven by the change in a specific input variable, if all other variables remain constant. The Sensitivity Analysis starts with a "base case" situation which is developed by using the expected values or variables as per the current budget or forecast. The NPV as calculated with the base case assumptions will be called the "base case NPV" and will serve as the benchmark (Brigham & Ehrhardt, 2006:396). The values used in the base case scenario will be altered by percentage points above and below the expected values and a new NPV value will be calculated to be compared to the "base case NPV" (Brigham & Ehrhardt, 2006:396).

Therefore the Sensitivity Analysis uses a series of "what if" scenarios to reflect how sensitive the NPV is to a change in a specific input variable. The degree of change in the NPV will reflect how sensitive the investment project is in relation to the specific variable that has been altered (Brigham & Ehrhardt, 2006:396). Ultimately the Sensitivity Analysis will assist decision-makers to determine the riskiness of the project and to identify the key variables.

2.9 CONCLUSION

This chapter concludes the literature review and industry overview and reports on the following:

- The pharmaceutical industry of South Africa, with a specific focus on the newly introduced National Health Insurance (NHI) system.
- The courier industry of South Africa, with a specific focus on effective distribution of parcels.
- A competitive assessment of the pharmaceutical industry, by applying Porter's Five Forces Model. The industry assessment will provide a higher degree of

perspective and appropriateness when recommendations and conclusions are made to Pharmacy X in Chapter 4.

- A literature review on outsourcing, vertical integration and the value chain of an organisation.

- A literature review on the Four Cost Benefit Analysis techniques. The four techniques include a practical example of two investment projects namely, Project A and Project B.

The Four Cost Benefit analysis models reviewed in Chapter 2 include, Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI) and a Sensitivity Analysis. According to Du Toit *et al*. (2001:124) the Net Present Value, Internal Rate of Return and Profitability Index all lead to the same outcome regarding the decision namely, whether to accept or reject an independent project or investment under review.

Chapter 2 therefore forms the theoretical background and foundation for the empirical study and cost benefit models applied in Chapter 3, to determine the feasibility of a courier investment in the Bloemfontein area.

CHAPTER 3

EMPIRICAL STUDY AND APPLICATIONS

3. CHAPTER 3: EMPIRICAL STUDY AND APPLICATIONS

3.1 Introduction

The aim of this chapter is to analyse the current business model of Pharmacy X and to present the results of the cost benefit models as discussed in Chapter 2. More specifically, this chapter will report on the following:

- the business model and supply chain of Pharmacy X;
- the current market segmentation and competitors in the courier pharmacy industry;
- cost drivers within the business of Pharmacy X;
- the value chain of Pharmacy X and specifically the primary activity of outbound logistics which is outsourced to third party providers; and
- the feasibility calculations concerning the investment of a courier operation in the Bloemfontein area, by applying the Four Cost Benefit Analysis techniques.

3.2 Business model of Pharmacy X

In 2004, the DOH introduced medicine pricing regulations in order to make medicine more affordable to the public. The medicine pricing regulation introduced the Single Exit Pricing "SEP" model of medicine. The SEP is calculated off the manufacturers' price and approved by the DOH. The SEP is the price for which medicine is sold by manufacturers on to medicine wholesalers, on to pharmacies and finally on to the end user or patient. Therefore the SEP's legislation states that manufacturers can only sell their medication at one price to all their customers, regardless of the nature of the

customer's order size or utilization level. The SEP's price for medicine may be increased on an annual basis, as determined by the Minister of Health. According to Khan (2013) the DOH has approved a 5.8% annual increase for all scheduled medicine in January 2013.

Pharmacies in South Africa earn their income by way of charging a professional fee, also known as a dispensing fee, per line item dispensed to the patient. The DOH regulates the pharmacy professional fee, which is based on a percentage of the regulated Single Exit Price (SEP) as well as a fixed rand amount pricing tier. The current approved DOH dispensing fee tier structure is shown by Table 3.1 below.

Table 3.1: Regulated dispensing fee for pharmacists

Tier	Single Exit Price (SEP)	Guide line	VAT
1	Less than R75	46% of SEP + R6	14%
2	R75 up to R200	33% of SEP + R15.75	14%
3	R200 up to R700	15% of SEP + R51	14%
4	Greater than R700	5% of SEP + R121	14%

Source: SA (2010)

Table 3.2 below illustrates the objective of the DOH with their new tiered pricing system to minimize the cost of medicine. As per the calculations below, pharmacists can now earn higher profit margins on lower priced medication.

Table 3.2: Regulated dispensing fee calculation example

Tier	Medicine cost (SEP excluding VAT) (a)	Dispensing fee fixed percenatge (b)	Dispensing fee fixed percenatge value (c) c = (a x b)	Fixed rand value per tier (d)	Total dispensing fee (excluding VAT) (e) e = (c + d)	VAT	Total dispensing fee (including VAT)
1	70.00	46.00%	32.20	6.00	38.20	5.35	43.55
2	165.00	33.00%	54.45	15.75	70.20	9.83	80.03
3	550.00	15.00%	82.50	51.00	133.50	18.69	152.19
4	1,200.00	5.00%	60.00	121.00	181.00	25.34	206.34

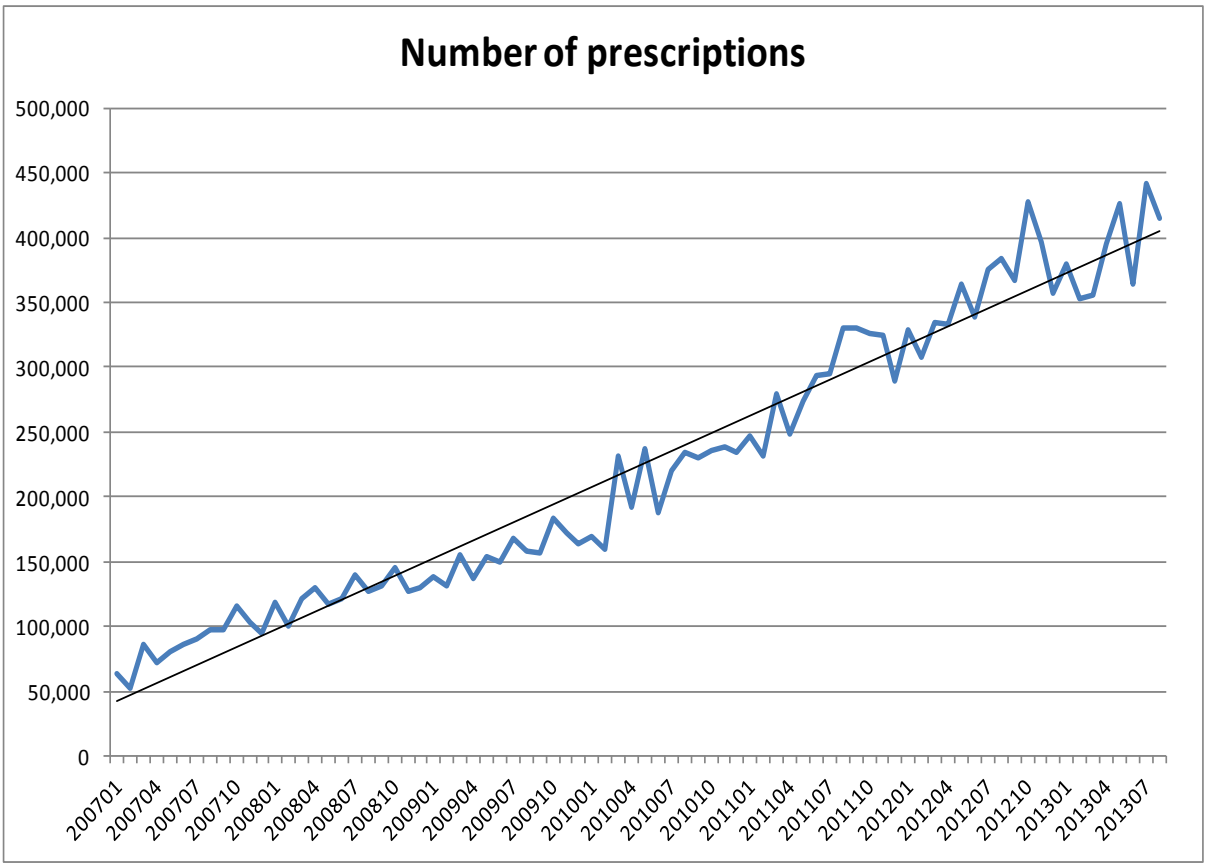
Tier	Total cost to patient (SEP + dispensing fee) (f) f = (a + e)	Medicine cost (SEP excluding VAT) (a)	Gross profit margin (g) g = (f - a)	Gross profit margin percentage (h) h = g / f
1	108.20	70.00	38.20	35.30%
2	235.20	165.00	70.20	29.85%
3	683.50	550.00	133.50	19.53%
4	1,381.00	1,200.00	181.00	13.11%

In the tier 1 example, the pharmacist will earn a 35.30% gross margin on a product that sells to patients for a SEP of R70. The pharmacist will only achieve a 13.11% gross margin in tier 4 when the cost of the medicine to the patient amounts to a SEP of R1200. The above tiered pricing structure will motivate pharmacists to dispense cheaper medicine to their patients, on which they generate a higher gross margin.

The courier pharmacy industry is known as a very low-margin industry, compared to the retail pharmacy industry. The main reason for this is due to the higher courier cost involved in the courier pharmacy industry, to deliver the medicine to the patient's address of choice. Therefore the success and sustainability of the courier pharmacy model is based on prescription volumes to benefit from economies of scale.

Pharmacy X managed to achieve a phenomenal prescription growth over the last six years. Figure 3.1 below illustrates the growth over the period January 2007 to July 2013. During the month of January 2007, Pharmacy X dispensed 64,708 prescriptions to patients nationally. For the month of July 2013 pharmacy X managed to dispense 442,071 prescriptions to patients nationally. The prescription volume growth for the period January 2007 compared to the period July 2013 amounts to 590.60% growth.

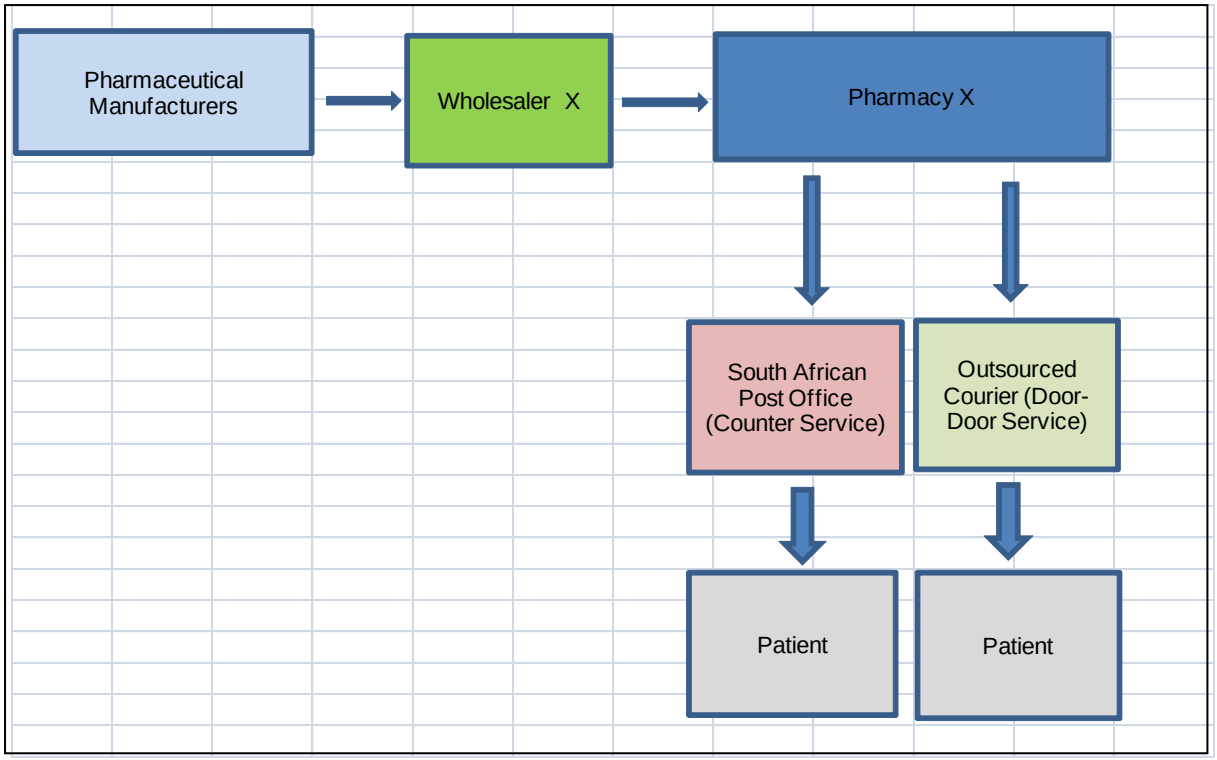
Figure 3.1: Number of prescriptions per month of Pharmacy X



The main reason for the exceptional growth experienced is due to the successful inclusion of one of the largest medical aid schemes within South Africa, to distribute chronic medication to their patients. Pharmacy X has managed to successfully retain the tender over for the last six years. The tender has been awarded to Pharmacy X again at the beginning of 2013 for another three-year period. Parallel to the prescription volume growth, Pharmacy X has also needed to increase their capacity and key resources to provide for the growth. Pharmacy X currently conducts their business from two operational facilities within South Africa. The main facility is based in Gauteng and the other operates in the Western Cape.

Certain partners play a key role in the success of the Pharmacy X business model and value proposition to their patients. Figure 3.2 shows the key role players within the current business model of Pharmacy X.

Figure 3.2: Key players within the business model of Pharmacy X



Pharmaceutical Manufacturers

The pharmaceutical manufacturers are mostly multi-national companies with global operations. The pharmaceutical manufacturers form an essential part of the supply chain and business model of Pharmacy X. The manufacturers produce all the required scheduled and unscheduled chronic medication to fill the patients' prescriptions.

Wholesaler X (vertically integrated sister company)

Wholesaler X is a registered pharmaceutical wholesaler, with the Medicine Control Council (MCC) and forms part of the group of companies that Pharmacy X belongs to. The core business of Wholesaler X is to procure the medication from the pharmaceutical manufacturers. Wholesaler X provides the warehousing function for the bulk medication and supplies the medicine to Pharmacy X on a daily basis, via a just-in-time (JIT) stock management system.

Pharmacy X

Pharmacy X is effectively the manufacturer within the supply chain and business model. Pharmacy X may not manufacture any finished goods but they receive all the pharmaceutical products from Wholesaler X, which can be seen as raw materials or a work-in-process. After receiving the medicine from Wholesaler X, Pharmacy X needs to produce a patient-ready parcel, according to the patient's prescription and all regulatory requirements. Once the parcel is completed, packed and quality assured, it can be seen as a finished good, before being dispatched to the designated courier company for delivery to the patient.

Courier Companies (Outsourced)

After each customer's medicine parcel has been completed, quality checked, invoiced and packed, it is passed on to the courier company. All the outsourced courier companies have dedicated in-house receiving and sorting facilities at the Pharmacy X premises. Each parcel is then sorted and checked by the courier at the in-house facility before being distributed to the particular region for delivery to the patient. After scanning the parcel out to the contracted courier company, the patient will receive an automatic text message with the waybill and tracking number of the parcel. This will enable the patient to start tracking the parcel via the Pharmacy X call center or on line via the web service of the courier company. The patient-ready parcel is now in transit to the patient with a track-and-trace function.

As per Figure 3.2 above, the patient can also decide on a counter service collection model via the South African Post Office (SAPO). SAPO also has a dedicated in-house receiving and -sorting facility at the Pharmacy X premises. The patient parcel will be forwarded by SAPO to a post office selected by the patient for collection. The patient will be notified via a text message when the parcel leaves the Pharmacy X premises on-route to the post office. When the parcel is received at the post office of choice, the patient will be notified with a text message or phone call that the parcel is ready for collection.

The focus of the study is on the outbound logistics function of Pharmacy X. The outbound logistics function is an essential aspect of the supply chain of Pharmacy X and forms part of the core strategic business activities of Pharmacy X.

Patients (customers)

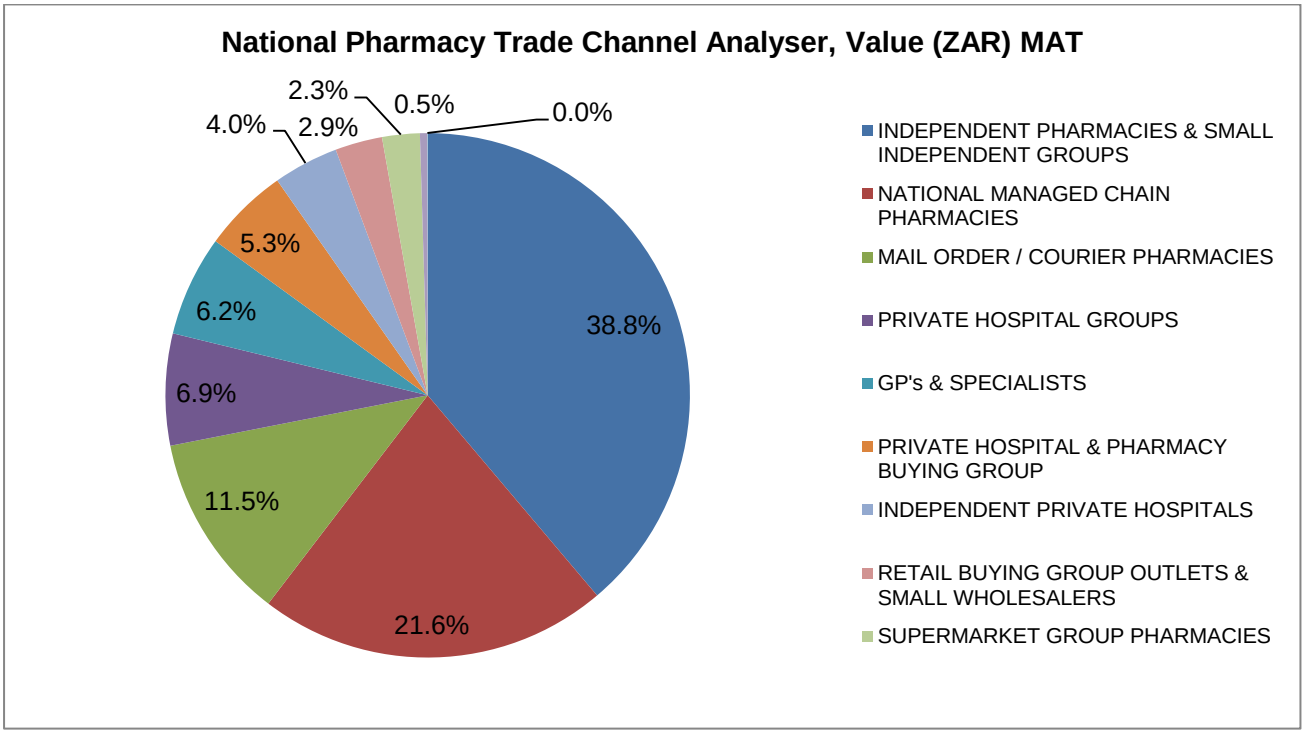
The patient or customer forms the final link in the supply chain and business model of Pharmacy X. Only when the patient receives the parcel from the courier, or has collected the parcel from SAPO, the transaction is completed. It stays the responsibility of Pharmacy X to ensure that the patient collects the medicine from SAPO or receives the parcel form the outsourced courier. Only after receiving the signed proof of delivery (POD) by the patient from the outsourced courier service provider, Pharmacy X can sign off the transaction.

3.3 Market segmentation and competitor analysis of Pharmacy X

The South African pharmaceutical industry has a total market value of thirty-billion rand per annum, as shown in Chapter 2 in Figure 2.2. According to IMSHealth the independent owned pharmacies and small buying groups grasp the largest market share, measured in rand value over the last twelve months at 38.8% (IMSHealth, 2012). As shown in Figure 3.3, the second largest trade channel market share of 21.6% is owned by the national managed chain pharmacies. The major players within the national chain pharmacies are Dis-Chem and Clicks. According to the South African Pharmacy Council (SAPC), there are currently 3,139 registered community pharmacies in South Africa (SA, 2013a).

As indicated in Figure 3.3 below, courier pharmacies currently hold a value market share of 11.5%, followed by private hospital groups at 6.9%.

Figure 3.3: Percentage market share per trade channel



Source: IMSHealth (2012)

Pharmacy X forms part of the 11.5% value market share as shown in Figure 3.3 above. The Pharmacy X chronic market segment consists of two segments:

The first segment and largest contributor to the Pharmacy X market is medical aid schemes opting for a courier pharmacy model as their designated service provider (DSP) for chronic medicine supply. The main reason for medical aids opting for a courier pharmacy model is as follows:

- Pharmacy X offers a very attractive dispensing fee per line item. The Pharmacy X dispensing fee offering is lower than the DOH approved dispensing fees as discussed in section 3.2 of Chapter 3. Therefore the Pharmacy X business model creates a significant saving for the medical aid schemes.

- The Pharmacy X courier model with its national footprint of delivery enables Pharmacy X to cover all medical aid members of a scheme, no matter where the member is situated in South Africa.

- The Pharmacy X courier model drives patient compliancy. The model supports chronic medication compliancy due to the scheduled monthly delivery directly to the patient. Medical aid schemes support this compliance initiative due the risks associated with patients that are not adhering to their chronic medicine.

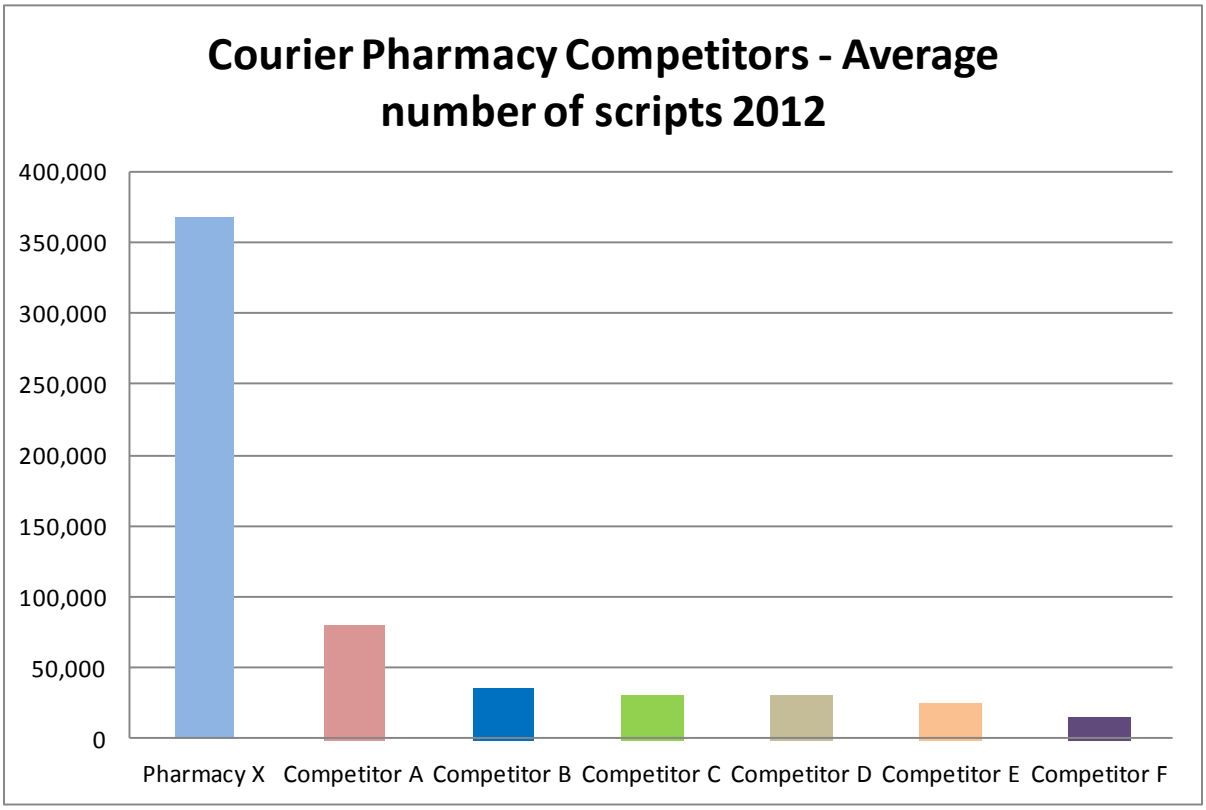
The second market segment of Pharmacy X relates to individual patient preferences due to the following:

- remote patients in rural- and townships areas with no easy access to retail pharmacies;
- patients with no means of transport or patients who are too old to travel to a retail pharmacy;
- patients who prefer to maintain their confidentiality; and
- patients who are time deprived and prefer the convenience of receiving their medication at their home or workplace.

Due to all the service offerings by Pharmacy X to medical aids and individual patients mentioned above, Pharmacy X has managed to increase the barriers of entry for the opposition. Especially the Pharmacy X offering of charging lower dispensing fees per line item to medical aids, compared to the higher regulated fees charged by other competitors.

Figure 3.4 below shows the courier pharmacy competitor analysis based on the average number of prescriptions dispensed on a monthly basis. It is clear from the graph below that Pharmacy X is the current market leader by far. The average number of prescriptions per month for Pharmacy X amounted to 367,000 during the 2012 calendar year, While the closest competitor managed to achieve an average of 80,000 prescriptions per month during the 2012 year.

Figure 3.4: Courier pharmacy industry competitors



Although the competitive assessment in Chapter 2 has revealed that rivalry among competitors is moderate, Pharmacy X still has an advantage when it comes to capacity and resources. None of the other players will be able to take on a large number of prescriptions without having to invest large amounts of money.

3.4 Cost drivers within Pharmacy X

The main cost drivers within Pharmacy X are courier costs and salaries. The staff comprises of a large number of professionally qualified employees, especially pharmacists. Currently pharmacists are scare within the South African industry. Due the shortage of pharmacists in the industry, there is a premium on the salaries earned by pharmacists and it is therefore very difficult for Pharmacy X to cut on salary expenses. As shown in Table 3.3 below, the courier expense budget for 2013 will amount to 35.70% of the total operating expenses.

Table 3.3: Pharmacy X's courier costs as a percentage of operating expenses

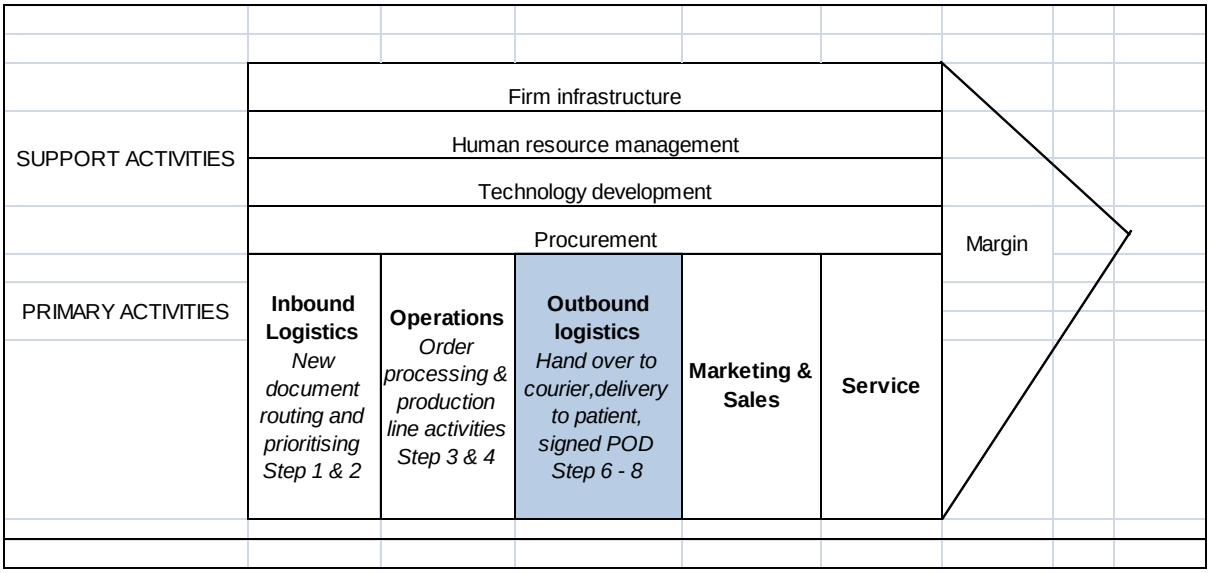
	2011 Actual	2012 Actual	Actual YTD August 2013	2013 Budget
Courier cost as a percentage of total operating cost	36.50%	39.40%	34.60%	35.70%

The actual year to date contribution of courier costs to the total operating expenses as at August 2013, amounts to 34.60%. During the 2012 financial year courier costs contributed to 39.40% of the total operating expenses of Pharmacy X. As shown in Table 3.3 above, the contributions of courier costs to total operating expenses are material within the business model of the company. Therefore it is imperative for the Pharmacy X management team to constantly review courier costs and to create a strategy to reduce courier costs.

3.5 Value chain analysis of Pharmacy X

The value chain analysis of Pharmacy X below reflects the importance of each process in the value chain to ensure that Pharmacy X successfully delivers to the patient on the scheduled due date. Porter's Generic Value Chain, as discussed in Chapter 2 is shown in Figure 3.5, incorporating the Pharmacy X value chain activities.

Figure 3.5: Porter's Generic Value Chain incorporating Pharmacy X's activities



The Pharmacy X value chain analysis as shown by Appendix C, reflects how dependent each value chain process is on the other, due to the strict regulatory environment and quality checks involved in medication. Pharmacy X has to comply with all GPP requirements and the strict time lines as per the medical aid scheme SLA.

The focus of this study is on steps 5-8 of the value chain of Pharmacy X. Steps 5-8 of the value chain activities include the current outsourced outbound logistics function. Therefore steps 5-8 of the Pharmacy X value chain is examined in detail in accordance with Appendix C. Step 5 begins with the handover of the parcel to the outsourced courier, and step 8 concludes the process, when receiving a signed proof of delivery (POD) by the patient from the courier.

Pharmacy X supplies a maximum of 4 weeks' (30 days') medication to patients. Each patient has a different scheduled date for delivery during the month. As illustrated by Appendix C, the courier receives the parcel on day 26 of the delivery cycle and has to delivery on day 28 of the delivery cycle. This ensures that the patient does not run out of medication and is technically left with 2 days' medication when receiving the parcel from the courier.

In the following section, a detailed description of steps 5-8 is conducted.

Step 5 – Hand over patient-ready parcel to outsourced courier company

Main Input

The main input is the handing over of the parcel to the outsourced courier company on day 26. The outsourced courier companies have their own dedicated in-house staff on the premises of Pharmacy X, to collect the parcels.

Transformation

The outsourced courier companies have the necessary resources and capabilities to deliver the final parcels daily on a national basis. Technology plays a major role within the courier industry and all the contracted couriers are able the track and trace the parcels at any stage of the transit process. The contracted courier companies' efficiency and conformance towards time lines are managed with a strict Service Level Agreement (SLA). The contracted courier company only has 2 working days after

receipt of the parcel to deliver the parcel to the patient. The patient needs to receive the medication on day 28 as per the value chain in Appendix C.

Main Output

The patient-ready parcel is now in transit to the patient with the function to track and trace the parcel at any time while in transit to the patient.

Steps 6 to 8 – Delivery to the patient and proof of delivery (POD)

Main Input

The main input is the handing over of the parcel, by the courier company to the patient, within the agreed delivery time of 2 working days.

Transformation

Pharmacy X receives daily electronic delivery confirmation reports from the courier companies on all the successful and unsuccessful deliveries made to patients. The daily reporting between the parties enable Pharmacy X to manage the unsuccessful deliveries with immediate action. The daily reporting tools also assist Pharmacy X to measure the success rate of the contracted courier to deliver the parcel to the patient within the agreed time frames.

Main Output

Pharmacy X receives a signed proof of delivery (POD) from the courier company. The signed POD will have a date and time specified as well as the name and surname of the person that signed for the parcel. Only the patient or a prior agreed assignee of the patient may receive and sign for the parcel. The signed POD is the final confirmation that the parcel has been delivered to the correct recipient or patient. The POD is scanned onto the patient profile on the ERP system to finally close off the transaction and dispensed prescription for the month.

As discussed in the literature study in Chapter 2, the Value Chain Analysis will assist management in the evaluation of the organisation’s core competencies, processes and assets. The Value Chain Analysis will also assist management to evaluate the company’s response to the opportunities and threats posed by the business

environment. The literature study also revealed that the value chain of a company is a fundamental part of the company's strategic intent and future thinking process to ensure that the company gains a sustainable competitive advantage.

The case study will now further investigate the primary value chain activity of the outbound logistics function that has been outsourced to third party courier providers.

3.6 PARCEL DELIVERY ANALYSIS OF PHARMACY X

Based on the July 13 data obtained from the management information system, Pharmacy X has delivered a total of 314,329 parcels to patients. Of the total 314,329 deliveries made to patients, 33,384 (10.6%) has been delivered to the South African Post Office (SAPO) as a counter collection option for patients. The main reason why these patients prefer SAPO is due to the confidentiality factor and wanting to manage their own time. The balance of the parcels has been delivered via a door to door service by the outsourced courier providers.

Table 3.4 below illustrates the number of parcels delivered per province by Pharmacy X. As shown by Table 3.4, the majority of parcels 73,802 (23.48%) are delivered within the KwaZulu-Natal area followed closely by Gauteng with 70,163 (22.32%).

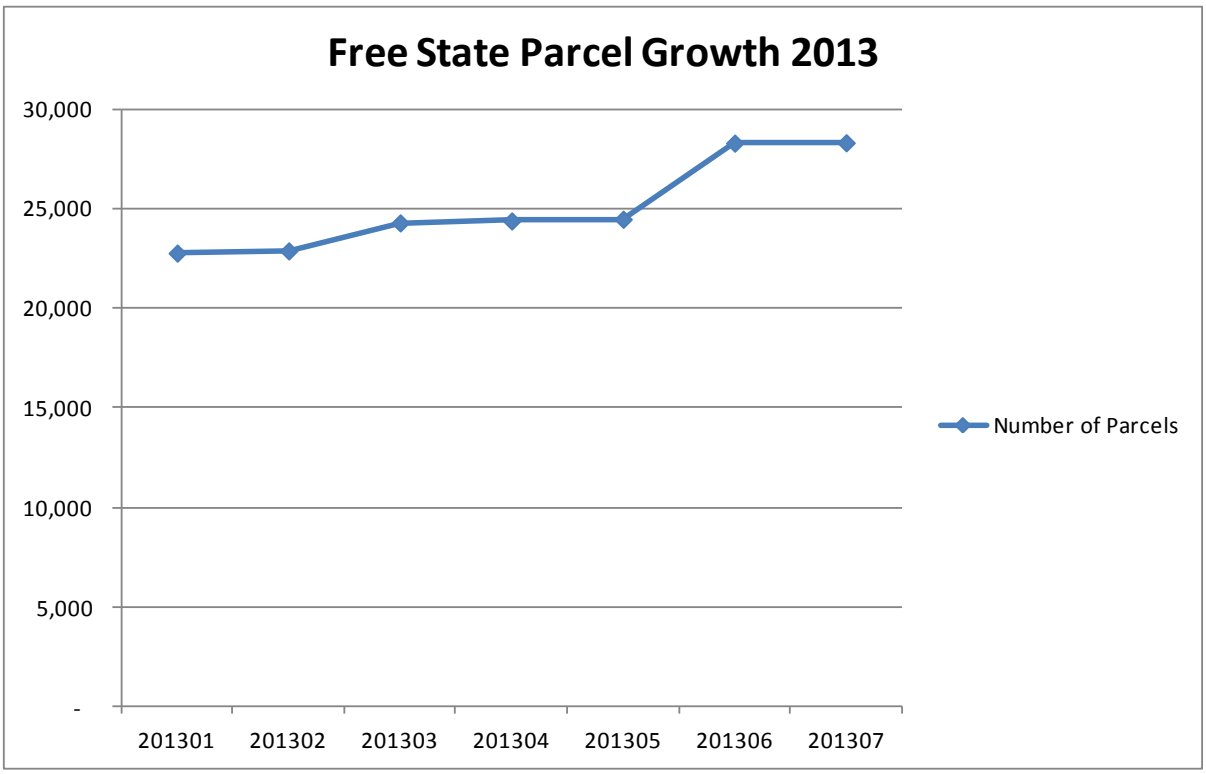
Table 3.4: Number of parcels delivered per province by Pharmacy X

Province	No of parcels per month	Percentage contribution per province
KwaZulu-Natal	73,802	23.48%
Gauteng	70,163	22.32%
Western Cape	38,114	12.13%
Eastern Cape	33,256	10.58%
Free State	28,313	9.01%
Limpopo	21,122	6.72%
Mpumalanga	20,406	6.49%
North West	19,673	6.26%
Northern Cape	9,480	3.02%
	314,329	**100.00%**

This study only focuses on the Free State Province and specifically the Bloemfontein area, due to the significant growth of patients within the area.

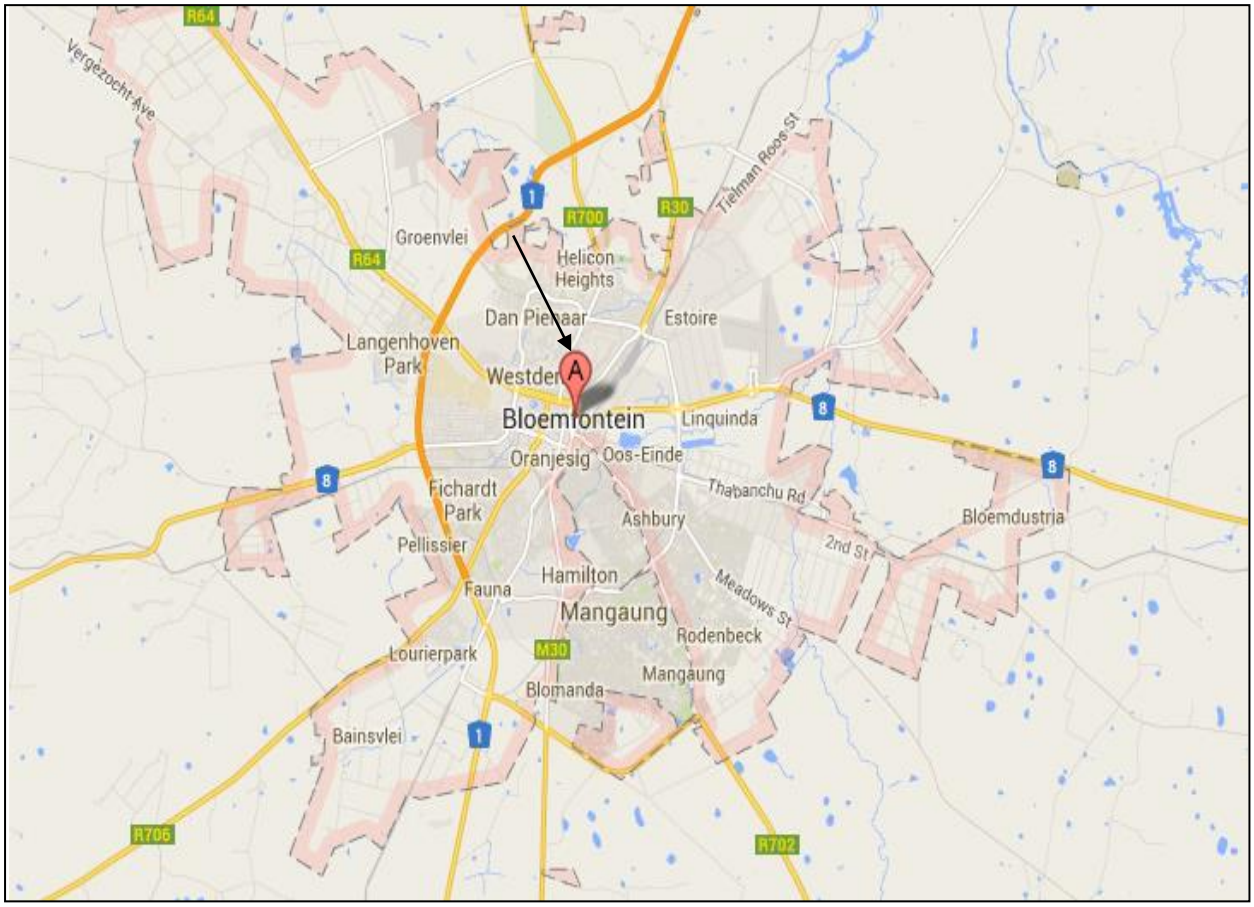
The Free State Province delivers a total of 28,313 parcels per month contributing to 9.01% of the total number of parcels delivered on a national basis. The number of parcels delivered within the Free State Province has shown a significant growth during the year of 2013. As shown in Figure 3.6 below, the Free State Province reflected a 24.32% growth in parcels from January 2013 to July 2013.

Figure 3.6: Free State Province parcel growth 2013



The deliveries made within the Bloemfontein Central area amounted to 9,538 parcels for the month of July 2013. Therefore the Bloemfontein Central parcels make up 33.69% of the total parcels delivered within the Free State Province. The Bloemfontein Central area has been the main contributor towards the growth experienced within the Free State Province during 2013. Figure 3.7 below shows the Bloemfontein Central area and suggests office location for the Bloemfontein courier investment project. The possible Bloemfontein office and distribution hub will be in the centre of the Central Business District (CBD).

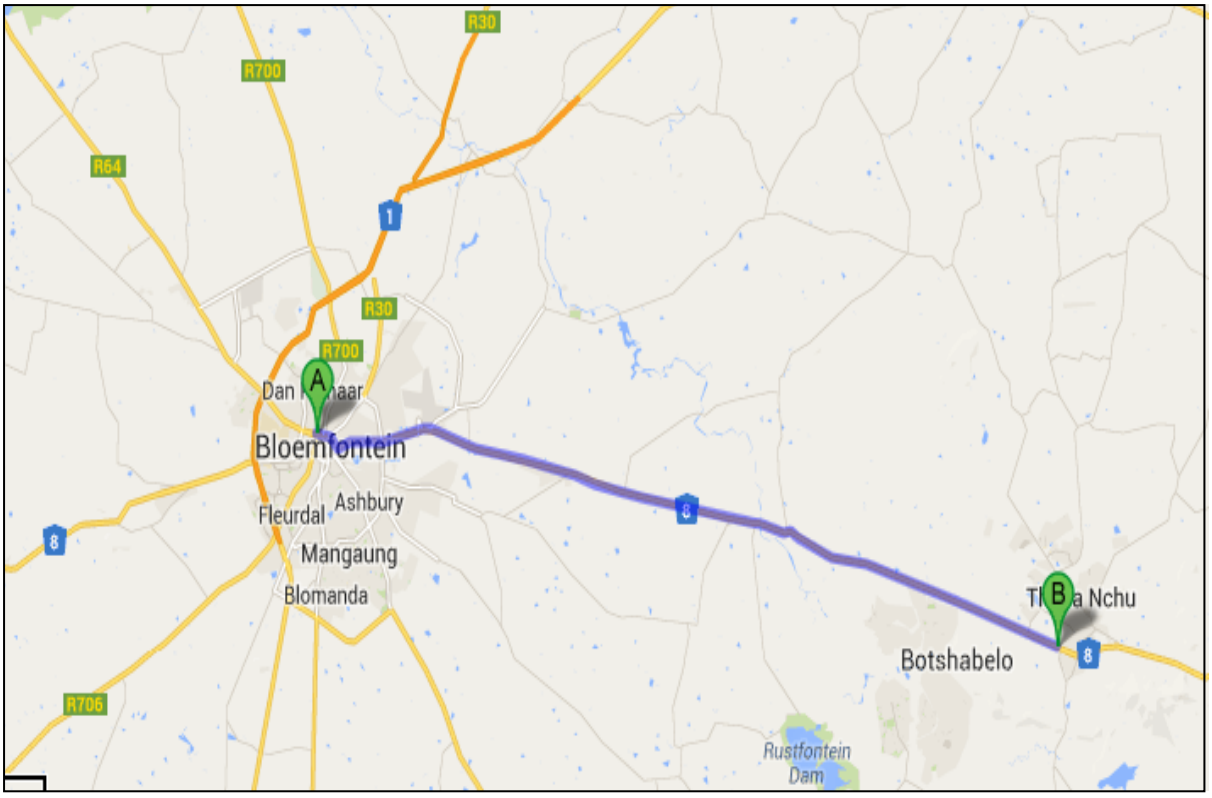
Figure 3.7: Bloemfontein Central area



Source: Google Maps (2013)

As show by Figure 3.8, the rural community of Thaba Nchu is situated 65,4 kilometers from the Central Business District (CBD) of Bloemfontein. The estimated travelling time from the Bloemfontein CBD to Thaba Nchu is sixty minutes. The Thaba Nchu rural community will serve as the furthest point of delivery when assessing the possible courier investment feasibility later on in Chapter 3.

Figure 3.8: Bloemfontein Central area including Thaba Nchu



Source: Google Maps (2013)

3.7 COST BENEFIT ANALYSIS

In order to apply the Four Cost Benefit Analysis techniques as discussed in Chapter 2, the following additional cost analyses must be done.

- The capital expenditure in order to gear the Bloemfontein branch to start with operations;
- The current cost per parcel charged by the outsourced Courier X;
- The monthly instalments of the financed vehicles that will deliver the parcels in the area;
- A fuel analysis of the current fuel price to determine the fuel cost per parcel for the Bloemfontein courier investment.

In addition to the above calculations, the different income - and expense line assumptions applied in the three-year budget plan for the Bloemfontein courier investment are discussed. The budget for the period 2014-2016 calculates the cash inflows and outflows for each period that will be applied in the four cost benefit analysis techniques.

The 2014-2016 budget and assumptions will form the base case of the Bloemfontein courier investment project. The base case numbers will be applied in the cost benefit analysis calculations of NPV, IRR and PI. In addition to the calculation of the NPV, IRR and PI, a Sensitivity Analysis will be done. The Sensitivity Analysis will show the effect on the NPV, IRR and PI when an increase or decrease takes place in the annual cash flow of the project.

For the purpose of this study, the required rate of return (r) will be 12%. The expected life of the project will be 36 months.

3.7.1 Capital Expenditure (CAPEX) assumptions

Table 3.5 below shows the total capital expense budget needed in order to start the operations in the Bloemfontein hub. The total capital expenses amount to R247 750. The main capital outlay of R45 000 will be the cost associated with the revamp of the office, in order to lean itself towards a courier operation layout. The other major capital costs relate to computer equipment and operational equipment.

The capital expenses of R247 750 will serve as the only initial investment cost to start with the operation in Bloemfontein.

Table 3.5: Capital expense budget of the Bloemfontein investment

Bloemfontein courier investment CAPEX		
Description	**Cost**	**Quantity**
Revamp of office	R 45,000	
Signage	R 18,000	
Chairs office	R 6,400	8
Chairs other	R 9,000	10
Desk office	R 9,000	3
Round table kitchen	R 2,100	1
Cabinet kitchen	R 1,800	1
Filing cabinet office	R 3,500	1
Telephones	R 3,000	6
Sorting table	R 11,000	1
Fridge cold chain items	R 21,000	1
Fridge office	R 3,000	1
Welcome mats	R 750	2
Bins (160 liter)	R 6,000	8
Steel shelving	R 2,700	2
Plastic bins	R 4,800	8
Ramp for motorcycles	R 1,700	1
Computers	R 30,000	5
Scanners	R 4,000	4
Multifunctional printer	R 6,000	2
Alarm system	R 5,000	1
Bike boxes	R 30,000	12
Safety gear	R 24,000	12
	R 247,750	

3.7.2 Outsourced parcel cost analysis

Courier X is currently the outsourced party in the Bloemfontein Central area, delivering all the parcels on behalf of Pharmacy X. Data have been obtained from the Pharmacy X accounting and management information system to compile Table 3.6 below.

Table 3.6 shows the calculated average cost per parcel, per postal code within the selected Bloemfontein Central area. According to the current actual data retrieved from the Pharmacy X systems, there are a total of 9,538 patients receiving medicine via Courier X on a monthly basis. The number of door-door deliveries amounts to 9,178 and a further 360 patients are situated within walking distance from the

earmarked new offices. The 360 patients within walking distance from the new offices will collect their medicine from the new offices via a counter service.

The bulk of the patients are situated within the area of postal code 9301. Postal code 9301 fits into the Bloemfontein Central area and close surrounding suburbs. Currently 5,135 patients are receiving medicine within postal code 9301. The current cost per parcel to deliver within postal code 9301 amounts to R32,47 per parcel with a total monthly spend of R166, 734.

Table 3.6: Number of parcels and cost per postal code

Town	Postal Code	Current Total No of Parcels	Collections (Walk-In Patients) at branch	No of Door-Door Parcels	Current Cost (Outsourced Courier X)	Current Cost per parcel (Outsourced Courier X)
Bloemfontein	9323	1,501	17	1,484	R 59,709.78	R 39.78
Bloemfontein	9305	28	20	8	R 906.84	R 32.39
Bloemfontein	9306	255		255	R 8,259.45	R 32.39
Bloemfontein	9301	5,135	40	5,095	R 166,733.45	R 32.47
Bloemfontein	9781	717	45	672	R 31,548.00	R 44.00
Bloemfontein	9325	83	54	29	R 2,871.22	R 34.59
Bloemfontein	9330	222	100	122	R 7,561.98	R 34.06
Bloemfontein	9300	702		702	R 23,488.92	R 33.46
Bloemfontein	9303	87	16	71	R 3,423.26	R 39.35
Bloemfontein	9332	54	32	22	R 1,713.79	R 31.74
Bloemfontein	9324	58	26	32	R 1,900.90	R 32.77
Bloemfontein	9364	36		36	R 1,334.00	R 37.06
Bloemfontein	9360	17		17	R 748.00	R 44.00
Bloemfontein	9338	36		36	R 1,112.00	R 30.89
Bloemfontein	9331	3		3	R 93.00	R 31.00
Bloemfontein	9329	3		3	R 211.53	R 70.51
Bloemfontein	9358	4		4	R 181.00	R 45.25
Thaba Nchu	9780	345		345	R 13,755.15	R 39.87
Selosesha	9783	235		235	R 8,840.70	R 37.62
Bloemfontein	9326	4	2	2	R 143.11	R 35.78
Bloemfontein	9302	13	8	5	R 459.33	R 35.33
		9,538	**360**	**9,178**	**R 334,995.42**	
			Average cost per parcel		**35.12**	

The total monthly spend in the selected postal areas amounts to R334 995. Based on the total number of parcels, the average cost per parcel amounts to R35,12.

The current outsourced courier cost charge of R35,12 per parcel will form the benchmark for the comparison of the Bloemfontein courier investment's project cost per parcel.

3.7.3 Vehicle investment and finance instalments

The initial vehicle investment will consist of two Chevrolet utility vehicles and twelve motor cycles. The vehicles will be financed over a period of three years in order to write off the vehicles over the period of the investment project. Table 3.7 below illustrates the use of an interest rate of 9.5% per annum, as well as the cost price or present values of each vehicle. The total monthly instalments based on an interest of 9.5% over a 36 months period amount to R20 716.

Table 3.7: Calculation of monthly vehicle instalments

Calculation of monthly instalments on vehicles			
Chevrolet Utility Vehicle @ R135,408		**No of vehicles**	**Total monthly instalment**
PV	135,408		
n	36		
i	9.50		
FV	-		
PMT	R 4,303.45	2	R 8,606.90
Honda XR 125 @ R16,000		**No of vehicles**	**Total monthly instalment**
PV	16,000		
n	36		
i	9.50		
FV	-		
PMT	R 508.50	3	R 1,525.50
Honda CBX 250 @ R37,000		**No of vehicles**	**Total monthly instalment**
PV	37,000		
n	36		
i	9.50		
FV	-		
PMT	R 1,175.91	9	R 10,583.19
Total monthly instalments			**R 20,715.59**

The total monthly instalment of R20 715 forms part of the 2014, 2015 and 2016 budget expenses.

3.7.4 Fuel analysis and assumptions

As discussed in Chapter 2 under the courier industry overview, fuel costs contribute to 3% of total operating expenses. However the change in fuel prices influences a lot of other expenses, such as line-haul charges and third party contract drivers' charges. Line-haul charges contribute to 12% of operating costs and third party driver costs to 24% of operating expenses (Vosloo, 2013b). Therefore, close to 40% of expenses will be influenced by fuel price changes.

Appendix A shows the petrol price for the period September 2012 to September 2013 and Appendix B the diesel price over the same period (Shell, 2013). As per Table 3.8 the petrol price at the end of September 2013 has amounted to 1327 cents per litre. The price of petrol at the end of September 2012 has amounted to 1176 cents per litre. Therefore the price of petrol has increased with 151 cents per litre, or with 12.84%, over the last year.

Table 3.8 indicates that the price of diesel increased with 234 cents per litre, or with 22.76%, over the same period.

Table 3.8: Fuel costs per parcel for the Bloemfontein investment

Petrol price (cent per litre)	
September 2013	1,327
September 2012	1,176
Increase in cent per litre	151
% Increase	12.84%

Diesel price (cent per litre)	
September 2013	1,262
September 2012	1,028
Increase in cent per litre	234
% Increase	22.76%

	Number of vehicles	Kilometers per day per vehicle	Total kilometers per day	Number of working days	Total kilometers per month	Kilometers driven per litre of fuel	Total litres usage per month	Price per litre	Total fuel cost per month	No of parcels	Total fuel cost per parcel per month
Vehicles	2	200	400	21	8,400	12	700	13.27	9,289	9,538	0.97
Motorcycles	12	120	1,440	21	30,240	20	1,512	13.27	20,064	9,538	2.10
									29,353		**3.08**

The fuel cost per parcel for the Bloemfontein project investment is estimated at R3,08 per parcel. Table 3.8 shows the detailed calculation, to arrive at R3,08 per parcel fuel cost. The costing is firstly split between vehicles and motorcycles. The total kilometres travelled in 21 working days is calculated and amounts to 8,400 kilometres for vehicles and 30,240 for motorcycles. The total kilometres are then divided by the fuel efficiency of each vehicle type per kilometre. As per Table 3.8, the total estimated litres of fuel usage per delivery type is then multiplied by the current fuel price of R13,27 per litre, to determine the total monthly fuel cost of R29 353. The final step of the calculation is to divide the estimated 9,538 parcels with the total cost of R29 353.

The fuel cost per parcel of R3,08 will form part of the 2014 budget and base case scenario of the Bloemfontein investment project.

3.7.5 Budget assumptions 2014 - 2016

The following are the key assumptions made in the 2014 budget as shown in section 3.7.6 below:

- As per the 2014 budget, the total potential number of parcel deliveries will only be done after a period of 6 months. This gradual start will allow the operational and support staff to find their feet and to become acquainted with the area.

- The fuel cost per parcel is estimated at R3,08, as calculated in Table 3.8 above.

- The line-haul charges are calculated at R195 per console bag from the main branch in Pretoria to the Bloemfontein office. The console bag can hold 40 parcels. Therefore the line-haul cost per parcel amounts to R4,88.

Due to the high fixed cost structure and gradual growth of parcels, the first 6 months of the 2014 budget shows a negative cash flow. The budget reflects a positive cash flow for the last 6 months of the year when 9,538 parcels are delivered per month. The total annual negative cash outflow for the year 2014 amounts to R128 323.

The following are the key assumptions made in the 2015 budget as shown in section 3.7.7 below:

- The fuel cost per parcel is increased with 15% based on the current growth of fuel price analysis as shown by Table 3.8 above.
- All other expenses are increased with 8% to allow for inflation and salary increases.
- The average courier cost of R35,12, as charged by Courier X as per Table 3.6 above, is increased with 6% to R37,23.

The 2015 budget reflects a cost per parcel of R32,71 versus the outsourced Courier X cost per parcel of R37,23. The saving of R4,52 per parcel relates to an annual cash inflow of R516 851.

The following are the key assumptions made in the 2016 budget as show in section 3.7.8 below:

- The fuel cost per parcel is increased with 15%.
- All other expenses are increased with 8% to allow for inflation and salary increases.
- The average courier cost of R37,23, as charged by Courier X in the 2014 budget, is increased with 6% to R39,46.

The 2016 budget reflects a cost per parcel of R35,41 versus the outsourced Courier X cost per parcel of R39,46. The saving of R4,05 per parcel relates to an annual cash inflow of R464 081.

3.7.6 Budget 2014

	2014												
Month	**Jan-14**	**Feb-14**	**Mar-14**	**Apr-14**	**May-14**	**Jun-14**	**Jul-14**	**Aug-14**	**Sep-14**	**Oct-14**	**Nov-14**	**Dec-14**	**12 Months / Full Year**
Total no of parcels	2,500	3,000	4,000	6,000	7,000	8,000	9,538	9,538	9,538	9,538	9,538	9,538	**87,728**
Door - Door no of parcels	2,140	2,640	3,640	5,640	6,640	7,640	9,178	9,178	9,178	9,178	9,178	9,178	
Collect (Walk-In Patients) parcels	360	360	360	360	360	360	360	360	360	360	360	360	
Expenses	**240,392**	**244,458**	**252,591**	**268,857**	**276,990**	**285,122**	**297,631**	**297,631**	**297,631**	**297,631**	**297,631**	**297,631**	**3,354,194**
Operating expenses													
Fuel per parcel	6,591	8,131	11,211	17,371	20,451	23,531	28,268	28,268	28,268	28,268	28,268	28,268	**256,897**
Consol bags	444	533	711	1,067	1,244	1,422	1,696	1,696	1,696	1,696	1,696	1,696	**15,596**
Line-haul charge	12,188	14,625	19,500	29,250	34,125	39,000	46,498	46,498	46,498	46,498	46,498	46,498	**427,674**
Cellphone - Nokia	750	750	750	750	750	750	750	750	750	750	750	750	**9,000**
Cellphone - BlackBerry	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	**70,200**
Capex installment	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	***248,587***
Salaries													
Amount of drivers	14	14	14	14	14	14	14	14	14	14	14	14	
Drivers salaries	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	**1,092,000**
Receptionist	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	**66,000**
Operational staff	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	**180,000**
Administrator	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	**90,000**
Branch supervisor	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	**216,000**
Cleaner	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	**28,800**
Depreciation - delivery vehicles													
Depreciation over 36 months	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**144,672**
Other expenses													
Alarm system	500	500	500	500	500	500	500	500	500	500	500	500	**6,000**
Consumables	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	**21,600**
Electricity	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	**42,000**
Insurance	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	**32,400**
Insurance vehicles	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400	**124,800**
Rent paid	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	**132,000**
Covered parking	800	800	800	800	800	800	800	800	800	800	800	800	**9,600**
Stationary	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	**42,000**
Telephone - Telkom	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	**31,200**
Travel & accommodation	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	**42,000**
Services on vehicles and motorbikes	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	**25,000**
Cost per parcel	**R 96.16**	**R 81.49**	**R 63.15**	**R 44.81**	**R 39.57**	**R 35.64**	**R 31.20**	**R 31.20**	**R 31.20**	**R 31.20**	**R 31.20**	**R 31.20**	**R 38.23**
Cost per parcel (excluding depreciation)	**R 91.33**	**R 77.47**	**R 60.13**	**R 42.80**	**R 37.85**	**R 34.13**	**R 29.94**	**R 29.94**	**R 29.94**	**R 29.94**	**R 29.94**	**R 29.94**	**R 36.58**
Current cost per parcel (Outsourced)	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	**35.12**	
Saving per parcel	(56.21)	(42.35)	(25.01)	(7.68)	(2.73)	0.99	5.18	5.18	5.18	5.18	5.18	5.18	
No of parcels per month	2,500	3,000	4,000	6,000	7,000	8,000	9,538	9,538	9,538	9,538	9,538	9,538	
Total saving per month (Cash flow)	**-140,530.60**	**-127,035.90**	**-100,046.49**	**-46,067.67**	**-19,078.26**	**7,911.15**	**49,420.86**	**49,420.86**	**49,420.86**	**49,420.86**	**49,420.86**	**49,420.86**	**-128,322.58**

3.7.7 Budget 2015

2015													
Month	**Jan-15**	**Feb-15**	**Mar-15**	**Apr-15**	**May-15**	**Jun-15**	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**	**12 Months / Full Year**
Total no of parcels	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	**114,456**
Door - Door no of parcels	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	
Collect (Walk-In Patients) parcels	360	360	360	360	360	360	360	360	360	360	360	360	
Expenses	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**324,080**	**3,888,963**
Operating expenses													
Fuel per parcel	32,508	32,508	32,508	32,508	32,508	32,508	32,508	32,508	32,508	32,508	32,508	32,508	**390,102**
Consol bags	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	**21,976**
Line-haul charge	50,218	50,218	50,218	50,218	50,218	50,218	50,218	50,218	50,218	50,218	50,218	50,218	**602,611**
Cellphone - Nokia	810	810	810	810	810	810	810	810	810	810	810	810	**9,720**
Cellphone - BlackBerry	6,318	6,318	6,318	6,318	6,318	6,318	6,318	6,318	6,318	6,318	6,318	6,318	**75,816**
Capex installment	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	***248,587***
Salaries													
Amount of drivers	14	14	14	14	14	14	14	14	14	14	14	14	
Drivers salaries	98,280	98,280	98,280	98,280	98,280	98,280	98,280	98,280	98,280	98,280	98,280	98,280	**1,179,360**
Receptionist	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	**71,280**
Operational staff	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	**194,400**
Administrator	8,100	8,100	8,100	8,100	8,100	8,100	8,100	8,100	8,100	8,100	8,100	8,100	**97,200**
Branch supervisor	19,440	19,440	19,440	19,440	19,440	19,440	19,440	19,440	19,440	19,440	19,440	19,440	**233,280**
Cleaner	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	**31,104**
Depreciation - delivery vehicles													
Depreciation over 36 months	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**144,672**
Other expenses													
Alarm system	540	540	540	540	540	540	540	540	540	540	540	540	**6,480**
Consumables	1,944	1,944	1,944	1,944	1,944	1,944	1,944	1,944	1,944	1,944	1,944	1,944	**23,328**
Electricity	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	**45,360**
Insurance	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	2,916	**34,992**
Insurance vehicles	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	**134,784**
Rent paid	11,880	11,880	11,880	11,880	11,880	11,880	11,880	11,880	11,880	11,880	11,880	11,880	**142,560**
Covered parking	864	864	864	864	864	864	864	864	864	864	864	864	**10,368**
Stationary	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	**45,360**
Telephone - Telkom	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	**33,696**
Travel & accommodation	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	**45,360**
Services on vehicles and motorbikes	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	**66,400**
Cost per parcel	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**	**R 33.98**
Cost per parcel (excluding depreciation)	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**	**R 32.71**
Current cost per parcel (Outsourced)	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	**37.23**	
Saving per parcel	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	
No of parcels per month	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	
Total saving per month (Cash flow)	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**43,070.88**	**516,850.57**

3.7.8 Budget 2016

2016													
Month	**Jan-16**	**Feb-16**	**Mar-16**	**Apr-16**	**May-16**	**Jun-16**	**Jul-16**	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**	**12 Months / Full Year**
Total no of parcels	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	**114,456**
Door - Door no of parcels	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	9,178	
Collect (Walk-In Patients) parcels	360	360	360	360	360	360	360	360	360	360	360	360	
Expenses	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**349,783**	**4,197,401**
Operating expenses													
Fuel per parcel	37,385	37,385	37,385	37,385	37,385	37,385	37,385	37,385	37,385	37,385	37,385	37,385	**448,617**
Consol bags	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	**23,734**
Line-haul charge	54,235	54,235	54,235	54,235	54,235	54,235	54,235	54,235	54,235	54,235	54,235	54,235	**650,820**
Cellphone - Nokia	875	875	875	875	875	875	875	875	875	875	875	875	**10,498**
Cellphone - BlackBerry	6,823	6,823	6,823	6,823	6,823	6,823	6,823	6,823	6,823	6,823	6,823	6,823	**81,881**
Capex installment	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	*20,716*	***248,587***
Salaries													
Amount of drivers	14	14	14	14	14	14	14	14	14	14	14	14	
Drivers salaries	106,142	106,142	106,142	106,142	106,142	106,142	106,142	106,142	106,142	106,142	106,142	106,142	**1,273,709**
Receptionist	6,415	6,415	6,415	6,415	6,415	6,415	6,415	6,415	6,415	6,415	6,415	6,415	**76,982**
Operational staff	17,496	17,496	17,496	17,496	17,496	17,496	17,496	17,496	17,496	17,496	17,496	17,496	**209,952**
Administrator	8,748	8,748	8,748	8,748	8,748	8,748	8,748	8,748	8,748	8,748	8,748	8,748	**104,976**
Branch supervisor	20,995	20,995	20,995	20,995	20,995	20,995	20,995	20,995	20,995	20,995	20,995	20,995	**251,942**
Cleaner	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	**33,592**
Depreciation - delivery vehicles													
Depreciation over 36 months	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**12,056**	**144,672**
Other expenses													
Alarm system	583	583	583	583	583	583	583	583	583	583	583	583	**6,998**
Consumables	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	**25,194**
Electricity	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	**48,989**
Insurance	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	3,149	**37,791**
Insurance vehicles	12,131	12,131	12,131	12,131	12,131	12,131	12,131	12,131	12,131	12,131	12,131	12,131	**145,567**
Rent paid	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	12,830	**153,965**
Covered parking	933	933	933	933	933	933	933	933	933	933	933	933	**11,197**
Stationary	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	**48,989**
Telephone - Telkom	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	**36,392**
Travel & accommodation	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	4,082	**48,989**
Services on vehicles and motorbikes	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100	**73,200**
Cost per parcel	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**	**R 36.67**
Cost per parcel (excluding depreciation)	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**	**R 35.41**
Current cost per parcel (Outsourced)	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	**39.46**	
Saving per parcel	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	
No of parcels per month	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	9,538	
Total saving per month (Cash flow)	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**38,673.42**	**464,081.07**

3.7.9 NPV of the Bloemfontein courier investment

The NPV of the Bloemfontein investment has been calculated based on the 2014-2016 budget figures. Table 3.9 below shows the initial investment of R247 750 and the annual cash flows for the three-year period of the project. Year 1 reflects a negative annual cash flow of R128 323, while year 2 reflects a positive annual cash flow of R516 851 and year 3 a positive annual cash flow of R464 081. The required rate of return (r) is 12%.

Table 3.9: NPV calculation of the Bloemfontein investment

Bloemfontein Courier Investment NPV				
r	12%			
Year	0	1	2	3
Cash Flow	-247,750	-128,323	516,851	464,081
NPV	**380,030.12**			

The NPV for the Bloemfontein courier investment project is calculated at R380 030. The R380 030 calculated NPV will serve as the base case in the Sensitivity Analysis of the investment.

3.7.10 IRR of the Bloemfontein courier investment

The IRR of the Bloemfontein investment was calculated based on the 2014-2016 budget figures. Table 3.10 below shows the initial investment of R247 750 and the annual cash flows for the three-year period of the project. Year 1 reflects a negative annual cash flow of R128 323, while year 2 reflects a positive annual cash flow of R516 851 and year 3 a positive annual cash flow of R464 081. The required rate of return (r) is 12%.

Table 3.10: IRR calculation of the Bloemfontein investment

Bloemfontein Courier Investment IRR				
r	12%			
Year	0	1	2	3
Cash Flow	-247,750	-128,323	516,851	464,081
IRR	**57.03%**			

The IRR for the Bloemfontein courier investment project is calculated at 57.03%. The 57.03% calculated IRR will serve as the base case in the Sensitivity Analysis of the investment.

3.7.11 PI of the Bloemfontein investment

In order to calculate the PI of the Bloemfontein investment project, the present value of the future cash flows must be calculated. Table 3.11 below shows the annual cash flows and the present value of the discounted cash flows. Year 1 reflects a negative discounted cash flow of R114 574, while year 2 reflects a positive discounted cash flow of R412 030 and year 3 a positive discounted cash flow of R330 324. The total of the discounted future cash flows amounts to R627 780. The required rate of return (r) is 12%.

Table 3.11: PI calculation of the Bloemfontein investment

Bloemfontein Courier Investment PI				
r =	12.00%			
Year	0	1	2	3
Cash Flow	-247,750	-128,323	516,851	464,081

Year (nper)	Cash Flow	Discounted Cash Flow
1	-128,323	-114,573.73
2	516,851	412,030.11
3	464,081	330,323.74
		627,780.12

	PI =	**627,780.12**	**=**	**2.53**
		247,750.00		

The PI for the Bloemfontein courier investment project is calculated at 2.53. The 2.53 calculated PI will serve as the base case in the Sensitivity Analysis of the investment.

3.8 SENSITIVITY ANALYSIS OF THE BLOEMFONTEIN INVESTMENT

As discussed in Chapter 2, the Sensitivity Analysis is an important technique for determining the effects of changes on the factors or assumptions that are used within the investment analysis. In the Sensitivity Analysis, the Bloemfontein investment assumptions regarding the annual cash flows have been adjusted with increments of 7.5%. The annual cash flow assumption was adjusted to a maximum of 22.5% upwards and 22.5% downwards.

3.8.1 NPV Sensitivity Analysis of the Bloemfontein investment

Sensitivity tests have been performed for the NPV to show the effect of an increase or decrease on the annual cash flows.

Table 3.12 shows the effect on NPV when tested at a decrease and an increase in the annual cash flows of 7.5%, 15% and 22.5%.

Table 3.12: Sensitivity calculation of the Bloemfontein investment NPV

Bloemfontein Courier Investment - Sensitivity Analysis NPV					
r	12%				
Year		0	1	2	3
Normal cash flow (Base case)		-247,750	-128,323	516,851	464,081
Sensitivity 1	**Decrease**	7.5%	-118,698	478,087	429,275
Sensitivity 2	**Decrease**	15.0%	-109,074	439,323	394,469
Sensitivity 3	**Decrease**	22.5%	-99,450	400,559	359,663
NPV = Normal cash flow (Base case)		380,030			
NPV - Sensitivity 1		332,947			
NPV - Sensitivity 2		285,863			
NPV - Sensitivity 3		238,780			

Bloemfontein Courier Investment - Sensitivity Analysis NPV					
r	12%				
Year		0	1	2	3
Normal cash flow (Base case)		-247,750	-128,323	516,851	464,081
Sensitivity 1	**Increase**	7.5%	-137,947	555,614	498,887
Sensitivity 2	**Increase**	15.0%	-147,571	594,378	533,693
Sensitivity 3	**Increase**	22.5%	-157,195	633,142	568,499
NPV = Normal cash flow (Base case)		380,030			
NPV - Sensitivity 1		427,114			
NPV - Sensitivity 2		474,197			
NPV - Sensitivity 3		521,281			

A decrease of 7.5% in the annual cash flows relates to a new NPV of R332 947 and a 22.5% decrease relates to a NPV of R238 780. As per Table 3.9 above, the base case NPV has been calculated as R38 030.

An increase of 7.5% in annual cash flows relates to a new NPV of R427 114 and a 22.5% increase relates to a NPV of R521 281.

3.8.2 IRR Sensitivity Analysis of the Bloemfontein investment

Sensitivity tests have been performed for the IRR to show the effect of an increase or decrease on the annual cash flows.

Table 3.13 shows the effect on IRR when tested at a decrease and an increase in the annual cash flows of 7.5%, 15% and 22.5%.

Table 3.13: Sensitivity calculation of the Bloemfontein IRR

Bloemfontein Courier Investment - Sensitivity Analysis IRR						
r	12%					
Year			0	1	2	3
Normal cash flow (Base case)			-247,750	-128,323	516,851	464,081
Sensitivity 1	**Decrease**	7.5%	-247,750	-118,698	478,087	429,275
Sensitivity 2	**Decrease**	15.0%	-247,750	-109,074	439,323	394,469
Sensitivity 3	**Decrease**	22.5%	-247,750	-99,450	400,559	359,663
IRR = Normal cash flow (Base case)		57.03%				
IRR - Sensitivity 1		52.73%				
IRR - Sensitivity 2		48.17%				
IRR - Sensitivity 3		43.33%				

Bloemfontein Courier Investment - Sensitivity Analysis IRR						
r	12%					
Year			0	1	2	3
Normal cash flow (Base case)			-247,750	-128,323	516,851	464,081
Sensitivity 1	**Increase**	7.5%	-247,750	-137,947	555,614	498,887
Sensitivity 2	**Increase**	15.0%	-247,750	-147,571	594,378	533,693
Sensitivity 3	**Increase**	22.5%	-247,750	-157,195	633,142	568,499
IRR = Normal cash flow (Base case)		57.03%				
IRR - Sensitivity 1		61.11%				
IRR - Sensitivity 2		64.99%				
IRR - Sensitivity 3		68.69%				

A decrease of 7.5% in annual cash flows relates to a new IRR of 52.73% and a 22.5% decrease relates to an IRR of 43.33%. As per Table 3.10 above, the base case IRR has been calculated as 57.03%.

An increase of 7.5% in the annual cash flows relates to a new IRR of 61.11% and a 22.5% increase relates to an IRR of 68.69%.

3.8.3 PI Sensitivity Analysis of the Bloemfontein investment

Sensitivity tests have been performed for the PI to show the effect of an increase or decrease on the annual cash flows.

Table 3.14 and Table 3.15 show the effect on PI when tested at a decrease and an increase in annual cash flows of 7.5%, 15% and 22.5%.

Table 3.14: Sensitivity calculation of the Bloemfontein PI (decrease)

Bloemfontein Courier Investment - Sensitivity Analysis PI						
r	12%					
Year			0	1	2	3
Normal cash flow (Base case)			-247,750	-128,323	516,851	464,081
Sensitivity 1	**Decrease**	7.5%	-247,750	-118,698	478,087	429,275
Sensitivity 2	**Decrease**	15.0%	-247,750	-109,074	439,323	394,469
Sensitivity 3	**Decrease**	22.5%	-247,750	-99,450	400,559	359,663

Bloemfontein Courier Investment - Sensitivity Analysis PI				
r =	12.00%			
Year	0	1	2	3
Cash Flow - Sensitivity 1	-247,750	-118,698	478,087	429,275
Cash Flow - Sensitivity 2	-247,750	-109,074	439,323	394,469
Cash Flow - Sensitivity 3	-247,750	-99,450	400,559	359,663

Year (nper)	Cash Flow Sensitivity 1	Discounted Cash Flow Sensitivity 1	Cash Flow Sensitivity 2	Discounted Cash Flow Sensitivity 2	Cash Flow Sensitivity 3	Discounted Cash Flow Sensitivity 3
1	-118,698	-105,980.70	-109,074	-97,387.67	-99,450	-88,794.64
2	478,087	381,127.85	439,323	350,225.60	400,559	319,323.34
3	429,275	305,549.46	394,469	280,775.18	359,663	256,000.90
		580,696.62		**533,613.11**		**486,529.60**

Sensitivity 1	**PI =**	**580,696.62 / 247,750.00**	**=**	**2.34**
Sensitivity 2	**PI =**	**533,613.11 / 247,750.00**	**=**	**2.15**
Sensitivity 3	**PI =**	**486,529.60 / 247,750.00**	**=**	**1.96**

A decrease of 7.5% in annual cash flows relates to a new PI of 2.34 and a 22.5% decrease relates to a PI of 1.96. As per Table 3.11 above, the base case NPV has been calculated as 2.53.

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Table 3.15: Sensitivity Analysis of the Bloemfontein PI (increase)

Bloemfontein Courier Investment - Sensitivity Analysis PI						
r	12%					
Year			0	1	2	3
Normal cash flow (Base case)			-247,750	-128,323	516,851	464,081
Sensitivity 1	**Increase**	7.5%	-247,750	-137,947	555,614	498,887
Sensitivity 2	**Increase**	15.0%	-247,750	-147,571	594,378	533,693
Sensitivity 3	**Increase**	22.5%	-247,750	-157,195	633,142	568,499

Bloemfontein Courier Investment - Sensitivity Analysis PI				
r =	12.00%			
Year	0	1	2	3
Cash Flow - Sensitivity 1	-247,750	-137,947	555,614	498,887
Cash Flow - Sensitivity 2	-247,750	-147,571	594,378	533,693
Cash Flow - Sensitivity 3	-247,750	-157,195	633,142	568,499

Year (nper)	Cash Flow Sensitivity 1	Discounted Cash Flow Sensitivity 1	Cash Flow Sensitivity 2	Discounted Cash Flow Sensitivity 2	Cash Flow Sensitivity 3	Discounted Cash Flow Sensitivity 3
1	-137,947	-123,166.76	-147,571	-131,759.79	-157,195	-140,352.82
2	555,614	442,932.37	594,378	473,834.63	633,142	504,736.89
3	498,887	355,098.02	533,693	379,872.30	568,499	404,646.58
		674,863.63		**721,947.14**		**769,030.65**

Sensitivity 1	**PI =**	**674,863.63 / 247,750.00**	**=**	**2.72**
Sensitivity 2	**PI =**	**721,947.14 / 247,750.00**	**=**	**2.91**
Sensitivity 3	**PI =**	**769,030.65 / 247,750.00**	**=**	**3.10**

An increase of 7.5% in annual cash flows relates to a new PI of 2.72 and a 22.5% increase relates to a PI of 3.10.

3.9 SUMMARY

Assessing the value chain of Pharmacy X and taking into consideration their experience in the industry, current resources and capabilities, they are able to create a competitive advantage that will ultimately results in superior value creation.

The calculations and results of Chapter 3 form the basis of the final chapter in determining the overall conclusion and recommendations regarding the feasibility of investing in a courier operation in Bloemfontein.

CHAPTER 4

CONCLUSION AND RECOMMENDATIONS

4. CHAPTER 4: CONCLUSION AND RECOMMENDATIONS

4.1 INTRODUCTION

This chapter concludes the study and contributes towards the primary and secondary objectives of this study, as explained in Chapter 1. The conclusions and recommendations will be based on the literature review conducted in Chapter 2 and the results obtained from the empirical study in Chapter 3.

The primary objective of the study is to determine the feasibility of an in-house courier operation in Bloemfontein versus the current outsourced model. Both Chapter 2 and Chapter 3 will form the basis of reaching the primary objective of the study.

In order to reach the first secondary objectives, a literature study was conducted in Chapter 2, to explain the topics of outsourcing, vertical integration, value chain and several Cost Benefit Analysis techniques. The literature study will form the basis for the Business Model Analysis and cost benefit techniques applied in Chapter 3.

The second secondary objective of the study was to assess the current cost per parcel charged by Courier X in the Bloemfontein area. Actual data from the accounting system and management information system was obtained and critically analysed in order to reach the second secondary objective.

Chapter 3 finally contributed towards reaching the third secondary objective of determining the nature and significance of the capital investment and operational costs required to move the service in-house. All the cost benefit techniques as discussed in Chapter 2 were applied in Chapter 3, in conjunction with a Sensitivity Analysis to reach the third secondary objective.

Finally this chapter will summarise al the results from the preceding chapters, conclusions will be conducted, and recommendations will be made with regard to the main objective of the study.

4.2 MAIN FINDINGS

4.2.1 The assessment of competition within the industry

Pharmacy X was the first national courier in South Africa and gained a first mover advantage. In Chapter 2 Porter's Five Forces Model was applied to determine and evaluate the current strength of market forces within the industry of Pharmacy X.

The competitive assessment revealed that the highest threat for Pharmacy X is that of new product offerings and services. Large corporate retail pharmacy chains like Clicks and Dis-Chem also started their own courier medicine services as an additional offering to their patients.

4.2.2 The risk of outsourcing a core strategic business activity

As indicated by the value chain analysis of Pharmacy X in Chapter 3, the outbound logistics function plays an integral role in the success of the delivery to the patient and therefore creating customer satisfaction. The current outsourced outbound logistics function is a core function and a strategic activity for Pharmacy X.

If companies outsource strategic and core activities that will create differentiation in the market, they stand the risk of losing their competitive advantage, internal competencies and innovative capabilities.

According to the literature discussion on outsourcing in Chapter 2, one of the main reasons to in-source will be the minimization of risk within the supply of an entity.

The opening of the Bloemfontein courier operation will be the first step in the right direction of reducing the risk of outsourcing a core strategic activity. It will also reduce risk for Pharmacy X within the supply chain of their goods.

4.2.3 The implementation of NHI presenting growth

Government plans to implement NHI over the next 14 years and chronic medication is high on the priority list of the NHI task team. The Pharmacy X business model supports the NHI initiative to decongest hospitals and clinics by taking healthcare to people. The distribution of chronic medicine will play a critical role in the success of NHI.

The opening of the Bloemfontein operation will strengthen the resources and capabilities of Pharmacy X in the field of outbound logistics and courier activities. This will increase the value offering, and improve the current business model of Pharmacy X to the Government and other possible new customers.

4.2.4 Net Present Value (NPV)

The Net Present Value, calculated at a 12% discount rate, equals R380 030. As discussed in the literature study in Chapter 2, a project with a positive NPV is acceptable. The positive NPV of R380 030 promises a return greater than the required rate of return of 12%. Therefore the conclusion is made, based on NPV, that Pharmacy X should invest in the Bloemfontein courier operation.

4.2.5 Internal Rate of Return (IRR)

The Internal Rate of Return was calculated at 57.03%. As discussed in the literature study in Chapter 2, a project with an IRR equal or greater than the required return must be accepted. In the case of the Bloemfontein investment project, the required rate of return is 12%.The IRR of 57.03% promises a return greater than the required rate of return of 12%. Therefore the conclusion is made, based on the IRR that Pharmacy X should invest in the Bloemfontein courier operation.

4.2.6 Profitability Index (PI)

The Profitability Index was calculated at 2.53. As discussed in the literature study in Chapter 2, a project with a PI greater than 1.0 must be accepted. If the PI of a project is less than 1.0, the present value of the future cash flows is less than the

original investment. Therefore the conclusion is made, based on a PI of 2.53, that Pharmacy X should invest in the Bloemfontein courier operation.

4.2.7 Sensitivity Analysis of the Net Present Value

The NPV of R380 030 as calculated in the base case of the Bloemfontein courier project was tested at different cash flow levels in order to test the sensitivity of the project. The annual cash flow inputs were adjusted at increments of 7.5% to a maximum of 22.5% up and down.

The Net Present Values, calculated at all three scenarios when adjusting the annual cash flow downwards and upwards, still reflected a positive NPV for all three scenarios. Therefore the conclusion is made based on the sensitivity of the NPV that Pharmacy X should invest in the Bloemfontein courier operation.

4.2.8 Sensitivity Analysis of the Internal Rate of Return

The IRR of 57.03% as calculated in the base case of the Bloemfontein courier project was tested at different cash flow levels in order to test the sensitivity of the project. The annual cash flow inputs were adjusted at increments of 7.5% to a maximum of 22.5% up and down.

The Internal Rate of Return, calculated at all three scenarios when adjusting the annual cash flow downwards and upwards still reflected an IRR greater than the required rate of return of 12% in all three scenarios. Therefore the conclusion is made, based on the sensitivity of the IRR that Pharmacy X should invest in the Bloemfontein courier operation.

4.2.9 Sensitivity Analysis of the Profitability Index

The PI of 2.53 as calculated in the base case of the Bloemfontein courier project was tested at different cash flow levels in order to test the sensitivity of the project. The annual cash flow inputs were adjusted at increments of 7.5% to a maximum of 22.5% up and down.

The Profitability Index calculated at all three scenarios, when adjusting the annual cash flow downwards and upwards, still reflected a PI greater than the required 1.0 in all three scenarios. Therefore the conclusion is made based on the sensitivity of the PI that Pharmacy X should invest in the Bloemfontein courier operation.

All the cost benefit analysis techniques above concluded that the Bloemfontein courier investment will be a financially viable operation. The Bloemfontein courier investment will increase shareholder value over the period of the project, compared to the current outsourced model.

4.3 RECOMMENDATIONS

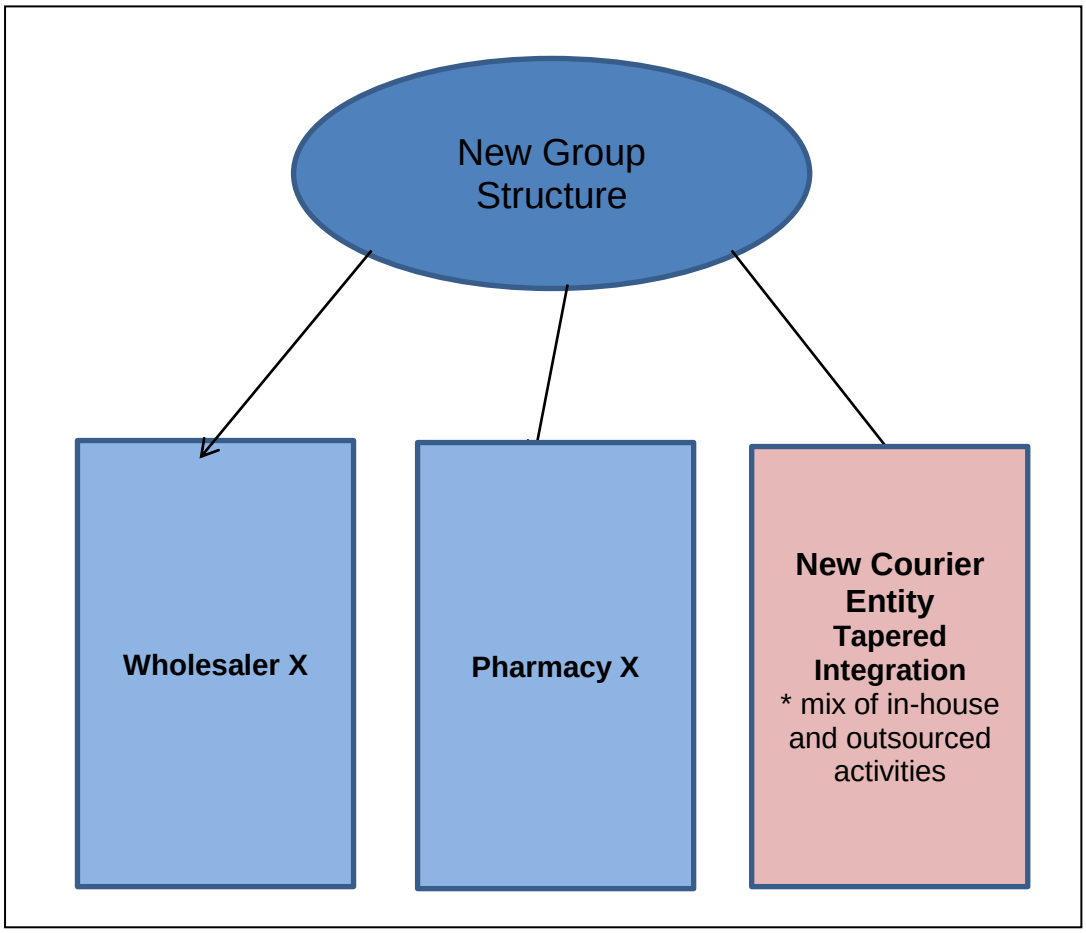
The courier pharmaceutical industry is a low-margin industry, and several new players are entering the market with new product offerings. The management team of Pharmacy X must focus on new strategies to lower costs, increase expertise and to create product and service differentiation.

Based on the findings and conclusions made in Chapter 4, the following recommendation can be made to the management team of Pharmacy X.

4.3.1 New vertical integration strategy for Pharmacy X

The opening of the Bloemfontein courier operation will lead to a newly found entity and a new forward integration strategy for Pharmacy X. Therefore Pharmacy X will start a newly found courier operation in the industry value chain, closer to the customer or patient. The recommended new group structure is shown by Figure 4.1 below. The new group structure as illustrated by Figure 4.1, will include a courier entity with a tapered integration strategy. The recommended tapered integration strategy is a mixture of in-house and outsourced activities within the outbound logistics activity of Pharmacy X.

Figure 4.1: New group structure of Pharmacy X



The Bloemfontein courier operation will be the first outbound logistics function under the full control of Pharmacy X, and part of the new courier entity. All the other geographical areas of delivery will still be outsourced to outside courier companies.

4.4 FINAL SUMMARY

The primary objective of this study was to determine the feasibility of an in-house courier operation in the Bloemfontein area, versus the current outsourced courier model. In order to achieve the primary objective of the study, several secondary objectives were set and reached throughout the four chapters of the study. The study applied cost benefit analysis techniques to determine the feasibility of the Bloemfontein courier operation.

Chapter one identified the primary and secondary objectives of the study. This chapter also explained the background, purpose and the structure of the study.

Chapter two reflected an industry overview and the size of the South African pharmaceutical market. The chapter also reflected on the courier industry of South Africa. The chapter included an assessment of the current market forces within the courier pharmacy industry where Pharmacy X operates in. Finally the chapter reflected a literature review on the topics of outsourcing, vertical integration, value chain and cost benefit analysis techniques.

Chapter three presented the data analysis and empirical results of this case study. The chapter included an analysis of the current business model, market segmentation and competitor analysis of Pharmacy X. The chapter further showed the cost drivers of Pharmacy X and the cost per parcel analysis of the current outsourced outbound logistics function of Pharmacy X. Finally the chapter applied four cost benefit analysis techniques to determine the feasibility of a Bloemfontein courier operation under the control of Pharmacy X.

Chapter four provided the conclusions and recommendations with regard to the results as obtained through the study. The findings and recommendations, based on this case study of the Bloemfontein courier investment will enable the management team of Pharmacy X to investigate other possible new areas for the roll out of their own outbound courier operations.

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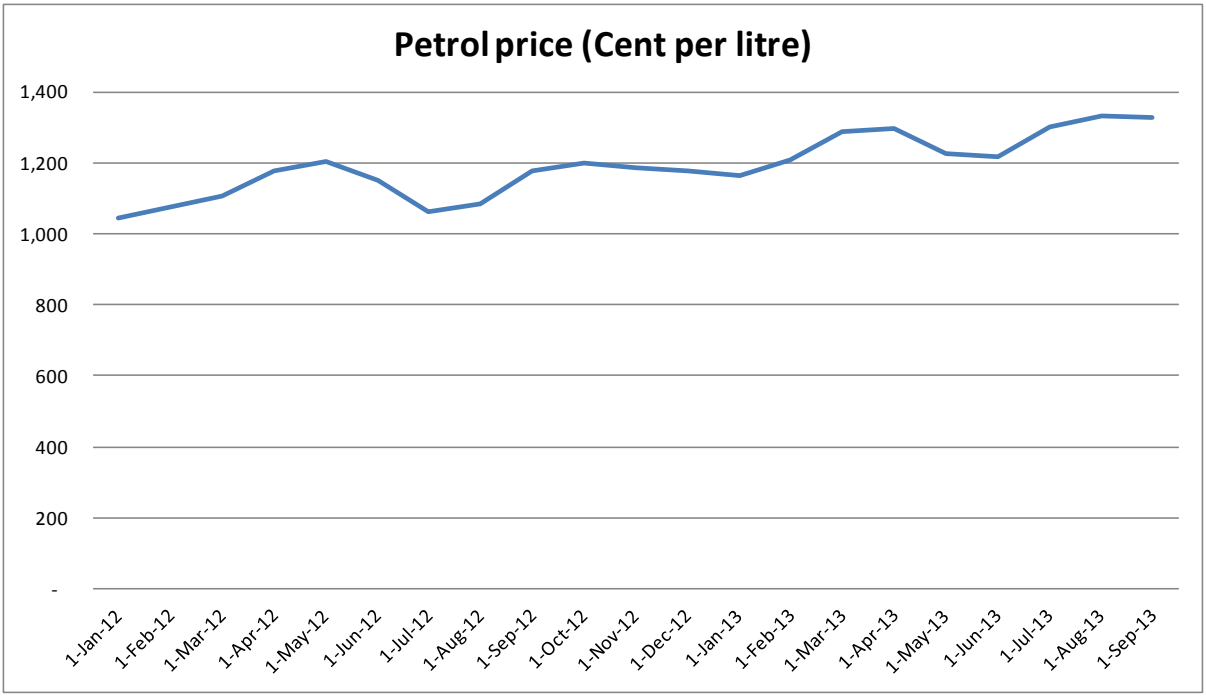
APPENDIX A: PETROL PRICE

2013 Petrol Price (Cent per litre)						
Petrol	Reef			Coast		
	Unleaded		LRP	Unleaded		LRP
	93	95	93	93	95	95
4-Sep-13	1,327	1,350	1,327	1,307	1,313	1,313
7-Aug-13	1,332	1,355	1,332	1,312	1,318	1,318
3-Jul-13	1,300	1,323	1,300	1,280	1,286	1,286
5-Jun-13	1,216	1,239	1,216	1,196	1,202	1,202
1-May-13	1,224	1,247	1,224	1,204	1,210	1,210
3-Apr-13	1,297	1,320	1,297	1,277	1,283	1,283
6-Mar-13	1,287	1,308	1,287	1,269	1,273	1,273
6-Feb-13	1,206	1,227	1,206	1,188	1,192	1,192
2-Jan-13	1,165	1,186	1,165	1,147	1,151	1,151

2012 Petrol Price (Cent per litre)						
Petrol	Reef			Coast		
	Unleaded		LRP	Unleaded		LRP
	93	95	93	93	95	95
5-Dec-12	1,178	1,201	1,178	1,160	1,166	1,166
7-Nov-12	1,187	1,210	1,187	1,169	1,175	1,175
3-Oct-12	1,197	1,220	1,197	1,179	1,185	1,185
5-Sep-12	1,176	1,197	1,176	1,158	1,162	1,162
1-Aug-12	1,083	1,104	1,083	1,065	1,069	1,069
4-Jul-12	1,061	1,082	1,061	1,043	1,047	1,047
6-Jun-12	1,150	1,167	1,150	1,132	1,132	1,132
2-May-12	1,205	1,222	1,205	1,187	1,187	1,187
4-Apr-12	1,177	1,194	1,177	1,159	1,159	1,159
7-Mar-12	1,105	1,123	1,105	1,188	1,193	1,193
1-Feb-12	1,077	1,095	1,077	1,060	1,060	1,065
4-Jan-12	1,043	1,061	1,043	1,026	1,031	1,031

Source: Shell (2013)

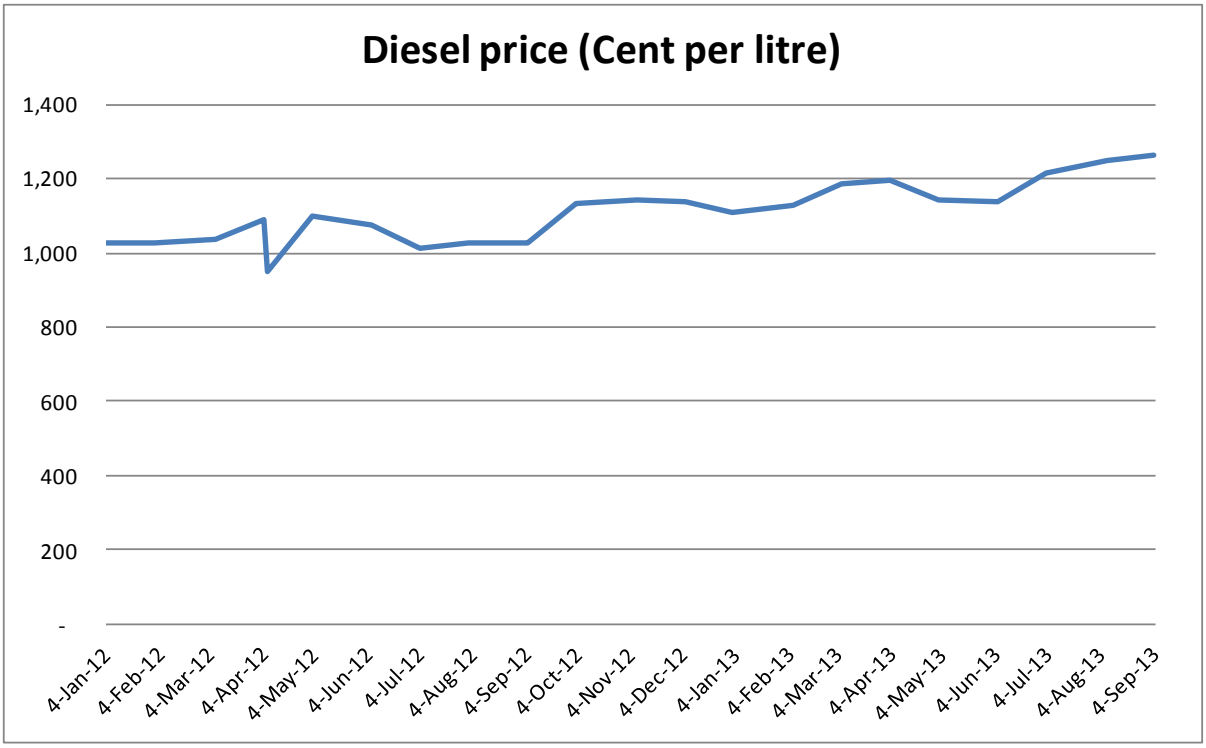

Petrol price (Cent per litre)
1,400
1,200
1,000
800
600
400
200
-
1-Jan-12
1-Feb-12
1-Mar-12
1-Apr-12
1-May-12
1-Jun-12
1-Jul-12
1-Aug-12
1-Sep-12
1-Oct-12
1-Nov-12
1-Dec-12
1-Jan-13
1-Feb-13
1-Mar-13
1-Apr-13
1-May-13
1-Jun-13
1-Jul-13
1-Aug-13
1-Sep-13

APPENDIX B: DIESEL PRICE

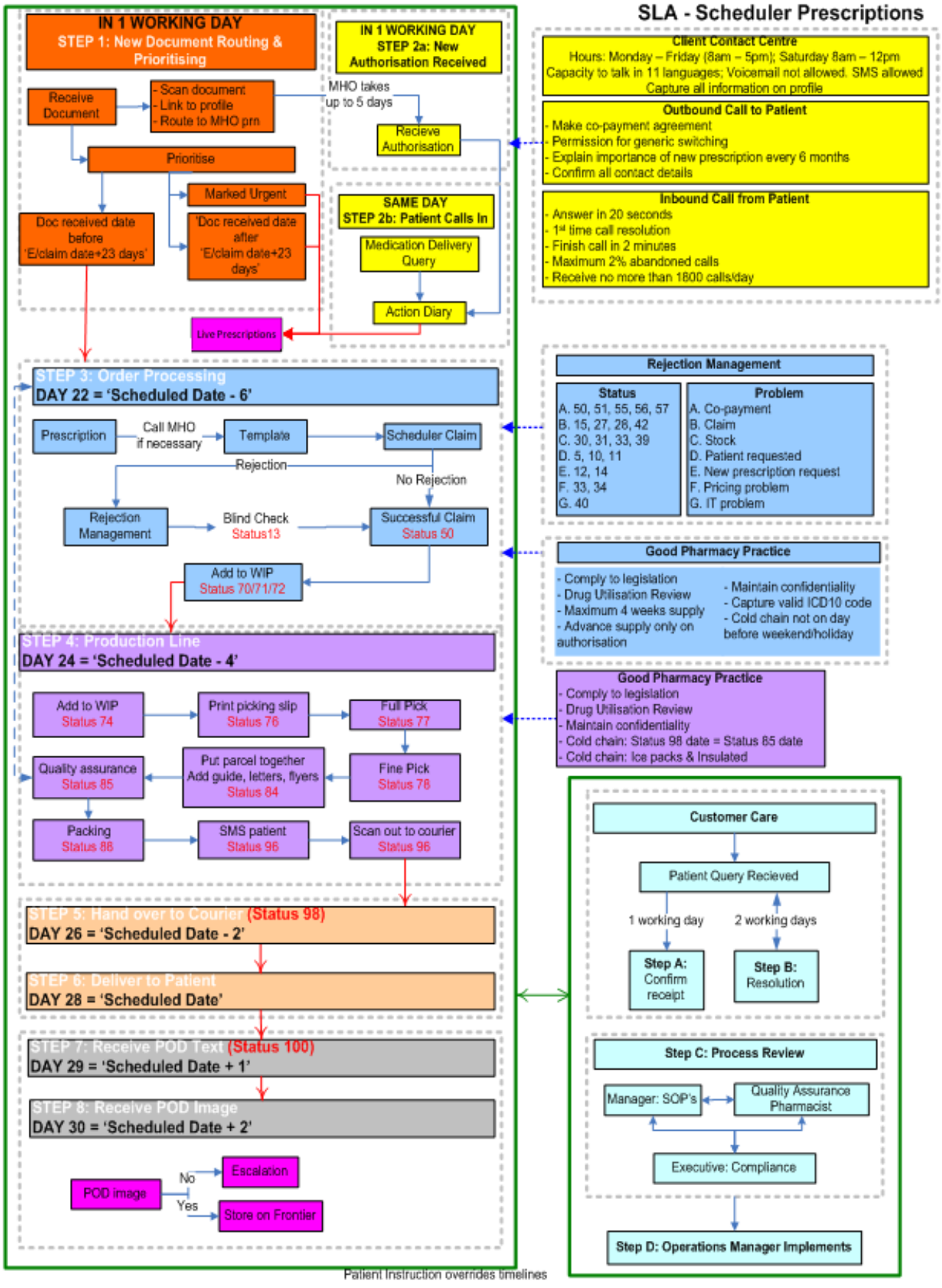
2013 Diesel Price (Cent per litre)				
Diesel	**Reef**		**Coast**	
		New		***New***
	0.05%	**0.01%**	**0.05%**	**0.01%**
4-Sep-13	1,262	1,268	1,236	1,241
7-Aug-13	1,248	1,253	1,222	1,226
3-Jul-13	1,215	1,220	1,189	1,193
5-Jun-13	1,137	1,142	1,111	1,115
1-May-13	1,141	1,146	1,115	1,119
3-Apr-13	1,197	1,202	1,170	1,175
6-Mar-13	1,188	1,192	1,163	1,167
6-Feb-13	1,129	1,134	1,105	1,109
2-Jan-13	1,111	1,116	1,087	1,091

2012 Diesel Price (Cent per litre)				
Diesel	**Reef**		**Coast**	
		New		***New***
	0.05%	**0.01%**	**0.05%**	**0.01%**
5-Dec-12	1,139	1,144	1,114	1,120
7-Nov-12	1,144	1,150	1,119	1,126
3-Oct-12	1,134	1,141	1,109	1,117
5-Sep-12	1,028	1,033	1,007	1,013
1-Aug-12	1,026	1,032	1,001	1,007
4-Jul-12	1,011	1,016	986	992
6-Jun-12	1,074	1,078	1,049	1,049
2-May-12	1,098	1,103	1,074	1,074
6-Apr-12	948	953	928	933
4-Apr-12	1,089	1,094	1,064	1,070
7-Mar-12	1,037	1,040	1,017	1,020
1-Feb-12	1,027	1,031	1,031	1,031
4-Jan-12	1,028	1,033	1,007	1,013

Source: Shell (2013)


Diesel price (Cent per litre)
1,400
1,200
1,000
800
600
400
200
-
4-Jan-12
4-Feb-12
4-Mar-12
4-Apr-12
4-May-12
4-Jun-12
4-Jul-12
4-Aug-12
4-Sep-12
4-Oct-12
4-Nov-12
4-Dec-12
4-Jan-13
4-Feb-13
4-Mar-13
4-Apr-13
4-May-13
4-Jun-13
4-Jul-13
4-Aug-13
4-Sep-13

APPENDIX C: FLOWCHART



APPENDIX D: LETTER FROM LANGUAGE EDITOR

November 5, 2013

TO WHOM IT MAY CONCERN

Re: Letter of confirmation of language editing

The dissertation **"A cost benefit analysis in chronic medicine courier pharmacies: A case study"** by Christiaan Frederick Beyers (11659920) was language, technically and typographically edited. The sources and referencing technique applied was checked to comply with the specific Harvard technique as per North-West University prescriptions. Final corrections as suggested remain the responsibility of the student.

Antoinette Bisschoff
Officially approved language editor of the NWU since 1998
Member of SA Translators Institute (no. 100181)