

UNIVERSITY OF KWAZULU-NATAL

**STRATEGIC SUPPLY CHAIN MANAGEMENT INITIATIVES AND THE
BARRIERS TO IMPLEMENTATION IN THE ETHEKWINI METROPOLITAN IN
KZN PROVINCIAL HOSPITALS**

By Edwin Bongani Sikhosana

(211557927)

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Declaration

I Bongani Edwin Sikhosana declare that:

- (i) The research reported in this dissertation/thesis, except where otherwise indicated, is my original research.
- (ii) This dissertation/thesis has not been submitted for any degree or examination at any other university.
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Abstract

The primary focus of the healthcare sector has been to provide patients with the best quality of care. The researcher has chosen seventy two (72) senior management of the nine KwaZulu Natal Provincial hospital as the population size because they are involved in the crafting of the strategy and its implementation. The research participants of this research were senior managerial staff and Supply Chain Management practitioners who were working in the nine Provincial hospitals in KwaZulu Natal in the EThekweni Municipality – by very nature they were suitable candidates for purposive sampling. In order to answer the research questions, a survey questionnaire was distributed to senior managerial staff and Supply Chain Management practitioners who were working in Provincial hospitals in KwaZulu Natal in the EThekweni Municipality. Respondents were asked to provide their perceptions of characteristics of successful health care supply chain initiatives, barriers to implementation on the overall organizational performance and effectiveness in their organizations, and the current state of the Provincial Hospital on Supply Chain Management. The study results identified ten (10) critical factors that are deemed as barriers to implementation of strategic supply chain management and ten (10) initiatives to be adopted. The study concluded by identifying four (4) practices that needs to be adopted and implemented in order to improve the existing situation. The sample design was non-probability sampling since the representativeness of sample was not critical and the research had to be completed within a short time frame. The sampling technique selected was judgement sampling because the subjects were selected on the basis of their expertise in the subject investigated. The delay in the approval process by the heads of the participating hospitals presented a major challenge in conducting this study. Data collection was also a challenge because the problem of internet connectivity by participants was only discovered very late when the response rate was nearly zero. The participants only had access to intranet whilst the study was internet bases using QuestionPro. These delays resulted in the researcher having to wait for in excess of two months before handing in hard copies to recipients.

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CHAPTER ONE

OVERVIEW OF THE STUDY

1.1 Introduction

The current state of the economy in South Africa and the rest of the world require that the way business is conducted be revisited. Leaders in all areas of the industries operating in a competitive environment in the manufacturing, storage and movement of goods and services face tough challenges daily. (Schneller and Larry R. Smeltzer, 2006) said that not so long ago health care providers' focus was on the provision of quality care irrespective of cost, however, with the increase of cost and competition in the health care industry, the role of materials management has changed and became more important. Health care managers have realised that efficient materials management would result in both cost reduction and improved quality care.

Supply Chain Management and logistics particularly in healthcare requires a balance that satisfies both the end users (physicians) on one hand and finance people on the other in the form of reduced inventory, high stock turns and elimination of obsolete and expiring stock but still remaining cost competitive. If processes, product information, information technology systems for both the buying and supplying organisation are connected, supply chain efficiencies will be achieved resulting in lowered costs in distribution centers and warehouses. Lowering inventory levels in warehouses and distribution centers, improving out of stock levels, reducing paperwork and improving data accuracy are a must nowadays (Griffith RJ, 2011).

This study was done against the above understanding with the aim of identifying current supply chain practices, what initiatives can be taken and the barriers to the implementation of those initiatives within the EThekweni provincial hospitals.

1.2 Motivation of the study

Government Provincial hospitals are confronted with need to lowering the expenses of holding and overseeing inventory while at the same time are expected to offer superior service delivery to patients at reasonable cost. Stock quantities are extremely huge, varied in terms of styles and brands and at times whether the stock is owned or consigned. Hospital staffs are occupied in cyclic and laborious stock takes and audits in an endeavour to gain some intelligence about their stock levels and to conform to regulatory bodies and Public Finance Management Act. In most cases clinicians and other support staff are not trained in Logistics and Supply Chain management and the result is the costly stock on hand or excess stock, shrinking stock that has to be scrapped and expired stock which is not taken off the shelves putting patients at risk at the same time wasting the clinicians time worrying about stock issues instead of patients.

1.3 Focus of the Study

The study was conducted in the nine Government Provincial hospitals in the EThekweni metropolitan area of Kwa-Zulu Natal.

1.4 Problem Statement

The large spending within hospital supply chain is influenced amongst others by expensive medical devices and physicians preferences of non-surgical consumables. The prevalence of HIV-AIDS coupled with aging population has increased the demand for health care services resulting in the increase of demand of technologically complex products required by physicians that far exceeds inflation.

According to Department of Health South Africa National Government (2010) the supply chain has an enormous impact on both the financial and the clinical performance of a hospital. This impact is now reaching a point where strategic supply chain management becomes an absolute necessity. When analysing the

hospital operating budget, the total supply chain expenses exceeds the labour costs. With this shift, it is becoming particularly crucial for hospital executives to apply close scrutiny to the supply chain and participate in the development of a supply chain management strategy.

The extreme financial challenges that hospital financial leaders are facing in the current economic downturn are unmatched —and results in the belief that there is a need for a strategic focus on supply chain management. By optimizing the supply chain, hospital executives can significantly increase margins and improve cash flows just by reducing total inventory on hand. Conserving cash through supply chain efficiencies will enhance a hospital's ability to central government funding (Department of Health South Africa National Government, 2010).

1.5 Objectives of Study

The objectives of the study were as follows:

- To investigate whether personal and functional characteristics of personnel in management have an impact on the functioning of Supply Chain Management.
- To determine the current status of supply chain in Kwa-Zulu Natal government provincial hospital sector in EThekweni municipality.
- To identify initiatives that affects the success of Supply Chain initiatives in the health care industry.
- To identify the supply chain challenges that will have an impact on the overall organisational effectiveness.

1.6 Research questions

- What is the lowest and highest professional and or academic qualification held by personnel in the supply chain organization and what are their designations?
- What are the current strategic initiatives relating to Supply Chain Management (SCM) in provincial hospitals?

- What are the major health care SCM initiatives to implementation of successful health care supply chain initiatives?
- What are the major health care SCM challenges to implementation of successful health care supply chain initiatives?

1.7 Limitations of the Study

The main constraint identified in this study was the time within which this study was conducted and completed. The time allocated for this project was less than five months. The sample size (57) was small due to the limited time in which to obtain data. The delay in the approval process by the heads of the participating hospitals presented a major challenge in conducting this study. Data collection was also a challenge because the problem of internet connectivity by participants was only discovered very late when the response rate was nearly zero. The participants only had access to intranet whilst the study was internet based using QuestionPro. These delays resulted in the researcher having to wait for in excess of two months before handing in hard copies to recipients.

1.8 Outline of the Study

This study was approached in a manner that provided a logical flow of the research process undertaken. The study is presented in five chapters as follows:

- Chapter One provides an introduction to the research problem, the motivation, focus of the study and the research question to be addressed. The objectives and limitations of this study are also identified.
- Chapter Two is based on a literature review, which is primarily on other similar studies conducted in India, Eastern Europe and the USA. The literature defines strategy, supply chain, supply chain management, barriers and initiatives of strategy implementation in hospitals. The implications and benefits of strategy implementation are also discussed.
- Chapter Three describes the various research methods employed in this study as well as the logic behind why those methods have been chosen.

- Chapter Four addresses the presentation, interpretation and discussion of the results. This chapter is approached in two sections; the demographic profile of the respondents and the findings related to the objectives of the study. The findings of this study were discussed with reference to the relevant literature pertaining to the objectives of the study.
- Chapter Five is the concluding chapter of this study in which the conclusions drawn and recommendations arising from the study are presented. The limitations identified in this study are discussed and recommendations for further research are offered.

1.9 Summary

This chapter introduced the research on challenges facing provincial hospitals regarding supply chain when procuring non-medical supplies. It outlined the nature of the research together with the direction that was followed in this research. The problem statement, objectives of the study, research questions and limitations of this study were formulated. The next chapter focuses on the literature review, which formed the basis for the empirical study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Very few studies have been conducted in the South African context regarding the strategic supply chain initiatives and the barriers to implementation in healthcare industry, especially, in public hospitals. A large portion of this literature review is, therefore, based on the European, Eastern and American studies. A study by Fawcett and Magnan (2004) maintained that in spite of the large volumes of research that exhibits the significance of supply chain management and the positive impact it can have on performance, there are still very few institutions that are engaged in governance efforts that promote extensive supply chain integration efforts. Most academic research focuses on the rationale of the Supply Chain Management and not on the barriers to the implementation of supply chain strategies (Richey Jr R. Glenn et al., 2010).

According to Efficient Healthcare Consumer Response (cited in Callender and Grasman, 2010) supply chain practices could contribute as significantly as \$23bn in cost savings but there is very little attention from health care managers to make the savings a reality. Moreover, the poor success of implementing supply chain practices in health care is attributable to the barriers encountered (Callender and Grasman, 2010).

According to Mihic, Obradovic, Todor and Petrovic (2012) the South African healthcare industry is not different from the rest of the world – it is also confronted by distinct challenges requiring Supply Chain solutions in order to reduce costs and offer responsive service to patients. In the current evolutionary and aggressive environment that healthcare providers operate in, value creation is also changing in a way that makes it clear that to sustain value and to survive healthcare providers have to apply strategic thinking. From this point of view, strategy is mainly the skill of placing a company at the correct position of the value chain - performing the right value adding activities (Acharyulu and Shekhar, 2012).

The improvements in the way business transactions are conducted and the dynamic forces in the market have changed the healthcare business making it the most aggressive business in the South African economy. Acharyulu and Shekhar (2012) conceded that almost none of the industries are confronted by a mixture of mass tailor-made products, fast decreasing product life cycles, quick stock depreciation, supply and demand mismatch, complicated supply chains, and growing expectations of end users than the healthcare industry. The burden of having a strong market share whilst providing good and quality healthcare at reasonable cost makes it important that hospitals have to depend on the right supply chain strategies that provides flexible and agile customer service whilst remaining competitive.

2.2 Definitions of terms

2.2.1 Supply Chain

Recent Supply Chain developments and functioning have necessitated that the supply chain be defined, and therefore, to give meaning to this study, a few definitions have been investigated and presented as follows:

According to Callender and Grasman (2010) supply chain is the combination of all the elements and activities performed in order to deliver the finished product from raw material to the end user and it includes requirement forecasting, reserve allocation, inventory management, production planning and scheduling up to delivery of a final product to customer. A strong and successful supply chain depends on the execution of the supply chain procedures which include internal interaction within the business, the support of the efforts and the processes introduced by supply chain management, information structures for data collection, data analysis and sharing, and ability to measure and to assess total supply chain costs and functioning, partnership and support in the upstream and downstream.

Callender and Grasman (2010) define supply chain in the health sector as an intricate structure that needs the flow of products and services in order to fulfil the requirements of those who deliver service to the patients. In hospitals, the unit

answerable for the well-organized management of supplies is often known as supply chain management or main stores. Supply Chain management functions include sourcing, procuring, expediting, receiving, warehousing, stock control and distribution with the objective of delivering great quality attention to end users at lessened charges.

According to Rose, Singh, Inder & Rose, (2012) supply chain is described as a process where entities or organisations come together in the provision and flow of information, products and services up and down between themselves as originators, banks or financiers, 3PL (third party logistics) providers, marketing concerns and other businesses who may be participating in the value chain (who may not be participants of the product manufacture) and it ends when the product reaches the customer(s). Furthermore, supply chain has been defined as follows:

- Supply Chain is —a structured manufacturing process wherein raw materials are transformed into finished goods, then delivered to end customers”.(Beamon, 1998)
- Tecc.com.au (cited in Janvier – James, 2012) explains Supply Chain as —a chain starting with raw materials and finishing with the sale of the finished good”.
- Bridgefield Group (2006) explains Supply Chain as —a connected set of resources and processes that starts with the raw materials sourcing and expands through the delivery of finished goods to the end consumer”(Bridgefield Group, 2006)..
- Pienaar (2009) defines Supply Chain as —a general description of the process integration involving organizations to transform raw materials into finished goods and to transport them to the end-user”.

The above definitions illustrate the beginning and the end of the supply chain function, that is, from raw material until the final finished product is transferred to the end user – the consumer. However more complicated and detailed definitions of Supply Chain extend and include the following:

- Little (1999) explains Supply Chain as —the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it”.
- Chow, Heaver & Henriksson define Supply Chain as —thegroup of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers. A Supply Chain comprises both the external and internal associates for the corporate”(Chow et al., 1994).
- Ayers (2001) defines Supply Chain as —the cycle processes involving physical goods, information, and financial flows whose objective is to satisfy end consumer requisites with goods and services from diverse, connected suppliers”.
- Mentzer (2001) defined Supply Chain as —aset of entities e.g..organisations or individuals) directly involved in the supply and distribution flows of goods, services, finances, and information from a source to a destination i.e. customer”.
- Lambert and Cooper (1998) defined supply chain in terms of business processes that interact among different companies that aim to aggregate value to end consumers (such as a relationship between supplier and customer).
- Janvier-James (2012) concurred that the role of Supply Chain is to increase value to a product when transporting or moving it from one location to another and in the process goods can be changed through processing.

The healthcare supply chain entails the movement of numerous diverse manufactured goods and the contributions of a number of participants. The foremost intention of the healthcare supply chain is to bring products in an appropriate way, in order to fulfil the requirements of end users. According to Callender and Grasman (2010) stakeholders in the healthcare supply chain industry are divided into three – based on their functionality: there are producers, purchasers, and providers as follows:

- Producers – manufacture medical products

- Purchasers (includes distributors and wholesalers) – they hold inventory for producers
- Healthcare providers – these are hospitals, integrated delivery networks, physicians' offices and specialised centres.

At a broader level, the above shows that Healthcare supply chains are very fragmented. The three major players are acting very independently of each other and coordinated supply chain hardly exists. This study and its findings show that integration of the hospital with suppliers systems caused by this fragmentation is a major barrier towards implementation of strategic supply chain initiatives.

2.2.2 Supply Chain Management

The concept of Supply Chain management as used in research today is associated with how the products are sourced, produced and distributed globally. This global sourcing, global production and global consumption of goods and services requires effective management of the flows of goods and information upstream and downstream of the supply chain. According to Trkman, Stemberger and Jaklik (2005) competition today is no longer amongst commodities but it is between the supply chains that deliver the commodities to the market. Trkman et al. (2005) maintain that the coordination between the manufacturers and the distributors of goods needs to be managed in order to offer quality service and good customer satisfaction and hence the role played by supply chain managers becomes critical and crucial. Furthermore, volatility in the markets requires a lot of flexibility from the supply chain participants and this flexibility needs to be managed effectively by staff in the Supply Chain Management.

Langley and Holcomb (1992) described the Supply Chain Management as a team of people that investigates and manages supply chain networks with the view of finding opportunities for cost saving and better customer service. Ballou (cited in Acharyulu and Shekhar (2012) describes supply chain management as responsible for visualisation and the control of the movement of goods and services from the point of origin up to the fulfilment of the need whilst meeting the organisation objectives

Rose et al. (2012) defined supply chain management as an act of planning, executing, observing, directing when possible and when necessary all the practices and flows of information within the supply chain which includes all the participants in the system whose main aim is to deliver product or service from the origin to the end customer.

In 1995 two studies by Lee Hau L. and Billington (1995) and Ganeshan and Harrison (1995) declared that —Supply Chain Management (SCM) incorporates the integration of activities taking place among facilities network that acquire raw material, transform them into intermediate products and final goods, then in the end deliver to customers through a system of distribution”.

Christopher (1998) extended the definition and said supply chain refers to the organizations network (within a specific corporate and across businesses) that are participating in the varied activities and undertakings that create worth to goods and services that are in the possession of the end user. Ayers (2001) extended the definition to include the maintenance and planning of supply chain processes and activities for the satisfaction of consumer's needs. The emphasis on all the definitions is the final delivery to the customer or the end user. A view held by Computerworld in 2001 whereby they defined Supply Chain Management (SCM) as the movement of the right goods and services to the position they needed on time, in the correct amount and at an acceptable cost. In order to manage this process efficiently it is important that the network needs to be supervised with regular feedback between customers, the suppliers, demand forecasting and inventory control departments.

By the year 2006 emphasis was on business process integration from end users to suppliers through sharing of information. The Supply Chain Management Professionals' Council (2009) went further and included all actions concerned in obtaining, procuring, conversion, plus the management thereof. Mainly, it also includes organisation and collaboration with system associates – these could be product providers and end users.

The study by Otchere et al. (cited in Stonkute, 2013) defines Supply Chain Management as that team of managers that tries to improve competitive functioning by closely combining the in house tasks within an enterprise and successfully linking them with the processes of suppliers, customers and other supply chain partners to be effective (Stonkute, 2013).

As illustrated by Janvier-James (2012), the academic literature has on hand a number of definitions of Supply Chain Management which over the years has been extended to encompass the wide ranging activities within the supply chain management. The primary observation of the above definitions is that a Supply Chain should be managed in a manner that is efficient, dependable, commercially viable and flexible enough to meet customers' requirements (Janvier-James, 2012).

The striking feature of all the above definitions is that they assumes that industries are homogenous – which is not the case. Hospitals differ in size, locations, complexity and specialisation requiring differing approaches when managing its supply chains as long as they are dependable and flexible to meet the end user needs.

2.2.3 Strategy and Strategic Management

An extensive evaluation of the literature by Rose et al. (2012) shows that strategy is motivated by the necessity to be competitive, as well as, by the need to adjust to change in order to survive and prosper. The authors assumed that the progressively vibrant type of the market conditions has resulted in varying reactions by organisations. Therefore, there is an overabundance of models explaining the strategy coupled with complementary new jargon which has not stopped to appear and on the rise. Right now, there is no agreement in literature as to a meaning of strategy or its accurate description. Literature reviews by various authors collected a long inventory of ideas concerning the nature of strategy. Their observation is that strategy as exhibited encompasses everything starting from a design or proposal to a mental state - a learning process. Rose et al. (2012) state that there are at least 37 descriptors of strategy which include

differentiation and cost leadership, core competencies, scope, intent, vision and network position. In literature, strategy is defined as something that can be broad, thought process that is methodical, evolving, balanced, incremental, implied, obvious, dogmatic, graphic or configurationally.

The principal motivation of strategic management in corporate environment is to make sure that businesses conduct themselves in line with the principle of going concern. The fundamental philosophies of strategic management originated from the need by the organisation to relentlessly monitor the developments in both its external and internal environment so as to ensure that business and organisation progresses and grows in an efficient and effective manner. With respect to the increasing development of world-wide competitions, hospitals have also moved towards business process reengineering strategy for success and increase of their efficiency and effectiveness (Mihic, Obradovic, Todorovic, & Petrovic, (2012).

Rose et al. (2012) state that this string of unrelated and frequently inconsistent models that try to explain the strategy does not help, but worsens and confuses business leaders and managers currently struggling with continued existence of their organisations and maintenance of those in their employ. They offer their personal pattern or representation whereby they see strategy to be both evolving and characterised by continuous revolution. By evolution they are referring to the changes in strategy to allow organisations to change and evolve as the market evolves, on the other hand, they see revolution to mean strategies that are aimed at creating new market opportunities to be exploited.

2.2.4 Strategic Supply Chain Management

Healthcare institutions in the USA started developing strategic management in the twentieth century wherein they started adjusting the model of strategic management into the hospital operational strategies (Mihic et al., 2012). According to Acharyulu and Shekhar (2012), the supply chain over and over again is regarded as a “back dock” support service which is there to provide the finished goods needed by clinical areas. To ensure efficiency, supply chain management

should be a cohesive linkage in the provision of clinical and non-clinical functions and not as a support service.

Rose et al. (2012) concede that while supply chains may be successful even when done in a spontaneous manner, there are strategies that can be employed to make the supply chain efficient and effective. This does not necessarily mean that having a strategy will result in the delivery of results desired by the organisation, but it means that devoid of a logical strategy between and amongst the supply chain associates, could possible results in having difficulty in harmonizing actions or effort on collective objectives. This attitude accentuates that all networks in the supply chain are a subset of the value chain that results in satisfied customers.

According to Ming-Hon and Hwang (2010), Supply Chain department is an important segment of any organisation and hence it is necessary that the supply chain strategy is somehow linked to the enterprise strategy. Studies have found a strong correlation between strategic management and supply chain management, hence, one may conclude that strategic management principles should be applied to supply chain management. The enterprise strategy management formulation and implementation can be successfully applied by the supply chain management division in order to optimise the supply chain networks. Optimization of the supply chain networks requires strategic planning which poses a challenge to many organisations. What worsens the situation is the conservative and stagnant available supply chain literature.

However, Morash (2001) and Cigolini et al. (2004) concluded that although earlier literature supported the idea that there should be a strategic alignment between the business strategy and the supply chain strategy, literature fails to empirically measure and test the relationship between the two. Rose et al. (2012) agree with the findings of Greenley (1994); Miller and Cardinal (1994); Miller and Willauer (2003) and Falshaw et al. (2006) that there is no agreement on the literature today that strategy making will have any impact on the organisation performance.

According to Stonkute (2013), there should be an alignment between supply chain strategy and the overall business strategy. He further states that there are two

major supply chain strategies: one focusing on operational excellence and the other focusing on customer closeness (Stonkute, 2013). Chopra and Meindl (2007) in their observation makes mention that the strategic decision system is classified into three levels, namely, competitive strategy, tactical plans and operational routines. Ming-Hon (2010) noted that strategy management requires, first, the formulation of the strategy, second, implementation and, last, by the evaluation. Further studies by Pitts and Leigh (2000) as well as Hill and Tones (1998) envisage enterprise strategy management to be comprising of the four processes of environmental scanning, strategy formulation, strategy implementation and evaluation – the emphasis being on the environmental scanning as a starting point (Ming-Hon and Hwang, 2010).

Based on a theoretical research conducted in Serbia, Mihic et al. (2012) hypothesised that strategic analysis methods are used in healthcare organisations in Serbia as a basis for formulation of goals and initiatives. Furthermore, they hypothesised that there is a direct link between successfully implemented initiatives and their strategic alignment, and that there is a direct link between the attainment of execution of strategic initiatives and a general approach towards identification of significances and selection of initiatives. Mihic et al. (2012) further reiterated that the subject of strategic management contains a sequence of approaches and methods and if implemented correctly will yield positive, quantitatively and qualitatively measurable results. Mihic et al. (2012) deliberated the merits of using management models such as strategic planning techniques, market analysis, stakeholder analysis and performance measurement. This is illustrated in Table 2.1 below:

Table 2.1 Implementation and impacts of use of strategic management methods and techniques

Country	Methods and Technique	Impacts	References
USA	<ul style="list-style-type: none"> Strategic Planning Market analysis Stakeholder analysis Focus on employees Process management Performance measurement Balanced scorecard 	<ul style="list-style-type: none"> Substantial reduction in length of stay Heart risk screening are more than doubled in three years Cardiology and orthopaedic market shares are increased by one third Referrals from primary care physicians are improved by one third Admitting physician satisfaction is improved by one quarter Mammogram turnaround – four days to one day Lab tests/ adjusted discharge -is among the lowest in the nation" Operating expense per adjusted patient day are declined Special effort recognition is increased by one third 	(Griffith RJ, 2011)
Afghanistan	Balanced scorecard	<ul style="list-style-type: none"> Enables identification of problems and focusing on critical areas Higher access to healthcare services in rural areas and increased number of service beneficiaries in rural areas Setting the foundation for well-balanced healthcare sector from the point of view of the patient, employees, service delivery capacities, quality and financial indicators. 	(Peters H.D et al., 2007)
Sweden	Balanced Scorecard	<ul style="list-style-type: none"> Improved managerial work Enhanced understanding amongst employees Improved interdepartmental coordination Broader perspective of the significance of organisational leadership Personal development Increased interest for staff engagement Increased participation of staff developmental activities 	(Kollberg B and Elg M, 2011)
Canada	Organisational mission statement	1. Establishing significant correlation between the performances of an institution with elements of a mission	(Bart CK and Tabone JC, 1999)
Denmark	SWOT analysis	2. Analysing strengths, weaknesses, opportunities and threats in healthcare system and identification of potential improvements: 1. Improving co-operability between the subsystems 2. Investing in education programs	(Janssen R, 2002)
Germany	<ul style="list-style-type: none"> Strategic maps Balanced scorecard 	<ul style="list-style-type: none"> Easier implementation of acute strategy Breaking down of objectives into measurable elements 	(Groene O et al., 2009)

2.2.5 Process of strategic supply chain management

Various authors have written work on strategic management and they have all come up with different approaches. However, there is an agreement that the process that each organisation chooses to embark on when formulating the overall organisation strategy is the same as the process that is followed when formulating the supply chain strategy. Ming-Hon and Hwang (2010) pointed out that strategic management for an organisation should include three steps, namely, strategy formulation, strategy implementation and strategy evaluation. R.A. Pitts and D. Lei (2000) extended the strategy management to include environmental scanning, strategy formulation, implementation and lastly evaluation. According to Hough et al. (2011) the managerial process of crafting and executing the company strategy consists of five interrelated and integrated phases of:

1. Developing a strategic vision of where the company needs to head and what its future products/ services and technology should be;
2. Setting objectives and using them as measures for measuring the company's performance and progress;
3. Crafting a strategy to achieve the objectives and move the company along the strategic course that management has charted;
4. Implementing and executing the chosen strategy efficiently and effectively, lastly;
5. Evaluating performance and initiating corrective adjustments in the company's long term direction, objectives, strategy or execution in light of actual experience, new conditions and new opportunities.

The Strategic Supply Chain Management (SSCM) process involves three steps: strategy formulation, strategy implementation and strategy evaluation. According to Ming-Hon and Hwang (2010) the purpose of supply chain strategy formulation is to determine the process to pursue in order to achieve a stated goal of the organisation, in the short, medium term. When the organisation is formulating the overall strategy, the first stage is environmental scanning and analysis of both the internal and the external environment of the organisation on matters related to the supply of goods and services. The information collated in this stage is used in the next stage, that is, objective formulation phase. The objective of formulation

phase is to create the complete competitive strategic course and objectives of the supply chain for the overall supply chain and its participants. In strategy implementation, supply chain participants agree on various practical strategies and methods to complete the competitive strategy and all objectives set at the strategy formulation stage efficiently. The rationale is that if there is a difficulty or incongruence at the implementation stage, management can go back to the objective formulation phase and re-establish their objective target. The final stage is the evaluation stage, wherein the objectives set at the strategy formulation stage are compared with the results of supply chain at the strategy implementation stage. Should there be a finding of misaligned or poor execution; members are then expected to return to the implementation stage and re-evaluate what has gone wrong and to come with a solution to the problem. In the last phase focus is on performance measurement and feedback wherein the performance is evaluated. The purpose of feedback is to ensure that supply chain initiates profit sharing and risk pooling with other supply chain members after executing of each strategy. Additionally, all objectives created in the strategy formulation stage are realized.

2.3 Supply Chain Management initiatives applicable to Healthcare Sector

The following literature review portrays supply chain management initiatives that can be applied effectively in the healthcare sector.

2.3.1 Education and Training for Executives on SCM

Callender and Grasman (2010) maintain that education and training is regarded as the first important practice for the enhancement of supply chain management practices. Training should contain training executives, the benefits from and ways on how to offer managerial assistance. The outcome demonstrates that attempts to educate healthcare managers on Supply Chain Management are being made. According to Katunzi (2011) supply chain process integration is often difficult because it entails appropriate training and readiness, keen and capable trading partners and transformation in one or more organizational cultures. However, the advantages of cooperation and information sharing can be substantial, that is,

reduced supply chain costs, greater flexibility to respond to market changes, less supply chain safety stock, higher quality levels, reduced time to market and a better utilization of resources.

2.3.2 Inventory Management practices and Information Technology

According to Callender and Grasman (2010) challenges of cost reduction in hospitals can be approached by the healthcare institutions using the supply chain function. The emphasis is on the significance gained by seizing the lead, confronting the challenges when transferring technology across the industry, employing the Just in Time (JIT) stock management system in the hospital and creating a win-win managerial philosophy (Callender and Grasman, 2010). According to a study conducted by Callender and Grasman (2010) on healthcare inventory management hospitals were found to have high stock levels which was caused by poor implementation of inventory management techniques, the use of personal judgement and individual experiences rather than using the scientific approaches to inventory management.

Heinbuch (2011) explains the importance of scientific approach to inventory management in hospital procurement and explains the serious consequences when purchasing is continuously conducted the traditional way, the consequences of which incorporate lack of stock management, contract conformity being missed, surplus stock on hand, frequent stock-outs and emergency orders requiring urgent transfers as well as workflow interruptions (resulting in cancelled or rescheduled theatre procedures). By redesigning their inventory management processes the hospital can realise significant benefits (Callender and Grasman, 2010).

2.3.3 Standardisation

The literature discusses other purchasing practices such as standardisation as well as the financial and clinical benefits derived from standardising the products used by hospitals Popiolek (2006) and Wagner (2006). When the hospital standardises, the obvious benefit is the increased and efficient use of the storeroom because the stock keeping units (SKU) are reduced as identical items

are used. The other benefits include improved ordering methods because of the few stock keeping units which have the potential of a reduced price or better pricing due to volume discount of similar products (Callender and Grasman, 2010).

According to Smith, Nachtman & Pohl (2012) managers in the healthcare supply chain have to deal with countless problems connected to data quality. The hospital keeps large master data files which are ever changing, and this often results in corrupt, inaccurate and obsolete product data. What makes the problem worse is that the product identification codes are not consistent between hospitals and at worst between departments in the same hospital. Low data integrity compounded by the lack of standardisation within the healthcare supply chain affects the quality of service provided by healthcare. This negatively results in the required products to perform procedures impacting negatively with patient safety being put on risk and or delayed treatment. Smith et al. (2012) further argue that the lack of standardisation of location identifications leads to increased costs by causing product delivery errors and complicating the rebate process wherein a single location has multiple names and identification codes.

2.3.4 Insourcing and Outsourcing

Nicholson and Asoo J. Vakharia (2004) discuss inventory management in healthcare sector where they compare the inventory cost and service levels obtained when the work is performed in-house (three echelon distribution network) versus when the work is outsourced (two echelon distribution network). The study revealed that when work is outsourced the hospital was benefiting since there was a noticeable inventory cost saving without compromising the quality of the service as outlined in the service level agreements.

Vendor Managed Inventory (VMI) is an automated inventory replenishment program that has been employed in automotive industry with great success and can be adapted to health care. Haavik cited in Callender and Grasman (2010) maintained that healthcare sector can eliminate the problem of overstocking if the distributors were assuming the responsibility of procurement, a win- win situation because they can then manage the payment process. Through utilising the VMI

system to manage procurement processes for pharmaceutical inventory a decrease of more than 30% can be achieved. For VMI to be successful, sharing of information by hospitals and wholesalers becomes critical as it will then lead to a more accurate demand forecast and cost reduction.

According to Lichocik and Sadowski (2013) the main advantage of outsourcing some functions to external service providers is that some of the company resources, funds and attention can be channelled to other areas vital for company's business. The outsourced duties are normally not the core function, hence the company normally does not have the skills nor the competencies to do that function well, and those functions do not give a competitive edge to the outsourcing organisation. They maintained that when the organisation keeps the logistics function in-house it generates fixed costs that would have been avoided if there were fluctuations in market demand or seasonal trends, such as, using only such a number of employees and vehicles as well as an amount of storage space that is required during a given period. By outsourcing, the organisation is able to transform fixed costs into variable costs.

2.3.5 Other practices

More solutions to health care supply chain and logistics are available on the literature. Burns discusses how electronic cataloguing can be used to aggregate suppliers and their products as well as increase the order visibility (Burns, 2002). More and Michael (2002) discuss the importance of information technology and tactics and strategies to gain cost effectiveness for the health care sector. E-procurement has a great potential of cost saving in the health care sector (Smith and Flanegin, 2004). Schneller and Larry R. Smeltzer (2006) discuss how e-procurement helps to significantly bring down the costs when the networks of suppliers are consolidated and partnerships formed. They further reiterate that the administration cost will be decrease when using Enterprise Resource Planning (ERP) tool because ERP introduces paperless automated transactions in the organisation.

Hult and Ketchen (2007) are of the view that firms that use strategic alliances to assist themselves in establishing the capabilities do not have benefits because they become competitive in their industry. Organisations have to revise their competencies every time there is change or technological disruptions in their environments. Organisations become constrained internally and hence have to rely on the competencies of others which then makes alliances and supplier networks an effective mechanism to manage these changes (Anand et al., 2010). According to Repenning and Sterman (cited in Carr et al 2012) alliances enable organisations to strategically modify their resources in order to meet new challenges brought about by changes in technology and markets (Carr et al., 2012). The risk of forming alliances is that in the event that the alliance does not work out as planned, alliance partners may begin to sell directly to the other partner's customers (Shambora, 2010).

According to Heinbuch (2011) within Procurement, supply chain managers must familiarise themselves with the use of Electronic Data Interchange (EDI) and internet based materials ordering systems in order to improve the supply chain transactions. These methods are deemed far superior than the traditional, inefficient high tendency of errors methods. He further mentions that the tools for the management of supply chain in the health sector will soon evolve in line with the changes happening in the hospital in order to realise some efficiencies that other industries are already benefiting from.

According to Acharyulu and Shekhar (2012), because of the development of expertise Radio Frequency centred tracing of shipments and material goods would allow broad distinguishability and correct accountability of assets with no manual administration. The automated stock management system permits programmed order processing which reduces the possibility of inventory being stocked out which is caused by individual mistake or a likely deferment by the manager. Supply Chain Management in hospitals must guarantee full visibility of information between product providers, wholesalers and end users (Acharyulu and Shekhar, 2012).

According to Braglia and Zavanella (cited in Rose et al, 2012) using consignment stock approach is another effective supply chain management strategy that can be employed in situations where demand varies and there is a lot of uncertainty. Consignment stock is an agreement between the consignor and consignee whereby the supplier will keep the minimum level of all the required goods at the customer's site and the customer is allowed to use the stock as and when required. This arrangement has an advantage of benefitting both the supplier and the customer as they develop a relationship that allows them to be able to integrate easily in the future and to have a long term relationship. The main advantage of consignment stock is that it saves the supplier storage space whilst allowing him to accurately measure and monitor the demand with no bullwhip effect caused by lack of coordination of the inventory highs and lows (Rose et al., 2012).

2.4 Barriers to strategic Supply Chain Management initiatives implementation

Melynik, Lumnus, Vokurka, Burns and Sando (2009) and Speier, Whipple, Closs and Voss (2011) collaborated and said that supply chain transformation leading to strategically integrated supply chain was inhibited by six main groups of obstacles and these were:

- lack of strategic view and orientation towards supply chain management;
- shortage of talent management and leadership in the field of supply chain;
- inadequate examples for supply chain optimization and risk minimization;
- inadequacy of process coordination with information sharing and integrating measures;
- poor relationships and lack of trust between supply chain participants; and
- Not enough examples of prevailing methodologies of supply chain network design, including optimization and real time information visibility.

Enyinda and Dunu (2009) highlighted the reality facing programme managers and policy makers about the daunting challenge they face when dealing with the high incidences of HIV/AIDS in Sub Saharan Africa. The challenges emanate from the

shortages of healthcare professionals in supply chain management. According to the World Health Organisation the constraints that confront a successful response to human resources challenges includes the non-existence of a rigorous human resources supply chain strategy to recruit, train and retain the workforce necessary to deliver Anti-Retroviral Therapy in healthcare and hospital institutions; the use of multiple and often conflicting training materials; pathetic training competence; inadequate quality control and certification systems in the training sector; lack of monetary resources for training; and poor organisation and segmented methods to training.

Callender and Grasman (2010) maintain that amongst many barriers available in the literature, the following barriers top the list, namely, lack of executive support, conflicting goals, skills and knowledge, constantly evolving technology, physician preference, lack of standardized codes and limited information sharing. Several other factors have been identified as contributing to the problems faced by hospitals in managing their supply chains and they include out-dated Information Technology systems and infrastructure, poor inventory and distribution management, adhoc procurement systems, lack of executive involvement, and no process improvement culture (Moon, 2004).

Manzouri, Rahman, Arshad & Ismail (2010) list the following as barriers to Supply Chain Management strategies implementation:

- Non-existence of senior management backing
- Misaligned strategies
- Failure or reluctance to share information
- Non-existence of trust between associates
- Reluctance to portion risks and rewards
- Intransigent organizational system and process
- Conflicts between functions
- Unreliable / insufficient performance measures
- Opposition to change
- Lack of training for new mind-set and skills

A summary include the following barriers as depicted in Table 2 below:

Table 2.2: Barriers of SCM implementation

<u>Description</u>	<u>Reference</u>
Lack of SC perception, culture and structure of organization.	(HalldoOrsson et al., 2008) (Fawcett et al., 2003)
Inappropriate systems, SC variance, lack of expert employees, intricacy of SCM, internal resistance, costs of implementation, and customer and supplier resistance.	(HalldoOrsson et al., 2008)
Inequality capability among the trading partners, risks of information security, distress of information system breakdown, slight superiority by the management, fear of SC breakdown, lack of assets, inadequate IT infrastructure resources, and deficiency in awareness about use of IT in SC.	(Jharkharia, 2005)
Lack of unification, lack of comprehensive systems, lack of purchase management, and problems in measurement	(Monczka and Morgan, 1997)
Lack of sharing and accurate information.	(Mentzer et al., 2000)
No employee emotion, lack of management obligation, preventive resources, poor friendly association management practices, and irregular performing aim.	(Fawcett et al., 2003)
<p>Silo mentality – this occurs when supply chain members engages on a “win, you lose” mentality and amongst others they then start to use cheap materials, not paying suppliers on time, investing little or no resources to new products or service design</p> <p>Lack of supply chain visibility – this refers to lack of synchronisation between the organisation IT systems with the vendors / suppliers</p> <p>Lack of trust. Effective process integration between partners requires trust. Trust occurs over time between supply chain partners, as each participant earns trust while it builds its standings among the other businesses.</p> <p>Lack of knowledge - lack of core supply chain management skills and knowledge is the greatest obstacle within organisations.</p>	(Katunzi, 2011)

Other barriers to effective SCM practices implementation in healthcare includes the ever changing or evolving technology of products, the ever increasing costs of physicians preferences of products, the lack or no standardisation of the nomenclature of products and the non-existence of the platform for technology (Burns, 2002). An observation made by McKone-Sweet attributed the gradual acceptance of SCM systems to absence of training in Supply Chain by hospital management, misaligned and conflicting goals, as well as, lack of performance measurement (McKone-Sweet, 2005).

2.5 Summary

This chapter highlights literature discussed in this study. From the literature review presented it is clear that barriers to strategic supply chain management are not the result of a single barrier but rather many barriers requiring a holistic approach to the problem. The following chapter is aimed at describing the research methods that were followed in this research project.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this chapter is to give insight into the methodology used in this study. To be successful, a research study needs to establish a methodological approach and develop a research design in order to answer the research questions. Business research textbooks, articles, research handbooks and research encyclopaedia were used to gather the information on research methodology. This chapter outlines the overall research methodology used. It explains the reasons for using the various sampling techniques and explains the benefits and the disadvantages of these techniques. It stipulates research design used in this study, the type of approach adopted, the sample taken, how data was collected and analysed. The chapter also gives insight into the questionnaire used, how it was constructed and the relevance of the questions asked in the questionnaire.

3.2 Research Methodology

When doing research it is important to select the method which is most likely to meet the objective/s of the research. The information that the researcher requires will determine the type of the research method to be used. Research methodology specifies the methods and procedures for collection, measurement and analysis of data that that researcher used in the study (Bougie and Sekaran, 2010). Since research is a process of finding out solutions to a problem it is important then to devise a methodology that would be best suited to achieve success.

3.3 Aim and Objectives

The aim of the study is to make a statement indicating what the research seeks to achieve and the objectives highlight specific issues to be investigated in relation to

the overall aim. Research objectives are the salient points which the study set out to achieve and from which the research questions are based.

3.3.1 Aim

The aim of the study is to identify the barriers that Government Provincial hospitals in EThekweni Municipality are faced with as well as the initiatives to be taken when implementing a strategy within Supply Chain Management.

3.3.2 Objectives

The objectives of the proposed study were as follows:

- To investigate whether personal and functional characteristics of personnel in management have an impact on the functioning of Supply Chain Management.
- To determine the current status of supply chain in KwaZulu-Natal government provincial hospital sector in EThekweni municipality.
- To identify challenges that affects the success of Supply Chain initiatives in the health care industry.
- To identify the supply chain initiatives that will have an impact on the overall organisational effectiveness.

3.4 Participants and location of the study

The study was conducted in the nine Government Provincials in the metropolitan areas of Kwa-Zulu Natal. The population of the study was the nine KwaZulu Natal Provincial hospitals senior management comprised of:

- CEOs x 9
- Accounting Officers x 9
- Systems Managers x 9
- Main stores Managers x 9
- Procurement Officers x 9

- Tender Adjudication committee members x 27 (3 x per hospital)

3.5 Research Design and Methods

Gilbert et al. (2002) define a research design as a framework or plan for a study, used as a guide in collecting and analyse the data. They further add that a research design ensures that the study will be relevant to the problem and will be economical in procedures. They further note that research design can be classified in terms of the fundamental objective of the research into three basic types: exploratory research, descriptive research or casual research. Bougie and Sekaran (2010) calls the causal research as hypothesis testing since the purpose of causal research is to know the nature of the relationship that may be established between the two variables or hypothesis. This study is a descriptive study since its aim is to describe the variables of the situation as well as describing characteristics of group of employees i.e. age, education, job status etc...Causal research / hypothesis testing will not be discussed further.

3.5.1 Exploratory Research

Stead (2001) define the exploratory approach as the research into an area that has not been studied and in which a researcher wants to develop initial ideas and a more focused research questions. The purpose of exploratory research is to determine whether or not a phenomenon exists, and to gain familiarization with such phenomenon, not to compare it with other phenomena. The major emphasis on exploratory research is on the discovery of ideas and insight. The exploratory study is particularly helpful in breaking broad, vague problem statement into smaller, more precise sub problem statements (Gilbert et al., 2002). Aaker (2004) add that the research methodology in exploratory research is highly flexible, unstructured, and qualitative, for the researcher begins without preconception as to what will be found.

3.5.2 Descriptive Research

Gilbert et al. (2002) define descriptive research as a research design in which the major emphasis is on determining the frequency with which something occurs or the extent to which two variables co-vary. McDaniel and Gates (2001) note that descriptive studies are conducted to answer the who, what, when, where and how questions. They identify two types of descriptive research: longitudinal and cross sectional studies. Bougie and Sekaran (2010) define cross-sectional studies as the study of a particular phenomenon at a particular time while longitudinal refers to the study of a particular phenomenon over a long period of time.

3.6 Sampling and Sampling Techniques

3.6.1 Sampling procedures

According Marsden and Wright (2010) in the Handbook of survey research, survey sampling theory is a branch of statistics concerned with the methods and techniques of selecting samples whose results may be projected to larger populations. Sampling techniques can be divided into two broad categories, that is, probability and non-probability sampling. Probability sampling is distinguished by the fact that each population element has a known chance of being included in the sample. In contrast to non-probability sampling, the basic principle that distinguishes probability sampling from non-probability sampling is the condition that each element in the population is given a nonzero probability of being selected into the sample (Marsden and Wright, 2010).

Lavrakas (2008 a) in the Encyclopaedia of Survey Research methods Volume 2, acknowledges that non probability sampling is useful in situations where it is difficult to define the population, or in circumstances where little or no interest exists in making inferences of sample to the population. The most familiar motivation for make use of non-probability sampling is its cost effectiveness and timeliness, that is, it is less expensive and can be implemented quicker than the probability sampling. The advantages and disadvantages of non-probability sampling are that they cost less than probability samples and can be gathered

more quickly than probability samples. The disadvantages are that sampling error cannot be computed, the researcher does not know the degree to which the sample is representative of the population from which it was drawn and lastly, the result of non-probability samples cannot be generalised to the total population.

Non probability sampling is frequently split into three major categories: (1) quota sampling, (2) purposive sampling, and (3) convenience sampling. For the purpose of this research the researcher chose purposive sampling also known as judgement sampling or expert sampling. The main objective for choosing purpose sampling was to create a representative sample of the population, notwithstanding the fact that some agreement on the statistical meaning of the word “representative” does not exist. When using purposive sampling, the researcher relies on the expert knowledge or the subject knowledge of the participants who are selected in a non-random manner to represent a cross section of the population. For purposes of this research, the researcher first decided on the important characteristics required from the participants before being included on the sample.

The limitation of using purposive sampling which may also apply to this research is that if this research was to be conducted by another researcher, different sample will be chosen as having the important characteristics. It is therefore important that more research be done to eliminate researcher bias when choosing the characteristics of the sample. Additional researches allows for the ability to arrive at strategies to adjust and measure the sample biases.

Purposive sampling is ideally used for small sample within a limited geographical area or when there are restrictions on population definition or at times when it is necessary to reach small but specialised group where making population inferences is not a priority.

Probability sampling methods include simple random samples, systematic sample, stratified sample, and cluster sample. For purposes of this study the probability sampling method was not used hence no further discussion on the subject will be discussed. The biggest advantage of probability in contrast to non-probability used in this study was the high generalisation of the findings to the population. Their disadvantage varies and includes systematic bias, they are time consuming and at

times individuals may not be happy in responding for second time particularly on double sampling design (Bougie and Sekaran, 2010). Aaker (2004) proposed that sample sizes for institutions located in regions or for institutions with specialisation requiring none or fewer subgrouping will suffice with a sample size of 50 to 200 participants. Although there were time and resource constraints the sample size remained 72 although there were only 57 participants.

The feedback from the respondents was generalised to the entire population of provincial hospitals at eThekweni.

3.6.2 Sampling Technique

According to Bougie and Sekaran (2010) sampling process involves selecting a sufficient number of the right elements that represent the population. Sampling requires the following steps:

Step 1. Defining the population – the researcher has chosen seventy two (72) senior management of the nine KwaZulu Natal Provincial hospital as the population size because they are involved in the crafting of the strategy and its implementation. The research participants of this research were senior managerial staff and Supply Chain Management practitioners who were working in the nine Provincial hospitals in KwaZulu Natal in the eThekweni Municipality – by very nature they were suitable candidates for purposive sampling survey.

Step 2. Determining the sample frame – the sample was drawn from the published register of Provincial hospitals in KwaZulu Natal.

Step 3. Determining the sample design – Probability and non-probability sampling. The researcher chose non probability sampling for this research because it is cost effective and for its timeliness i.e. it can be implemented quicker than the probability sampling. The researcher saw no significance of making population inferences from the estimates drawn from this research outcome.

Step 4. Determining the appropriate sample size – factors, such as, the research objectives, the precision desired, the acceptable level of risk in determining the level of precision, the variability of the population, the costs and the time constraints and the possible size of the population were taken into consideration when determining the sample size. Bougie and Sekaran (2010) indicated that for generalizability the sample size and the sample design must be representative of the sample. Even if the sample size is large, inappropriate sample design does not compensate to allow generalisation of the population. This is also true, unless the sample size is large and satisfactory and meets the desired precision level it cannot be a useful tool for the research – i.e. meeting the objective of the research.

The research instrument consisted of 28 items, with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into 10 questions which measured various themes. In total, 72 questionnaires were despatched to 72 respondents and 57 were returned which gave a 79% response rate.

3.6.3 Census and Sampling Errors

According to Lavrakas (2008 a) a census is an attempt to list all elements in a group and measure one or more characteristics of those elements. A census can provide detailed information on all or most elements in the population, thereby enabling totals for rare population groups or small geographic area. A census is also conducted if information is needed from every individual or object in the population.

For purposes of this research, the researcher did not conduct a census but did a sample survey, that is, preselect a subset of elements for inclusion in the study. The respondents in this study consisted of hospital Chief Executives, Finance Managers, Procurement Managers, warehouse managers and three members of the bid adjudicating or evaluation committees. The above participants were selected to participate in this study because they were perceived to form key elements of the strategy drafting and implementation. The supply chain management division gets the direction that is drafted by the Senior Management Committee which aligns with the vision and the mission.

The population in this study is the nine (9) EThekweni Provincial hospitals. These hospitals are a mixture of public hospitals and public / private partnership. According to Keller (2012) two major types of errors can arise when a sample is taken from the population:

- Sampling error – differences between the sample and the population that exists only because of the observations that happened to be selected for the sample, and
- Non sampling error – errors that result from mistakes made in the acquisition of data or from the sample observations being selected improperly resulting in either non response bias or selection bias.

3.6.4 Non response and non-response error

Due to the sensitivity around the Supply Chain practices in government institutions obtaining information from a list of respondents may be difficult and will result in non-response error. This error exists when those responding to the survey are different from those who actually did not respond on characteristics of interest to the study. The reason for non-response varies from, amongst other things, the length of survey and data collection method chosen.

3.7 Data collection methods

According to Hair, Money, Samouel, and Page (2007) in order for the researchers to explain the phenomena that happens in business they have to examine variables such as demographics, attitudes, beliefs and expectations of consumers or organisations. They, therefore, require data which can be collected by means of interviews or by questionnaires/observations. Data collected is then analysed and it becomes the basis of informed decision in order to avoid very costly errors.

Hair et al. (2007) stipulate the amount and type of data to be collected depends upon the nature of the study and the research objectives. If the study is exploratory the researcher may decide to use narrative data through the use of

focus groups, personal interviews or by observing the behaviour of events using smaller samples or case studies – qualitative data. Conversely, if the study is causal the researcher will require large data obtained by using large scale surveys or by accessing electronic databases. The process of data collection starts by examining the secondary data collected through informal interviews and observations. The purpose of examining the secondary data is to ascertain whether the research objectives can be achieved using secondary data because if they can, then, there is no need to proceed and collect primary data. Primary data collection method can be divided into two – qualitative and quantitative.

3.7.1 Qualitative Data Collection

There are two methods of collecting qualitative data, namely, interviews using a questionnaire and observations. Depending on the objective of the study, the researcher can choose either method. For instance, if the researcher wants to examine the behaviour of people or events, the researcher will choose to observe the phenomena, whereas if the objective of the study is to understand why things happen the researcher will then choose to interview people (Hair et al., 2007).

3.7.1.1 Observation

According to Bougie and Sekaran (2010) it is possible to gather information from respondents without asking them any question, that is, by observing their behaviours using mechanical, electronic device or human participation. Observational studies can either be structured or unstructured. To be successful, the needed information must be observable and the behaviours of interest must be repetitive, frequent, or predictable in some manner.

The primary advantages of observation are, observer sees what people actually do rather than having to rely on what they say they did. This approach can avoid much of the bias factors caused by the interviewer and question structure associated with the survey approach. It also allows the researcher to note the effects of the environment on specific outcomes without being obstructive to the

respondent. The disadvantages of observation, according to Bougie and Sekaran (2010), are that it is usually only behaviour and physical characteristic that can be examined. The researcher does not learn about motives, attitudes, intention or feelings. The other disadvantage is that the researcher has to be physically present for a prolonged period of time, unless the camera or other mechanical system is used. This method of data collection is not only slow, but also tedious and expensive. Because of the long periods spent on observing the subjects, there is a great possibility of the research fatigue setting in resulting in some bias. Hence, observers have to be trained in how and what to observe to avoid observer bias.

3.7.1. 2 Interviews

According to Hair et al. (2007) an interview is where the researcher speaks to the respondent directly. They are helpful when gathering data with complex or on sensitive issues and when open-ended questions are used. Because of the sensitivity around the supply chain in government institutions the researcher has chosen to use qualitative method (interviews) as a means of data gathering and because of the flexibility it has – the respondents were to respond from the comfort of their offices at work – however, the researcher chose quantitative methods discussed below. Interviews can vary from being highly structured to highly unstructured; either way interviews can take a variety of forms, such as, face to face and telephone interviews. Unstructured interviews are conducted in a very flexible approach whilst structured interviews are consistent and orderly. In structured interviews the interviewer uses structured interview sequence to avoid bias that may result from inconsistent interview practices. The researcher may choose to use semi structured interviews which have the advantage of asking related but unanticipated questions which were not originally included resulting in unexpected and insightful information coming to light which enhances the findings.

Unstructured interviews on the other hand have no sequence which allows the researcher to elicit information in a free and open discussion with the advantage of exploring in depth issues raised during the interview. An in-depth interview is an unstructured one to one discussion between the respondent and the interviewer

and they are suitable for situations where the respondents have a specialised insight but may not be open in their comments in a setting such as the focus group. The disadvantage of this method is that it is time consuming and expensive since it is one on one.

The other interviewing technique is the projective technique whereby the researcher understands how the respondents can resort to withholding information. When the researcher interviews the respondent he/she presents the respondent with an ambiguous stimuli on the strength that the respondent will not associate the question to himself because he/she wants to suppress the information because of social concerns, or just an unwillingness to provide an accurate response to the question.

3.7.2 Quantitative data collection method

Quantitative data collection involves gathering numerical data using structured questionnaires or observation guide to collect primary data from individuals. The collected data may be a combination of beliefs, opinions, attitudes and lifestyle to general background information, such as, age, gender, education and income. Business researchers often refer to quantitative data collection as survey research. Hair et al. (2007) define the survey research methods as the research procedures used for gathering huge amount of unprocessed statistics by question and answer. The advantages of survey research include:

- Its capability to contain large sample size at a relative cost.
- They are easy to administer as they require no sophisticated tools to record the reactions of the participants as it is with observations or experiments.
- Lastly, because they are quantitative they can be used further for advanced statistical analysis to measure large and small differences in patterns and trends in the data.

Although implementation of the survey methods is easy, the greatest disadvantage is the difficulty of developing it. In order for a researcher to ensure the precision of the tool, he has to deal with construct development, scale measurement and questionnaire designs. When these matters are not attended to

earlier, they results in systematic errors. The other disadvantage of survey method is that they limit the use of probing questions limiting the researcher to from using unstructured or open ended questions which has the potential of losing the details or the depth that the researcher would have gained if he was using open ended questions. Lastly, survey methods lack the control that the researcher has on the time – they considerably take longer to finish compared to other methods. According to Hair et al. (2007) in direct mail (mail surveys, internet or electronic survey or drop off and pick up) for example where self-completion method is used, the researcher must carefully develop the questionnaire packet, disseminate the packet and wait for them to be returned by postal services or electronic mail. The researcher in this study used the self-completion method to complete this study and not the interviewer completed method.

According to Hair et al. (2007), survey methods are normally split into two broad types:

- The interviewer completed survey in which questionnaires are completed either face to face or over the telephone.
- Self-administered survey. In this survey, there is little, if any, actual face-to-face contact between the researcher and the prospective respondent. The respondents read the questions and record their answers.

Hair et al. (2007) stipulated that the greatest disadvantage of using self-administered survey is that the researcher loses control because the researcher has no means of knowing whether the intended person completed the questionnaire or if the respondent answered the questions in the sequence they are formatted in or whether they asked for input from others irrespective of the administrative technique used.

The table 3.1 below lists the advantages and disadvantages of methods of administering survey questionnaires.

Table 3.1 Advantages and disadvantages of administering survey questionnaires

Method of administration	Advantages	Disadvantages
Through post, fax, drop off etc...	<ul style="list-style-type: none"> • Wider access and better coverage • Provides anonymity • Relatively low cost • Large sample size • Respondents complete questionnaire at their own pace 	<ul style="list-style-type: none"> • Questionnaire must be simple • Low response rate • Points of clarification are not possible • Follow up of non-response is difficult
In person	<ul style="list-style-type: none"> • Establish empathy and interest in the study • Can probe complex issues • Clarify respondents queries • High response rate 	<ul style="list-style-type: none"> • Expensive in time and cost • May lead to interviewer bias • Difficult to obtain wide access • Relatively small sample size
Over the telephone	<ul style="list-style-type: none"> • Provides personal contact • Wide geographic coverage • Easy and quick access • Can be done with the aid of the computer 	<ul style="list-style-type: none"> • Short interview time • Limited to listed telephone numbers • Can be expensive
Electronic	<ul style="list-style-type: none"> • Easy to administer • Global reach • Fast data collection and analysis • No interview bias 	<ul style="list-style-type: none"> • Loss of anonymity • Low cost • Can be complex to design and program • Limited to computer users

3.7.3 Questionnaire

Self-completion approaches to collecting data use structured questionnaires. A structured questionnaire is a scientifically developed instrument for measurement of key characteristics of individuals, companies, events and other characteristics (Hair et al., 2007). The questionnaire is the common thread for almost all data collection methods. A questionnaire is a data collection technique in which a respondent is asked to respond to the same set of questions in a predetermined order (Bougie and Sekaran, 2010). According to Hair et al. (2007) there are a number of interrelated activities that must be considered when using questionnaire as a data collection tool. These include the general design of the questionnaire, the validation of the questionnaire by pretesting and the method by which the questionnaire is administered. The above considerations enable the researcher to evaluate whether the questionnaire provides the necessary information to achieve the goals of the study and whether it fits the respondent's. According to Bougie and Sekaran (2010) questionnaire design should focus on the following three areas:

- Wording of questions – content and purpose questions, wording and language, type and form of questions, sequencing lastly, the classification of data or personal information.
- Principles of measurement – categorisation, coding, scales and scaling lastly, reliability and validity.
- The general appearance of the questionnaire – appearance of questions, length of questionnaire, introduction to respondents and lastly, instruction for completion.

Questionnaires can be either of the self-administered type, or interviewer administered type (Hair et al., 2007). Self-administered questionnaires can be administered online, through the post or delivered to and collected from respondents, while interviewer administered questionnaires can take the form of either telephonic questionnaires or structured interviews. Developing well-crafted questionnaires is more difficult than it might seem. Researchers should carefully consider the type, content, wording, and order of the questions that they include.

3.7.4 Advantages of questionnaires

According to Bougie and Sekaran (2010) questionnaires are less expensive than interviews. They do not require a large staff of skilled interviewers. They can be administered in large numbers all at one place and time. Anonymity and privacy encourages more candidates and honest responses. There is lack of interviewer bias, speed of administration and analysis. They are suitable for computer based research methods and offer less pressure on respondents.

3.7.5 Disadvantages of questionnaire

Bougie and Sekaran (2010) states that the major disadvantage questionnaires offer is little flexibility to the respondent with respect to response format and the possibility of low response rates, which can lower the researcher's confidence in the result. The bias associated with self-selection makes them scientifically worthless unless response rates are high.

3.8 Choice of data collection method

The aim of this study is to establish the barriers to implementation of strategic supply chain management initiatives in Provincial hospitals. The questionnaire has been chosen as the data-gathering tool. The reasons for choosing a questionnaire are that it allows for easy data collection and analysis and it is less expensive than interviews. This will allow the researcher to compile the results quickly and form conclusions from the results in an efficient manner. Furthermore, a questionnaire would be able to provide the relevant information needed. The research participants of this research were senior managerial staff and Supply Chain Management practitioners who are working in the nine (9) Provincial hospitals in KwaZulu Natal in the EThekweni. The questions asked were closed- ended with a few open-ended questions that inquired on the demographics of the respondents.

3.8 Questionnaire construction

Hair et al. (2007) noted that many researchers believe that designing questionnaires is more of an art than a science, where art relates to the researcher's creative use of words in asking the right questions and developing the related scale points. While there is some level of creativity involved in designing a questionnaire, the process itself should be a scientific one that integrates established rules of logic, objectivity, discriminatory powers and systematic procedures. Theoretically, questionnaires consist of numerous sections, words, questions, format and hypothesis, that are integrated into a recognisable, hierarchical layer system. Hair et al. (2007) and Bougie and Sekaran (2010) recognises that responding to a questionnaire is voluntary and, therefore, the research should be designed to maintain the interest of the respondents. For purposes of this research the researcher has designed the questionnaire to meet the following criteria (Bougie and Sekaran, 2010):

- Comprise accurate and well-defined instruction on how the question is to be answered;
- It is divided into sections defining the participant – demographics, current state of the hospital supply chain management, supply chain management initiatives and lastly barriers to implementing supply chain initiatives;
- Questions at the beginning are easy to answer;
- Follow up questions are more specific;
- Questions that are personal or sensitive are at the end of the questionnaire;
- Technical jargon is avoided by employing the respondent's vocabulary; and
- The number of questions are minimised just to avoid respondent fatigue.

3.8.1 Types of questions

Listed below are five types of questions that the researcher may have chosen to use in the formulation of the questionnaires. The questions asked were chosen based on the type of response required.

3.8.1.1 Open ended and closed questions

The justification for using open ended questions is that it allows respondents to answer in their own words as they select and articulate whichever understanding they consider applies. The participants are not given a choice or an alternatives. Open ended questions are suitably for use as opening questions or when clarification is sought by the researcher. Among the disadvantages of open-ended questionnaires are that they allow for a considerable degree of bias on the part of the interviewer and that they may demand a difficult and time consuming tabulation of responses. The researcher did not choose to include open-ended questions in the study.

In contrast, closed questions ask the respondents to make choices among a set of alternatives given by the researcher. All questions in a questionnaire using a nominal, ordinal, Likert or ratio scale are considered closed questions. Closed questions are easy to code and analyse, however, care must be taken in ensuring that questions are mutually exclusive and collectively exhaustive.

3.8.1. 2 Multiple-choice questions

The purpose of using multiple choice questions is to offer unambiguous options to the participant to choose from. These types of questions are favoured to open-ended questions because they make it easy for the researcher to record, tabulate and edit the results. In this study, multiple choice questions with no right or wrong answers were used – the answers are merely an indication of how the respondents feel about the matter in question.

3.8.1.3 Dichotomous questions

Dichotomous questions enable the researcher to ask questions requiring answers that are unambiguous like yes or no. Only two choices are offered to the respondents and the advantages of these types of questions are similar to those of multiple-choice questions. The only criticism is that they do not allow for the 'don't know' or 'maybe' class of response. Another difficulty is that one cannot factor a statistical technique to analyse dichotomous questions and thus produce subscale from a measure.

3.8.1.4 Scaled response questions

According to Hair et al. (2007) a fourth question format that is often used to gather data on attitude and perception is scaled-response question. There are four levels of measurements:

- Nominal – they use numbers as labels to identify and classify an object like when an athlete is assigned a number to identify the player.
- Ordinal – they measure non numeric concepts/ranking, e.g. class rankings and socio economic class.
- Interval scale, e.g. Likert scale – a method whereby quantitative value (5 to 7 points) is ascribed to qualitative data, such as, attitudes, feelings, opinions and perception.
- Ratio scaled – they tell us about the exact value which makes it easy for analysis, e.g. the speedometer, the number of children in a household, walking speed and the price of an item.

3.8.1.5 Ranking question

According to Hair et al. (2007), the rank order questions combine a scale point format which then allows participants to relate their own responses by designating their preferences in the order they ranked from highest to lowest. It is easy to compare each possible raw response if presented in this format. Personal interviews and self-administered surveys are easy to use analyse ranking scales

are used. Although it can be difficult, it is possible to use them in telephone interviews as well.

3.9 Sequence of questions

Aaker (2004) noted that the sequence of the questions would be determined initially by the need to gain and maintain the respondent's cooperation and make the questionnaires as easy as possible for the interviewer to administer. They give basic guidelines for sequencing a questionnaire to make it interesting and logical to both the interviewer and respondents:

- Open the interview with an easy and a non-threatening question;
- Questionnaire should flow smoothly and logically from one to the next;
- It is better to proceed from broad general question to more specific questions; and
- Sensitive or difficult questions dealing with income status, ability and so forth should not be placed at the beginning of a questionnaire.

3.10 Preparing and presenting good questions

According to Hair et al. (2007) a few guidelines on preparing good questions is suggested to include the following:

- Use of simple words – questions must be in a language familiar to the respondent, that is, no technical jargon.
- Be brief – questions must be brief and to the point and where possible not to exceed a line.
- Avoid ambiguity – wording should be clear, concise and avoid vagueness and ambiguity.
- Avoid leading questions – leading question imply that a particular answer is correct or lead the respondent to a socially desirable answer.
- Avoiding double barrelled questions – questions that contain more than one issue because they make interpretation difficult and impossible.
- Be careful about question order and context effects – questions must be organised in a logical order organised by topics. The context effects occur

when the position of a question relative to other questions influences the response.

Employee's time was taken into consideration during the design of the questionnaire. It was felt that a short precise questionnaire would have greater results than a longer one. Sufficient information was extracted to describe the desired area of interest. Special care was taken to ensure that questions or options were not double barrelled. The vocabulary used was simple and ambiguity was guarded against. To eliminate confusion when answering the questions, most questions had options to choose from and the respondents were assured that their responses would be treated with confidentiality. All respondents were thanked for their time.

3.11 Layout of questionnaire

The questionnaire was designed, electronically delivered and collected at all nine Provincial Hospitals in the KwaZulu Natal participating institutions. A 10-question questionnaire was aimed to solicit information from hospital managerial staff regarding the role of Supply Chain Management in an effort to understand the barriers to implementing strategic supply chain management initiatives in Provincial hospitals.

The questionnaire was divided into four sections A,B,C and D. Section A consisted of four questions about the demographics of the respondents while Section B comprised of a further four questions on the current condition of the hospital supply chain. Section C had ten questions on supply chain barriers and section D closed with a further ten supply chain initiatives.

3.12 Pretesting and Validation

3.12.1 Validity and Reliability

There was no pilot study conducted prior to the questionnaire being sent out – an error on the side of the researcher. However, discussion with the Statistician was

that it would be impossible to do the post study pilot study. The Statistician argued that the scales used are well established in many research contexts over the years and the data is highly reliable and valid as shown by the Cronbach's Coefficient Alpha below. The scales used have adequate psychometric properties in a great deal of surveys (especially recent ones), they are used in many countries with different cultures and current analyses reveal they have high internal consistency and construct validity. The results are considered as valid and reliable enough to use in the main survey without being cautious about the generalizability of research results.

3.12.2 Reliability Statistics

The two most important aspects of precision are reliability and validity. Reliability is computed by taking several measurements on the same subjects. A reliability coefficient of 0.70 or higher is considered as —acceptable”.

The table below reflects the Cronbach's alpha score for all the items that ranked data in the questionnaire.

Table 3.2 Reliability Statistics using Cronbach's Coefficient Alpha

Question 4 – 8 Reliability Statistics	
Cronbach's Alpha	N of Items
.811	5

Table 3.3 Reliability Statistics using Cronbach's Coefficient Alpha

Question 9 Reliability Statistics	
Cronbach's Alpha	N of Items
.588	10

Table 3.4 Reliability Statistics using Cronbach's Coefficient Alpha

Question 10 Reliability Statistics	
Cronbach's Alpha	N of Items
.897	10

Table 3.5 Reliability Statistics using Cronbach's Coefficient Alpha

Overall Reliability Statistics	
Cronbach's Alpha	N of Items
.888	20

The overall reliability score of 0.888 exceeds the recommended value of 0.70. This indicates a high (overall) degree of acceptable, consistent scoring for the research.

All of the themes (sub-sections) have values that exceed or are very close to the acceptable standard, except for Q9. One of the reasons for this is that the construct is newly developed.

3.13 Questionnaire Administration

An Online questionnaire survey was used in this study because Provincial hospitals in KwaZulu Natal are connected to networks which then made the administration of questionnaire easy (Bougie and Sekaran, 2010). Web based surveys are more efficient and attractive, hence, in this study the web based online software programme hosted by QuestionPro was used. QuestionPro has various options of sending the survey to potential respondents. QuestionPro creates a Uniform Resource Locator (URL) which can be sent to potential respondents via email, through a website intercept, and through posting the survey on any of the social media or social networking websites, such as, Facebook, Twitter and LinkedIn (QuestionPro, 2011). The option chosen was to

email the URL link to potential respondents. This was done using the respondents' email addresses.

3.14 Analysis of Data

After the data had been collected from the sample the next step was to analyse it in order to test the research hypothesis (Sekaran & Bougie 2010). It has to be ensured first that the data is accurate, complete and suitable for further analysis. The point of departure is data coding which involves assigning a number to the participants' responses so that they can be entered into a database. Data in the form of coded responses from the questionnaires will be analysed using the Statistical Package for Social Scientists (SPSS). SPSS package was chosen because of its ability to provide a broad range of capability for the entire analytical process. SPSS will be used to compare, correlate, compute factor analysis and Principal Component Analysis, t-Test and contrast the data collected from the questionnaires. The results will be discussed in Chapter Four.

3.15 Ethical Consideration

The ethics committee of the University of KwaZulu-Natal approved the questionnaire before it was delivered at the respective Hospitals. The questionnaire and the research proposal were further approved by the Regional and the Provincial Ethics committee of the KwaZulu Natal Department of Health. After this approval each participating hospital was presented with the questionnaire, the departmental approvals and the research proposal for an approval by the institution research committee or CEO. Respondents were asked to sign as an indication of giving their consent to voluntarily participate in the research.

3.16 Summary

This chapter detailed the research methodology used in this study. Different research methods have been discussed and the rationale behind the methods

chosen for this study was discussed. The questionnaire was discussed; its administration and data analysis. Chapter Four deals with the presentation and discussion of results obtained from completed questionnaires.

CHAPTER 4

PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the results and then discusses the findings obtained from the questionnaire surveys conducted in this study. The questionnaire which was the primary tool that was used in the study to collect data was distributed to nine KwaZulu-Natal Provincial hospitals' senior management. The data obtained from the responses was analysed with SPSS version 22.0. The results present the descriptive statistics in the form of graphs, cross tabulations and other figures for the quantitative data that was collected. Inferential techniques include the use of correlations and chi square test values, which are interpreted using the p-values.

4.2 Objectives of the study and findings

In order to satisfy the requirements of each objective, the responses to each question were analysed and where necessary, correlations with independent variables were studied.

4.2.1 Objective 1: To investigate whether personal and functional characteristics of personnel in management have an impact on the functioning of Supply Chain Management.

Table 4.1 below as published by the Stats SA was inserted to show the official demographic spread of the South African population. It was used as a point of departure when the analysis was done to see how representative the personnel in management position was within the hospital Supply Chain.

Table 4.1 Mid-year population estimates for South Africa by population group and sex, 2014. Source: Stats SA: July 2014

Population Group	Male		Female		Total	
	Number	% of male population	Number	% of male population	Number	% of male population
African	21 168 700	80,3	22 165 000	80,2	43 333 700	80,2
Coloureds	2 305 800	8,7	2 465 700	8,9	4 771 500	8.8
Indian / Asian	677 000	2,6	664 900	2,4	1 341 900	2.5
Whites	2 214 400	8,4	2 340 400	8,5	4 554 800	8.4
Total	26 366 000	100,0	27 635 900	100,0	54 002 000	100,0

Q1 – Q3: Biographical data

This section summarises the biographical characteristics of the respondents.

Figure 4.1 below indicates the gender composition of the sample.

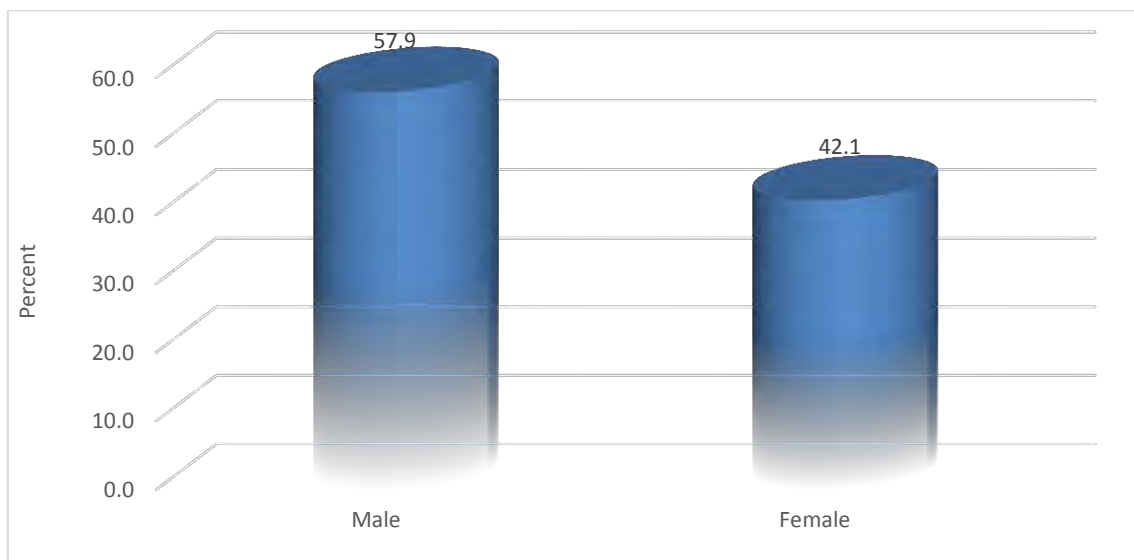


Figure 4.1 Gender composition of the participants

Figure 4.2 below shows the racial composition of the sample. There were nearly two-thirds of Black respondents (63.2%) with a further (approximately) third (31.6%) being Indian. The remaining respondents were Coloured (5.3%).

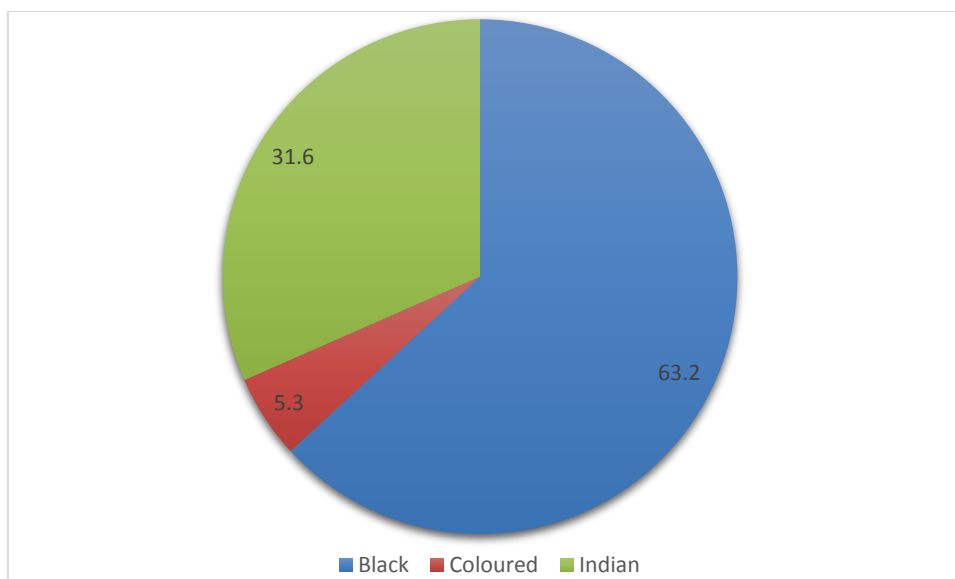


Figure 4.2 Racial composition of the participants

The official Stats SA publication shows that the SA population is 80.2% Blacks, 2.5% is Indians, 8.8% Coloureds and 8.4% White. The actual results as per study shows a larger representation of Indians which could be attributed to the tertiary education of the then predominantly Black institutions which were not offering training in the fields of commerce. This trend is currently being addressed and can be proven by the fair representation of the Black study participants.

Amongst the respondents, 8.3% of the Black respondents had an/a MBch/PhD qualification, which formed 5.3% of the total sample. No other race groups had respondents with these qualifications. This is because only three (3) medical doctors that are in managerial position within the hospital Supply Chain participated in the study. More Black candidates had a University degree or Technikon Diploma (41.7%) whilst more Indian respondents had a post graduate degree (66.7%). The ratio of males to females in the Black race group was 1:1 whilst that amongst the Indians was 2:1. Three of the respondents were Coloured and they were all male.

Overall, it was observed that the ratio of males to females was similar (approximately 1:1) for respondents having University degree or Technikon diploma and for others having Post graduate degree / diploma or B Tech. (The percentages are found in the last row labelled Total.)

Callender and Grasman (2010) maintain that education and training is regarded as the first important practice for the enhancement of supply chain management practices. Training should contain training executives, the benefits from and ways on how to offer managerial assistance. The outcome demonstrates that attempts to educate healthcare managers on Supply Chain Management are being made. According to Katunzi (2011) supply chain process integration is often difficult because it entails appropriate training and readiness, keen and capable trading partners and transformation in one or more organizational cultures. However, the advantages of cooperation and information sharing can be substantial, that is, reduced supply chain costs, greater flexibility to respond to market changes, less supply chain safety stock, higher quality levels, reduced time to market and a better utilization of resources.

The qualifications of the respondents are shown below. Nearly half of the respondents (47.4%) had a post graduate qualification. All of the respondents indicated some form of qualification.

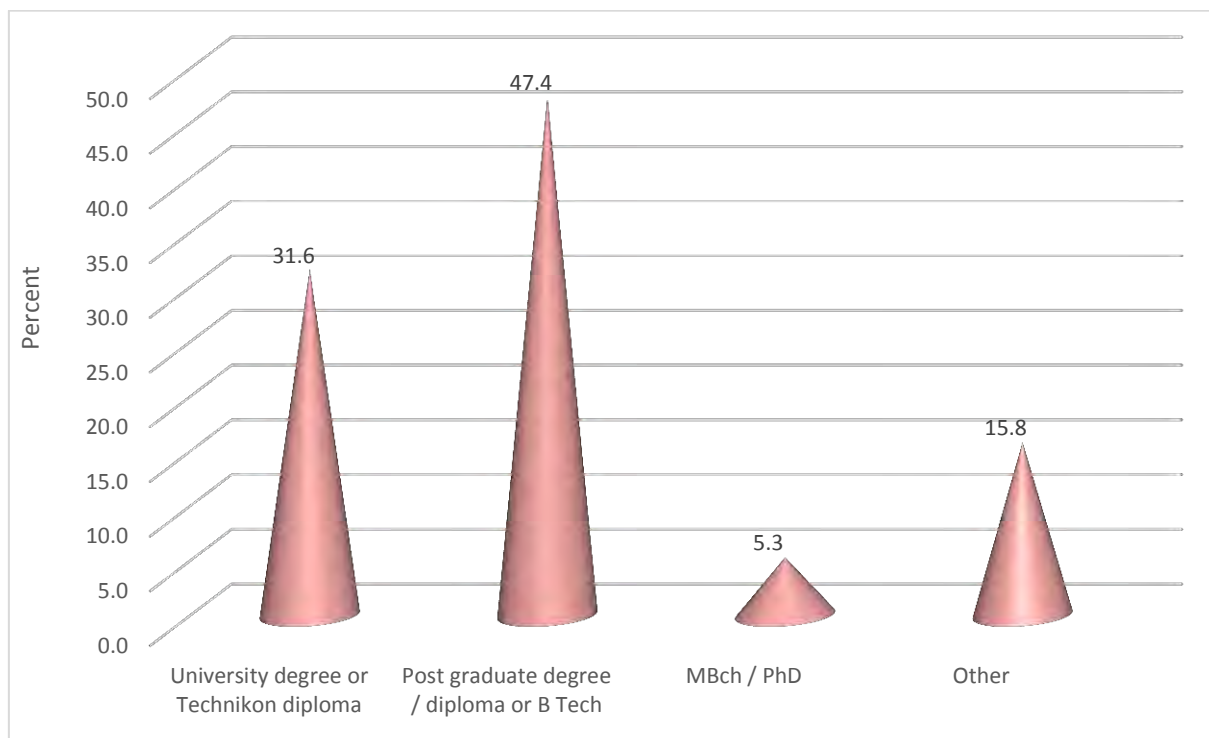


Figure 4.3 Qualifications of the participants

4.5.2 Objective 2: To determine the current status of supply chain in Kwa-Zulu Natal government provincial hospital sector in EThekweni municipality.

Questions 4 to 8

The following questions investigated the current status of the Supply Chain Management in KZN government provincial hospitals. The aim was to understand whether the hospital management has an understanding of the strategy component when managing the supply chain function. The figure below is a summary of the scoring patterns.

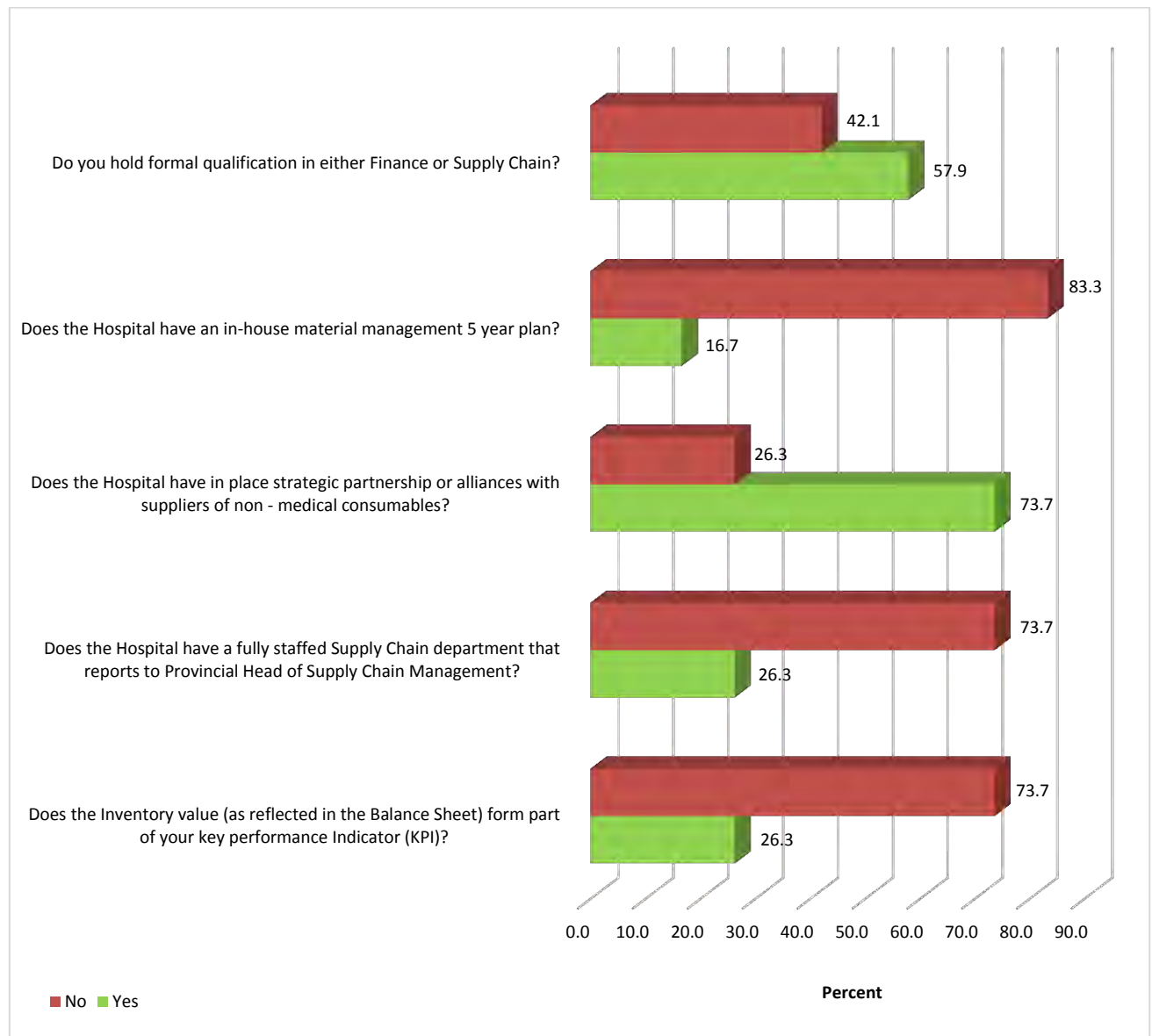


Figure 4.4 Current state of SCM regarding hospital strategy

Section Analysis

Of the total respondents almost 32% and 47% had a formal qualification of either a university degree or post graduate qualification respectively which highlights that there is a recognition that Supply Chain Management personnel requires some form of formal training.

Blacks: The Black respondents made up 63.2% of the participants and there was a 50:50 split between males and females showing a fair and even split. Almost 42% of the respondents had university degrees and diplomas and another 42% had post graduate qualification.

Coloureds: The Coloured respondents had other qualification – this could indicate Short Courses which were not classified as diplomas.

Indians: The Indian respondents made up 31% of the participants and 66% were males while 34% were females and that was probably the result of the warehousing/stores environment which was largely male.

White: There were no white participants in the study.

The section that follows analyses the scoring patterns of the respondents per variable per section. The results are first presented using summarised percentages for the variables in Table 4.2 that constitute each section. Results are then further analysed according to the importance of the statements in Table 4.3.

Table 4.2 Staff with SCM or Finance qualification

		Do you hold formal qualification in either Finance or Supply Chain?		Total
		Yes	No	
Highest educational qualification	University degree or Technikon diploma	Count % of Total	6 10.5%	12 21.1%
	Post graduate degree / diploma or B Tech	Count % of Total	24 42.1%	3 5.3%
	MBch / PhD	Count % of Total	0 0.0%	3 5.3%
	Other	Count % of Total	3 5.3%	6 10.5%
	Total	Count % of Total	33 57.9%	24 42.1%
				57 100.0%

Participants holding University degree and post graduate degree ranked 31.6% and 47% respectively. This implies that there is focus towards employing people with some form of training in either finance or supply chain management.

The cross-tabulation results below in Table 4.3 summarise the biographical data by race.

Table 4.3 Biographical data by race of the participants

Race			Gender		Total	
			Male	Female		
Black	Highest educational qualification	University degree or Technikon diploma	Count % of Total	6 16.7%	9 25.0%	15 41.7%
		Post graduate degree / diploma or B Tech	Count % of Total	6 16.7%	9 25.0%	15 41.7%
		MBch / PhD	Count % of Total	3 8.3%	0 0.0%	3 8.3%
			Count % of Total	3 8.3%	0 0.0%	3 8.3%
		Total	Count % of Total	18 50.0%	18 50.0%	36 100.0%
	Coloured	Highest educational qualification	Count % of Total	3 100.0%		3 100.0%
Total			Count % of Total	3 100.0%		3 100.0%
Indian		Highest educational qualification	University degree or Technikon diploma	Count % of Total	3 16.7%	0 0.0%
	Post graduate degree / diploma or B Tech		Count % of Total	9 50.0%	3 16.7%	12 66.7%
	Other		Count % of Total	0 0.0%	3 16.7%	3 16.7%
	Total	Count % of Total	12 66.7%	6 33.3%	18 100.0%	
Total	Highest educational qualification	University degree or Technikon diploma	Count % of Total	9 15.8%	9 15.8%	18 31.6%
		Post graduate degree / diploma or B Tech	Count % of Total	15 26.3%	12 21.1%	27 47.4%
		MBch / PhD	Count % of Total	3 5.3%	0 0.0%	3 5.3%
			Count % of Total	6 10.5%	3 5.3%	9 15.8%
		Total	Count % of Total	33 57.9%	24 42.1%	57 100.0%

Using the T – test to analyse data

The usual assumption is that the populations have the same variance. The interpretation rule for the t-test is as follows: If p value is less than or equal $p \leq 0.05$, statistically there is a significant difference between the groups. If p value is greater than $p > 0.05$, statistically there is no significant difference between the groups.

To determine whether the differences per option per variable were significantly different, chi-square tests were done by variable (statement). The null hypothesis tested the claim that there were no differences in the scoring options per statement. The test statistics results are shown below in Table 4.4.

Table 4.4 Test statistics for Gender, Race and Qualifications

	Gender	Race	Highest educational qualification
Chi-Square	1.421 ^a	28.737 ^b	23.211 ^c
df	1	2	3
Asymp. Sig.	.233	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 28.5.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.0.

c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 14.3.

Since the two significance values (p-values) are less than 0.05 (the level of significance), it implies that the distributions were not even. That is, the differences between the options were significant. It is noted that the sig. (p-) value for gender ($p = 0.23$) is greater than 0.05. This implies that the difference in numbers between males and females was not significant.

It was noted that 57% of the respondents held formal qualification in either Supply Chain or Finance. This was an indication that there was emphasis towards employing suitably qualified personnel in Supply Chain Management. Supply

Chain is a new field of study and it is possible that the respondents were largely from finance background – these two fields complement each other.

Regarding the 5 year plan in the second statement, 83% of the respondents said NO, meaning that they did not know of any material management strategic plan. This shows that at least for the next five years there would be no changes in the way the goods are procured, delivered to stores, received, packed and distributed to the wards or users. There are no planned changes to the IT system, location of the warehouses or with vendors in the next five years. According to Ming-Hon and Hwang (2010) the purpose of supply chain strategy formulation is to determine the process to pursue in order to achieve a stated goal of the organisation, in the short, medium term. When the organisation is formulating the overall strategy, the first stage is environmental scanning and analysis of both the internal and the external environment of the organisation on matters related to the supply of goods and services. The information collated in this stage is used in the next stage, that is, objective formulation phase. The objective of formulation phase is to create the complete competitive strategic course and objectives of the supply chain for the overall supply chain and its participants.

The respondents (74%) answered positively on strategic partnership and alliances question. This is possible because a large number of contracts are in place between suppliers and the Department of Health at National level. The positive response by respondents on this question does suggest that more strategic initiatives should be employed and be visible. Hult and Ketchen (2007) are of the view that firms that use strategic alliances to assist themselves in establishing the capabilities reaps the benefits because they become competitive in their industry. Organisations become constrained internally and hence have to rely on the competencies of others which then makes alliances and supplier networks an effective mechanism to manage these changes (Anand et al., 2010). According to Repenning and Sterman (cited in Carr et al 2012) alliances enable organisations to strategically modify their resources in order to meet new challenges brought about by changes in technology and markets (Carr et al., 2012).

Approximately three-quarters (73.7%) of the respondents did not agree with the last two statements. These results show that unlike in the private sector or in the

private hospitals, the inventory value is not a critical key performance indicator and none of the managers are accountable for large inventory values. Privately held organisation regards inventory as cash tied up that could be used for other cash generating projects – not the case in the public sector. Understandably, the healthcare industry takes care of human life and that cannot be compromised by the inventory failure caused by shortages. Other strategies should therefore be employed to minimise the stockholding by increasing the inventory turns and applying the Just-In-Time methodology.

To determine whether the differences between the options for each variable were significant, chi-square tests were performed. The results are shown below.

Table 4.5 Differences between the options for each variable

	Do you hold formal qualification in either Finance or Supply Chain?	Does the Hospital have an in-house material management 5 year plan?	Does the Hospital have in place strategic partnership or alliances with suppliers of non - medical consumables?	Does the Hospital have a fully staffed Supply Chain department that reports to Provincial Head of Supply Chain Management?	Does the Inventory value (as reflected in the Balance Sheet) form part of your key performance Indicator (KPI)?
Chi-Square	1.421 ^a	24.000 ^b	12.789 ^a	12.789 ^a	12.789 ^a
df	1	1	1	1	1
Asymp. Sig.	.233	.000	.000	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 28.5.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 27.0.

All of the differences were significant as $p < 0.05$ (as is observed in the figure above), except for the first variable. Since the $p > 0.05$ ($p = 0.233$), it implies that there were not much differences in the number of respondents who did have a qualification to those who did not.

4.5.3 Objective 3: To identify initiatives that affects the success of Supply Chain initiatives in the health care industry.

This section deals with the supply chain processes which are deemed important in any sector that deals with the movement and storage of goods and services with the sole purpose of increasing productivity. SCM is a collection of several elements. These elements and their importance are acknowledged by their inclusion in the study that includes a large and wide range of supply chain participants in the Ethekewini Public hospitals.

Table 4.6 Supply Chain initiatives in healthcare

	N	Mean	Std. Deviation	Rank Position
Plan strategically	57	4.47	0.76	1
Close partnership with suppliers	57	4.21	1.11	2
Holding safety stock	57	4.21	0.77	2
Few suppliers	57	3.63	0.94	4
eProcurement	57	3.63	1.10	4
Close partnership with users	57	3.47	1.48	6
Just in Time (JiT) supply	57	3.37	1.05	7
Supply Chain benchmarking	57	3.37	0.94	7
Outsourcing	57	3.11	1.03	9
Use of external consultants	57	2.32	0.93	10

A low standard deviation (between 0.76 and 1.48) shows that the data are clustered closely around the mean making the above data more reliable.

The most important factor identified by the respondents was strategic planning. In business, customers are at the centre of the strategy and supply chains needs to be designed and aligned to nature of the company's business. As in the case of hospitals, the strategy should be consistent to maximize patient care. By planning strategically the hospital supply chain can achieve the following:

- Ensuring the uninterrupted product availability;
- Minimize unutilised storage space;
- Maximize patient care space;

- Reduce material handling time and costs for all medical staff (nurses, pharmacists, doctors);and
- Reduction of inventory.

Strategic planning must be a deliberate and comprehensive attempt by an organisation to adapt to the changing industry forces and market environments. Results of strategic planning are normally the large scale changes that affect the entire stream of business operations. Such strategic change often represents a radical shift in the way the organisation interacts with its customers and its employees. Accordingly, strategic planning requires that the organisation reconcile its internal and external environments and match the requirements in order to serve their markets effectively.

Joint second, respondents identified “Close partnership with suppliers” and “Holding safety stock”. These two factors are complementary as one depends on the other. Recent studies on successful companies have shown that most of their success is the result of closer partnering with their strategic suppliers. Most innovative ideas now come from suppliers and, in the case of hospitals, it is accepted that suppliers are privately owned and, therefore, are driven to continuously find new and innovative ideas in order to compete and remain profitable. It is no coincidence that respondents saw the close partnership as second most important initiative to be adopted. There are three levels in the supplier hierarchy and strategic partnering. When organisations reach the third level with their suppliers their suppliers see the future faster and in a new and different way because they continually seek to add value to every situation in addition to products and services provided by the contract agreement. A strategic partner who understands the organisation business goals helps to mutually develop solutions in order to reinforce the long term relationship with the organisation.

Holding stock or holding safety stock is ranked second together with strategic partnership. There are a few reasons why participants view this as an important initiative. Uncertainty is the reason why any organisation and hospital wants to hold stock. There are three major kinds of uncertainty; demand uncertainty,

uncertainty in supply and uncertainty in yield – this uncertainty is common in the manufacturing when they really do not know what will be the losses as the result of scrap due to irregularities in the process. The stock component used to cover uncertainty is safety stock – which is a strategic decision.

The second purpose of holding stock particularly in hospitals is to hold batch stock caused by financial restrictions. Buyers buy large quantities than immediately necessary to prevent repeat shopping in a short space of time which requires another routine approval. These batch purchases at times are caused by suppliers dictating the minimum order quantity and the unintended consequence is that usually the products become out dated or reach expiry dates before they are consumed.

Breir (1995) did a study in the health care sector on inventory management and the results of his study revealed that hospitals hold high inventory because they had poor inventory management practices, and they used personal judgement to determine the safety stock instead of approaching inventory management using scientific approaches. Since the hospitals' main function is to care for patients and save lives, it is no coincidence that keeping of safety stock is paramount; unfortunately it is done at all cost.

Fewer suppliers and e-procurement occupy the same spot. Regarding fewer suppliers one assumes that the respondents see the move towards fewer supplies as of importance. Whilst a large pool of suppliers will mitigate against the supply disruptions by one supplier it appears that respondents believe that having strategic partners will require that only a few suppliers are required. There is a strong correlation between fewer suppliers and having strategic alliances.

The study shows that in the area of procurement there is a wide support towards automated processes like Electronic Data Interchange (EDI) and Internet ordering in order to improve the supply chains transactions. According to Heinbuch (2011) within Procurement, supply chain managers must familiarise themselves with the use of Electronic Data Interchange (EDI) and internet based materials ordering systems in order to improve the supply chain transactions. These methods are deemed far superior than the traditional, inefficient high tendency of errors

methods. Using the electronic means provides much more benefits than using the traditional fax and phone when ordering since there are fewer errors. There is little or no capital outlay should the organisation opt for internet ordering, all that is required between the buying organisation and the supplier(s) is that they both be connected to the internet. The use of internet enables the transactions to be automated and allows the transactions to be integrated with the financial systems.

In order to reduce inefficiencies in the supply chain within the healthcare sector strong close partnership with users is deemed key. Close partnership relates to sharing of information downward and upward, that is, healthcare providers sharing information with suppliers and users which includes sharing inventory related information, such as, on hand stock and backorders in order to create supply chain visibility. The ability to share information will result in reduction in inventory carried and will increase inventory turns and product availability. Sharing of information is also a barrier to implementation of supply chain strategies probably because not the right information is shared.

The last four elements studied are summarised next. The last twenty or so years have produced some important and critical changes in the way production is performed as there has been a move towards Just In Time (JIT) production and outsourcing. These two elements were essential in order to remain competitive in the rapidly changing global economy.

JIT manufacturing is a flexible system of production which is aimed at reducing lead time and excessive work in progress inventories at the plant level, while helping to improve productivity and product quality. It often involves the use of new technology, such as, computer-integrated manufacturing, cellular layouts, and advanced information systems. This new technology is also frequently associated with the implementation of innovative management practices, such as, JIT sourcing. JIT and outsourcing strategies are always viewed as challenges as well as opportunities dependant on the proximity of the supplier. However, with the advent of improvement in technology and the reduction in transportation cost, proximity of supplier should not be a barrier. However, JIT may reinforce the need for proximity as it relies heavily on frequent deliveries and closer relationship and communication between the supplier and the purchaser. JIT effectiveness requires

flexibility in the ordering and reliability of deliveries between entities. These two elements together with benchmarking and use of external consultants are further down the ranking in the study simply because of them being specialised subjects of study and may be distant from the participants.

It is noted that the standard deviations are relatively small, indicating that the mean scores are fairly representative of the responses. This also implies that there is a level of consistent scoring by the respondents.

4.5.4 Objective 4: To identify the supply chain challenges that will have an impact on the overall organizational effectiveness.

Factor Analysis

In order to manage and reduce the data a technique called factor analysis was employed. The use of factor analysis is commonly applied by researchers when they want to represent a number of questions but employing a small number of hypothetical factors. To explain the use of factor analysis we use as an example a situation when the researches do national survey but asking differing questions to the participants represented at national, regional and provincial level. The responses to questions may not reflect the true sentiment towards what is being researched but when combined may give an improved measure towards what is being measured. By employing factor analysis the researcher would establish whether the differing questions measured the same thing, if they did then the combined scores creates a variable called a factor score. Factor techniques may be applied to a number of conditions that are given names and analysed as if they are real things. Table 4.7 below is a factor analysis used to measure the supply chain challenges.

Table 4.7 KMO and Bartlett's Test Source: Computed from Primary Data

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.712
Bartlett's Test of Sphericity	Approx. Chi-Square
	496.240
	Df
	45
	Sig.
	.000

Each matrix table is preceded by a table that reflects the results of KMO and Bartlett's Test. The requirement is that Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be greater than 0.50 and Bartlett's Test of Sphericity less than 0.05. In all instances, the conditions are satisfied which allows for the factor analysis procedure. From the above table it is found that the Kaiser- Meyer-Olkin measure of sampling adequacy is .712 and Bartlett's test of sphericity with approximate Chi-Square value 496.240 are statistically significant at 5% level. These designate all the 10 variables as more appropriate and suitable to reduce predominant problems of SCM implementation. These lead to further verification of significant variances existing among 10 variables.

Table 4.8 Supply Chain Barriers in Healthcare - Computed from Primary Data

	Initial	Extraction
Resistance to change	1.000	.738
Human Resource challenges	1.000	.600
Skills shortage	1.000	.843
Insufficient vendor support	1.000	.822
Hidden costs	1.000	.915
Integration with existing system	1.000	.806
Integration with suppliers system	1.000	.798
Possibility of supply chain failure	1.000	.516
No proper Supply Chain Management leadership	1.000	.674
Failure of Inventory Control	1.000	.720

Extraction Method: Principal Component Analysis

Communalities indicate the extent to which statements belong to a section (theme)

- Values > 0.5 are acceptable. It is noted that all of the variables meet this requirement. From the above table it is found that the variance of 10 variables ranges from .500 to .915 and this shows that 10 variables exhibit considerable variance of 50 % to 91.5%. Therefore it can be concluded that all these 10 variables are able to segment themselves with respect to the perception of participants to form the predominant factors. Table 4.9 below gives the individual variances of the predominant factors emerged out of 10 variables.

Table 4.9 Total Variances for problems in implementing SCM practices.

Component	Initial Eigenvalues			Extraction Sums of Squared			Rotation Sums of Squared		
	Loadings			Loadings			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.597	55.973	55.973	5.597	55.973	55.973	5.443	54.428	54.428
2	1.834	18.338	74.311	1.834	18.338	74.311	1.988	19.883	74.311
3	.751	7.508	81.819						
4	.615	6.148	87.967						
5	.380	3.802	91.769						
6	.343	3.434	95.203						
7	.187	1.873	97.076						
8	.154	1.536	98.612						
9	.100	.996	99.608						
10	.039	.392	100.000						

Extraction Method: Principal Component Analysis

From the above table it is found that ten variables are reduced into two predominant factors with individual variances 54.428 and 19.883. This is also found, that the total variance of the 10 variance is 74.311% which is greater than the bench mark of 50%. It also conforms the factor segmentation to a meaningful approach. This leads to the following variable loading to frame the factors in Table 4.10 below:

Table 4.10 Extraction Method: Principal Component Analysis

	Component	
	1	2
Resistance to change	.832	.215
Human Resource challenges	.774	-.009
Skills shortage	.916	.052
Insufficient vendor support	.034	.906
Hidden costs	.102	.951
Integration with existing system	.859	.261
Integration with suppliers system	.860	.239
Possibility of supply chain failure	.705	-.137
No proper Supply Chain Management leadership	.789	.226
Failure of Inventory Control	.838	-.134

Rotation Method: Varimax with Kaiser Normalisation.

a. Rotation in 3 iterations

The variables that makes the unit is split and has two components in it which implies that the respondents saw certain aspects to belong to one theme and certain aspects to belong to the other theme. From the above table it may be seen that the first factor consists of 8 variables namely:

1. Resistance to change (.832)
2. Human Resources challenges (.774)
3. Skills shortages (.916)
4. Integration with existing systems (.859)
5. Integration with supplier's system (.860)
6. Possibility of supply chain failure (.705)
7. No proper Supply Chain management Leadership (.789)
8. Failure of Inventory Control (.838)

The above eight factors are followed by the following two factors namely:

1. Insufficient vendor support (.906)
2. Hidden costs (.951)

The factor analysis revealed that the two major problems - confused strategies and poor supply flow. These are predominant in breaking and hindering SCM practices of EThekweni Public Hospitals.

4.6 Summary

The overall research design drew on both qualitative and quantitative approaches using descriptive study to find out and establish the strategic supply chain initiatives and barriers to its implementation in the EtheKwini Provincial hospitals of KwaZulu Natal. The questionnaire was divided into four sections A,B,C and D. Section A consisted of four questions about the demographics of the respondents while Section B comprised of a further four questions on the current condition of the hospital supply chain. Section C had ten questions on supply chain barriers and section D closed with a further ten supply chain initiatives. The ethic committee approved the questionnaire before it was delivered at the targeted hospitals to be participants. Respondents were asked to sign as an indication of giving their consent to voluntarily participate in the research. Quantitative data in the form of coded responses from the questionnaires was analysed using SPSS. SPSS was also used to compare, correlate, covariance, t-Test and contrast the data collected from the questionnaires. The next chapter will discuss the limitations, conclusions and recommendation of the study.

CHAPTER 5

LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives an overview of the research findings on strategic supply chain initiatives and barriers to implementation in the Provincial hospital at eThekweni. This chapter discusses the conclusions with reference to the problem statement and objectives outlined in Chapter One. It further provides the limitations of the study and recommendations that could be considered when attending to the issues in relation to strategy and its implementation. Finally, it provides possible areas for further research.

5.2 Limitations of the study

This study is a research project, in partial fulfilment of the Masters in Business Administration degree at the University of KwaZulu Natal. The overall goal of the research project was to do an investigation into the strategic supply chain management initiatives and barriers to implementation in the EThekweni Provincial Hospitals.

The delay in the approval process by the heads of the participating hospitals presented a major challenge in conducting this study. Data collection was also a challenge because the problem of internet connectivity by participants was only discovered very late when the response rate was nearly zero. The participants only had access to intranet whilst the study was internet based using QuestionPro. These delays resulted in the researcher having to wait for in excess of two months before handing in hard copies to recipients.

5.3 Answering of the research questions

The following are the questions posed to respondents and are on the Appendix. The researcher answers these questions based on the analysis and findings of Chapter Four and the reviewed literature from Chapter Two.

5.3.1 Biographical data

The ratio of males to females is approximately 3:2 (57.9%: 42.1%). According to the official published figures by Stats SA 2014 the male: female ratio is 51:49. This shows that there is a good spread of males and females employees in the hospital Supply Chain Management which is supported by the official figures.

Gender: It is noted that the sig. (p-) value for gender ($p = 0.23$) is greater than 0.05. This implies that the difference in numbers between males and females was not significant.

Race & educational qualifications: Since sig. values (p-values) are less than 0.05 (the level of significance), it implies that the distributions were not even. That is, the differences between the options were significant.

Formal qualification in either Finance or Supply Chain: It is noted that there is a 15% difference between the positive and negative responses regarding respondents having a formal qualification in either Finance or Supply Chain, with more agreeing which denotes that there is a focus of gradually bringing in qualified personnel within Supply chain. Since the $p > 0.05$ ($p = 0.233$), it implies that there was not much difference in the number of respondents who had a qualification to those who did not.

5.3.2 Current state of the Provincial hospitals

In 2008/09 financial year, the Department of Health reported an over expenditure of R1.3bn and a qualified audit. Finance and Supply Chain was identified as one of the key challenges requiring attention to improve the service delivery in line with the Public Finance Management Act (PFMA). The identified challenges included:

- Historical under-funding and non-alignment of budget with service delivery demands partly due to the lack of an effective costing model.
- Poor financial management and inadequate management competencies, inefficient controls and discipline and limited development programmes especially at facility level.
- Ineffective Supply Chain Management Systems.
- Poor contract management, controls and oversight. Centralised non-core contracts not aligned with institutional budgets.

The following questions were asked as a means to understand how far since 2008/09 had the hospitals at institutional level progressed since and how significant their responses were to the study:

- Does the hospital have an in-house material management 5 year plan? 83.3% of the respondents said No – this is in line with the 2010 /14 Department of Health Strategic Plan wherein cancellations or postponement of projects not yet started was listed as a cost containment strategy to be employed.
- Does the hospital have in place strategic partnership or alliances with non-medical suppliers of consumables? 73.7% of the respondent said Yes – this is in line with the 2010~14 Strategic plan wherein improvement of the supply chain was listed as a focus area. National RT contracts are in place, bid committees have been established and the review of policies and procedures established to improve governance in the Central Provincial Stores.
- Does the hospital have a fully staffed Supply Chain department that reports to Provincial head of Supply Chain Management? 73.7% said No - the 2010/14 Department of Health strategic plan placed a moratorium on filling non clinical posts – including Supply Chain Management. Although the Human Resources Plan makes provision for the allocation of suitably qualified and skilled personnel, delivering as per the plan is challenged by, amongst others, the geographical distribution of facilities, inadequate staff accommodation, limited financial resources and cost containment

measures including the increasing demand for compensation of employees on expenditure allocations.

- Does Inventory value (as reflected in the balance sheet) form part of your key performance measurement? This measure is confined to accounting officers and therefore it will not be discussed further in this study.

6.0 Conclusion

This article provides insight about material management practices in the healthcare sector. From these insights we have established a set of practices shown in Table 5.1.

Table 5.1 Material Management best Practices

Area	Recommended best Practice
Plan Strategically	<ul style="list-style-type: none"> • Increase training and education on SCM principles such as executive support, communication within internal departments, information systems and measurement systems
Holding Safety stock	<ul style="list-style-type: none"> • Use computer software applications for calculating reorder points and quantities based on demand forecast and safety stock levels • Increase inventory turns to hold less inventory and invest less capital at a given time
Close Partnership with suppliers	<ul style="list-style-type: none"> • Increase automated ordering process by using electronic means (EDI, Internet) • Comply with GPO contracts to achieve cost savings • Standardize products to reduce the number of contracts and transactions
Close Partnership with users	<ul style="list-style-type: none"> • Share inventory related information with vendors for better planning. Information should include: sales data, backorders, and on-hand inventory; it should also be accurate and accessible in a timely manner • Involve physicians and other providers in the product selection process through collaboration and cooperation

With the initial thrust to collect information related to SCM implementation barriers and material management best practices, survey findings revealed that improvements have been made in the healthcare supply chain, primarily in the area of education. Most material managers and healthcare executives seemed to have received formal training and acquired appropriate skills and knowledge about SCM practices. As a consequence, healthcare executives have realized the benefits and importance of the adoption of SCM practices and have started to offer more support for the implementation of such practices. Though healthcare institutions are experiencing support from their executives, full implementation of SCM practices has not been achieved.

Moreover, it has been seen in this study that the adoption of these practices is still hindered by the presence of strong implementation barriers. This study suggests that areas such as inventory control, procurement processes, and information sharing will require more attention from material managers. Other practices such as product standardization and contract compliance will require involving physicians in the product selection process. Improvements in all these areas can become possible with the aid of information technology, along with collaboration and cooperation of stakeholders. The barriers for implementation of SCM practices provide stakeholders in the healthcare supply chain with a clear prescription for overcoming them. These material management best practices can greatly help material managers with their continuous improvement efforts, while maintaining quality of care.

While this study has provided an assessment of material management in the healthcare sector, there are some limitations to this study. Given the sample size and inequality of the groups of participants, conclusions cannot necessarily be drawn about the general population. Future research should attempt to draw a larger sample of the population to make more robust conclusions about the differences among hospitals and healthcare providers in order to provide better recommendations to specific institutions and their supply chain.

Research that focuses on specific supply chain levels can help better define their characteristics and explain differences between stakeholders, especially between

material managers and other stakeholders. Purchasing and contracting practices in material management should be further explored so more specific recommendations can be made regarding product selection and standardization, as well as to understand why healthcare products have not standardized or adopted universal product numbers.

Finally, the adoption of new emerging technologies, such as radio frequency identification (RFID) and its benefits to the healthcare industry should also be explored to identify innovative alternatives to material management in the healthcare sector.

7.0 Recommendations for further research

This research was conducted with an aim of facilitating a better understanding of the strategic supply chain initiatives (best practices) and the barriers to implementation in the EThekweni Municipal hospitals. However, with the limited resources and time frame, it proved difficult to explore all areas of improvements and the getting of more supply chain stakeholders within and outside of the hospitals to participate.

While the EThekweni municipality samples included respondents from the nine hospitals, sample sizes were too small to test for possible differences between all the hospitals to make a fair generalisation. This is a compelling opportunity for future research; likewise it would be interesting to do this study in other metropolitan in Gauteng, Port Elizabeth and Cape Town. Since some of the respondents were not professionals in terms of SCM implementation and have recently started in SCM in their hospitals, there would be an area to apply another survey among these hospitals when they become professionals in the future.

Furthermore, research is also needed to determine the leading facilitators of SCM implementation. According to this survey, these facilitators were technological rather than relational. Differing from this result, on the primacy of computers and technology, people and relationships remain as important factors in the SCM puzzle. How do SCM relationships impact technology? Should training employees

and reorganization be done earlier than the development of technology? It is recommended that further research be undertaken to explore SCM perspectives, barriers, and facilitators in the minds of professionals looking at SCM from the viewpoints of other functions or intellectual domains such as operational management or purchasing and supply management. Further research is needed on the effective factors in choosing different perspectives on SCM, across provinces with differing cultures.

Areas to be included on the next study must concentrate on the following potential barriers: Lack of executive support for SCM efforts, lack of skills and knowledge about SCM at executive level, lack of skills and knowledge about SCM at management level, conflicting goals regarding inventory choices in the supply chain, constantly evolving technology of products, physician preference for high cost items and Information systems for data collection, analysis and sharing.

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Appendix 1

Questionnaire

Dear Respondent,

I, Bongani Edwin Sikhosana, an MBA student at the Graduate School of Business, University of KwaZulu-Natal am currently conducting a study entitled —Strategic Supply Chain Management initiatives and the barriers to implementation in the provincial hospitals”. The purpose of this survey is to solicit information from hospital managerial staff regarding the role of Supply Chain Management in an effort to understand the barriers to implementing strategic supply chain management initiatives in provincial hospitals. The information and ratings you provide will go a long way in helping identify the shortcomings of the current processes and to formulate intervention. The questionnaire should only take 5~8 minutes to complete. In this questionnaire, you are asked to indicate what is true for you, so there are no “right” or “wrong” answers to any question. Work as rapidly as you can. Make sure not to skip any questions. Researcher: Bongani Edwin Sikhosana (031 462 8985 or 082 826 900; email sikhosanabe@gmail.com) Supervisor: Mr Steven Msomi (031 - 2607564) Research Office: Ms P Ximba 031-2603587. I thank you for your support and, in anticipation, for your time in completing the survey. If you wish to participate, please click the ‘I Agree’ icon and start the survey by clicking on the ‘Continue’ button below.

Questionnaire

1. Section A: Demographics

a) Gender

- i. Male
- ii. Female

b) Race

- i. White
- ii. Indian
- iii. Black
- iv. Coloured

c) Highest educational qualification

- i. MBCh / PhD
- ii. Masters degree or M.Tech
- iii. Post graduate degree / diploma or B.Tech
- iv. University degree or Technikon diploma
- v. Other

d) Do you hold formal qualification in either Finance or Supply Chain Management?

- i. Yes
- ii. No

2. Section B: Current state of the Provincial hospitals

a) Does the hospital have an in-house material management 5 year plan?

- i. Yes
- ii. No

b) Does the hospital have in place strategic partnership or alliances with non medical suppliers of consumables?

- i. Yes
- ii. No

c) Does the hospital have a fully staffed Supply Chain department that reports to Provincial head of Supply Chain Management

i. Yes

ii. No

d) Does Inventory value (as reflected in the balance sheet) form part of your key performance measurement

i. Yes

ii. No

3. Section C: Supply Chain initiatives

a) Rank the following supply chain initiatives (5 being highest and 1 being lowest) to have an impact to supply chain management in your hospital

i.	Close partnership with suppliers	1	2	3	4	5
ii.	Close partnership with users	1	2	3	4	5
iii.	Just in Time (Jit) Supply	1	2	3	4	5
iv.	eProcurement	1	2	3	4	5
v.	Outsourcing	1	2	3	4	5
vi.	Plan strategically	1	2	3	4	5
vii.	Supply Chain benchmarking	1	2	3	4	5
viii.	Few suppliers	1	2	3	4	5
ix.	Holding safety stock	1	2	3	4	5
x.	Use of external consultants	1	2	3	4	5

4. Section D: Supply Chain challenges

a) Rank the following supply chain challenges (5 being highest and 1 being lowest) in your hospital

i.	Resistance to change	1	2	3	4	5
ii.	Human Resource challenges	1	2	3	4	5
iii.	Skills shortages	1	2	3	4	5
iv.	Insufficient vendor support	1	2	3	4	5

v.	Hidden costs	1	2	3	4	5
vi.	Integration with existing system	1	2	3	4	5
vii.	Integration with suppliers system	1	2	3	4	5
viii.	Possibility of supply chain failure	1	2	3	4	5
ix.	No proper SCM direction from leadership	1	2	3	4	5
x.	Failure of Inventory control	1	2	3	4	5

End of the Questionnaire

Thank you for taking the time to complete the questionnaire.

Appendix 2

Ethical Clearance



18 February 2014

Mr Bangani E Sikhosana (211557927)
Graduate School of Business and Leadership
Westville Campus

Protocol reference number: HSS/0078/014M
Project title: Strategic Supply Chain Management Initiatives and the barriers to Implementation in the provincial hospitals

Dear Mr Sikhosana,

In response to your application dated 14 February 2014, the Humanities & Social Sciences Research Ethics Committee has considered the aforementioned application and the protocol have been granted **FULL APPROVAL – Expedited**.


Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.







Take this opportunity of wishing you everything of the best with your study.

Yours faithfully,


Dr Shenuka Singh (Chair)

Cc: Supervisor: Dr Steven S Msimi
Academic Leader Research: Dr C Mungoni
School Administrator: Ms Zarina Bullyral

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4006
Telephone: +27 (0) 31 260 2597/31504557 Facsimile: +27 (0) 31 260 1509 Email: s.singh@ukzn.ac.za / shenuka@ukzn.ac.za / shenuka@ukzn.ac.za
Website: www.ukzn.ac.za

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Appendix 3

Regional approval



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Postal Address: Private Bag X54318 Durban 4000
is: 83 Jan Smuts Highway, Mayville, Durban 4001
Tel: 031 2405308 Fax: 031 2405500
Email: nan.hosain@kznhealth.gov.za
www.kznhealth.gov.za

Inquiries: Ms Jabu Hlazo
Tel: 031 240 5303
Date: 3 December 2013

Attention: Mr. E. Sikhosana

E-mail : esikhosana@hotmail.co.za

REQUEST TO CONDUCT RESEARCH:

"Strategic Supply Chain Management" initiatives and the barriers to implementation in the Provincial Hospital."

Support is hereby granted to conduct research on the above topic.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regard to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure that this office is informed before you commence your research.
4. The District Office will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office.

For The District Manager
EThekweni Health District
Telephone: 031 2405303
Fax: 031 2405500
Email: jabuswehlazo@kznhealth.gov.za

uMnyango Wazempilo . Departement van Gesondheid

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Appendix 4

Provincial approval



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x3051
Pietermaritzburg
3200
Tel: 033 – 3953189
Fax: 033 – 394 3762
Email: hkrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 33/14
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Mr BE Sikhosana

Subject: Approval of a Research Proposal

1. The research proposal titled '**Strategic Supply Chain Management (SCM) initiatives and the barriers to implementation in the provincial hospitals**' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at Addington, Clairwood, Inkosi Albert Luthuli Central, King Dinuzulu Hospital Complex, Mahatma Gandhi, Prince Mshiyeni, St Aicans and Wentworth Hospital.

2. You are requested to take note of the following:
- a. Make the necessary arrangement with the identified facility before commencing with your research project
 - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X3051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hkrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge

Chairperson, Health Research Committee

Date: 15 - 12 - 2014

uMnyango Wezemphobo, Departement van Gesondheid

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