



**DEVELOPING A DEMAND MANAGEMENT FRAMEWORK
IN THE PUBLIC SECTOR: THE CASE OF GAUTENG
DEPARTMENT OF HEALTH**

by

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DECLARATION

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Developing a demand management framework in the public sector: The case of Gauteng Department of Health

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.



Mr DH Selby

28/01/2022

Date

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"It seems impossible until it is done."

Mr Nelson Mandela

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DEDICATION

I dedicate this thesis to my father, the late James Ewon Selby. The knowledge and wisdom you imparted to me have been my source of inspiration and support throughout my studies and career. You have inspired me to pursue my goals with hard work and dedication. Thank you for believing in me. May your gentle soul continue to rest in perfect peace.

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“I can do all things through him who strengthens me”.

ABSTRACT

The study examined demand management practices within the South African public sector. Demand management plays a crucial role in implementing service delivery programmes and the achievement of socioeconomic imperatives in the South African public sector. However, demand management practices have not been optimally implemented within the South African public sector, negatively influencing public service delivery. The research study was designed to employ a combination of exploratory and descriptive research, using a mixed method approach based on a survey of demand management practitioners in the Gauteng Department of Health. A structured questionnaire was administered to demand management practitioners who were selected using simple random sampling. Descriptive statistics using the software SPSS version 27.0 was used to analyse and provide the descriptive analysis results.

The results of the study revealed that, in general, demand management practices were being adequately implemented in the Gauteng Department of Health. Based on the analyses of the three constructs (demand management practices, compliance to the SCM policies and regulations, alignment of demand planning to strategic objectives and budgeting); the results revealed the adequate implementation of demand planning, compliance to SCM policies and regulations and alignment between demand planning, strategic objectives and budgeting. The study, however, revealed challenges in the implementation of demand management in some public sector entities in the South African public sector. The study is significant because it provided a demand management framework to enable the efficient implementation of demand management in the South African public sector. By so doing, the research contributed to the body of knowledge.

Key words: demand management, demand planning, SCM policies, SCM regulations, strategic objectives, budgeting, implementation of demand management, challenges in implementing demand management, strategic planning, forecasting, and demand analysis

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LIST OF ABBREVIATIONS AND ACRONYMS

The following abbreviations are used throughout the study:

AGSA	Auditor General of South Africa
BAC	Bid Adjudication Committee
BAS	Basic Accounting System
BB-BEE	Broad Based Black Economic Empowerment
BEC	Bid Evaluation Committee
BSC	Bid Specification Committee
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CPAR	Country Performance Assessment Review
CPFR	Collaborative Planning, Forecasting and Replenishment
CPI	Consumer Price Index
EAA	Enterprise Application Architecture
FPPPA	Federal Public Procurement Property Administration Agency
GDP	Gross Domestic Product
GDoH	Gauteng Department of Health
HDI	Historically Disadvantaged Individual
HDPA	Hierarchical Demand Planning Approach
HDPF	Hierarchical Demand Planning Framework
HOD	Head of Department
ICT	Information Communication Technology
IPFA	Institute of Public Finance Agency
ISO	International Standards Organisation
IT	Information Technology
JIT	Just-in-Time

KPI	Key Performance Indicator
KMO	Kaiser-Meyer Olkin
MAPE	Mean Absolute Percentage Error
MEC	Member of Executive Committee
MRI	Magnetic Resonance Imaging
MRP	Material Resource Planning
MSE	Mean Squared Error
MTEF	Medium Term Expenditure Framework
NDP	National Development Plan
NGO	Non-Governmental Organisation
NHI	National Health Insurance
NSG	National School of Government
PALAMA	Public Administration Leadership & Management Academy
PC	Principal Component
PE	Procurement Entity
PFMA	Public Finance Management Act
PMU	Procurement Management Unit
PPDA	Public Procurement and Disposal of Public Assets Authority
PPDPA	Public Procurement and Disposal of Public Assets Act
PPI	Producer Price Index
PPOA	Public Procurement Oversight Authority
PPPDS	Public Procurement and Property Disposal Services
PPPFA	Preferential Procurement Policy Framework Act
PPPFR	Preferential Procurement Policy Framework Regulation
PPRC	Provincial Protocol Committee
PRAZ	Procurement Regulatory Authority of Zimbabwe
RBV	Resource-Based Theory

RDP	Reconstruction & Development Programme
SAMDI	South African Management Development Institute
SANAS	South African National Accreditation System
SAP	Systems Application and Products in Data Processing
SBD	Standard Bidding Document
SCM	Supply Chain Management
SCMBP	Supply Chain Management Best Practices
SD	Standard Deviation
SKU	Stock Keeping Unit
SMART	Specific, Measurable, Achievable, Realistic and Timely
SMME	Small Medium Micro Enterprise
SPSS	Statistical Package for Social Science
STB	State Tender Board
TB	Tuberculosis
TCT	Transaction Cost Theory
TOR	Terms of Reference
UNISA	University of South Africa
US/ USA	United States of America
WB	World Bank
WWW	World Wide Web

CHAPTER 1: ORIENTATION OF THE STUDY

1.1 INTRODUCTION

Recent economic conditions have resulted in organisations having to offer their customers excellent levels of customer service, including a greater variety of quality products, to maintain a competitive advantage over their competitors (Loretto, 2014:4). Demand management forms a significant component of the supply chain management (SCM) within an organisation to ensure a balance between the demand and supply capabilities within and across the supply chain (Lysons & Farrington, 2016:227). Demand management plays a crucial role in ensuring customers receive quality products according to their specific needs (Cassettari, Bendato, Mosca & Mosca, 2017:49–50). According to Bizana, Naudé and Ambe (2015:64), demand management ensures that customers receive the correct quantity and quality of the right product, at the right place, at the right time and at the right price.

Demand management is the first element in the SCM business model in the South African public sector and provides a stable foundation for the SCM business model elements to balance user needs with the available resources. A study by Maleka (2016) found that the South African public sector had failed to successfully implement demand management practices in several public sector entities, resulting in significant disruptions to service delivery. According to Matloko (2021), a considerable challenge facing the South African public sector is the inability to implement demand management practices, non-compliance with SCM policies and regulations, the misalignment between demand planning and strategic objectives and budgeting, and the failure to compile comprehensive and accurate specifications for goods and works, and terms of reference (TOR) for services.

The above challenges could result in fruitless and wasteful expenditure in instances where suppliers may deliver the incorrect goods, or works and services, or it may result in advertised tenders being subsequently cancelled due to non-responses from prospective bidders due to poorly compiled specifications and TOR.

A further challenge could be overspending on budget due to the non-alignment between demand planning and budgeting, or inappropriate goods, works, or services

being delivered due to the non-alignment between demand planning and strategic objectives.

The impetus for this particular research study is the number of recent studies that have been conducted in SCM in the South African public sector. These studies identified several challenges relating to the lack of implementation of demand management practices, the non-compliance of demand management practices to SCM policies and regulations, and a lack of alignment between demand planning, strategic objectives and budgeting. However, none of these studies was conducted within the public healthcare sector. Therefore, the research study aims to make a contribution to the body of knowledge in improving demand management practices in South Africa's public sector, with specific focus on the public healthcare sector.

1.2 CONCEPTUALISATION OF THE STUDY

The following section presents reasons for this research. This section starts by discussing the public healthcare system in South Africa, and provides a generic perspective on demand management, and lastly, discusses demand management in the South African public sector.

1.2.1 Understanding the South African health system

The public sector in South Africa is responsible for rendering public healthcare services to the citizens of South Africa. Post-1994, the South African government inherited a fragmented public healthcare system with significant disparities in health spending, and inequities relating to access and quality of healthcare (Chikobvu, 2016:2). Before 1994, South Africa was based on an ideology of the racial superiority of the white population who held political and economic power. This resulted in public sector services, including healthcare services for the white people, outweighing those of the black population (Chikobvu, 2016:2).

According to Prince (2014), 80% of South Africa's citizens are dependent on the public healthcare sector for their healthcare needs. A study by Plaks and Butler (2012) entitled "Access to Public Healthcare in South Africa", found that most South African citizens rely on public sector healthcare instead of private sector healthcare. Government Gazette Number 35101 of 2 March 2012, number R.185, categorises public sector healthcare institutions as follows: district hospitals, regional hospitals,

specialised hospitals, tertiary hospitals and central hospitals (Gauteng Provincial Government, 2020/21:7).

Table 1.1 lists and explains the categories of public hospitals in Gauteng.

Table 1.1: Category of hospitals and type of care provided

Category of hospital	Type of healthcare provided
District hospital	Generalist care
Regional hospital	Specialist care
Specialised hospital	Specialised care for certain specialised groups of patients
Tertiary hospital	High specialised care
Central hospital	Very high specialised care for multi-speciality clinical services, innovation and research

Source: Researcher's own compilation

The Gauteng Department of Health (GDoH) provides healthcare to 14.6 million citizens in the Gauteng Province of South Africa through hospitals, clinics and community health centres (Gauteng Provincial Government, 2020/21:8). The GDoH comprises four central hospitals, 377 clinics, three tertiary hospitals, 13 district hospitals, 19 specialised institutions and eight regional hospitals. Despite Gauteng's expanding population and challenging economic conditions, the GDoH is responsible for utilising the limited resources to improve the quality of public healthcare services to citizens in the Gauteng province (Gauteng Provincial Government, 2020/21:7).

It, therefore, becomes imperative for the South African public sector to improve their demand management practices. Improved demand management ensures that the right pharmaceutical items, suitable medical consumables and right medical equipment are delivered to public healthcare facilities, at the right place, at the right time, at the right price and in the correct quantity.

1.2.2 Demand management: A generic perspective

Chase (2016) defined demand management as an estimate of customer requirements, including planning, with other role players in the value chain. Through the effective implementation of demand management practices, customer needs are satisfied (Lysons & Farrington, 2016:245).

According to Mtshali (2017), demand management is that part of SCM that ensures customers receive quality products according to their specific requirements. Effective demand management practices exist when an organisation gets the correct item at the right price, place and time (Ambe, 2016). The following factors can influence effective demand planning: demand, location, distance, variety, technology and bulk ordering (Mtshali, 2017:12).

1.2.3 Demand management in the South African public sector

Demand management ensures that the resources required to fulfil the strategic objectives, as identified during the strategic planning sessions, will be received in the correct quantity, correct quality, at the right place, at the correct price and at the proper time (Setino, 2018).

Demand management contributes to attaining an organisation's strategic objectives (Naidoo, 2019). The implementation of demand management practices can assist public sector entities in the achievement of their mandates in ensuring that the required resources are received timeously (Bizana *et al.*, 2015:644).

Strategic plans include an entities strategic objective for a financial year (NSG, 2017:52). Demand management ensures that the resources required to achieve the strategic objectives are delivered at the correct time, at the right price, in the proper place, in the correct quantity and quality (Setino, 2018).

The demand management process includes the implementation of demand management practices, that demand plans are aligned to strategic objectives, and the compilation of accurate specifications and demand plans that are aligned to the budget (NSG, 2017:52).

The critical issues regarding demand management are discussed below:

- **Understanding demand management practices**

The head of SCM must form part of the strategic planning session (Setino, 2018). Demand management practitioners in a public sector entity must fully understand the current and future needs to assist end-users to identify the frequency of requirements in determining appropriate strategic sourcing methods (NSG, 2017:52). Demand management forms a vital part of the budgeting process in ensuring that the identified procurement of goods, works and services is linked to the budget. Demand management practitioners must assist end-users in implementing demand management practices by embarking on the following types of analyses: a needs analysis, an expenditure analysis, a commodity analysis, market analysis, and industry analysis (Ambe, 2016). Demand management practitioners must assist end-users to compile accurate specifications for the goods and TOR for services and provide regular feedback to role players regarding demand management issues, including how these issues can be resolved (NSG, 2017:52).

However, a critical question that can be posed is whether the South African public sector has implemented demand management practices adequately. Public sector entities experience challenges with improper market analysis and the non-compilation of demand plans, resulting in poor demand planning (Maleka, 2016:10). There is a lack of needs analysis being performed, and future demands are not incorporated into demand plans (Matloko, 2021). The challenges identified in implementing demand management practices include poorly drafted specifications (Bizana *et al.*, 2015:679). Fourie (2017) indicated that poor demand management practices could result in the delivery of incorrect goods, works and services, inflated prices and increased opportunities for abuse by suppliers due to inadequate specifications and inaccurate costing.

- **Compliance with SCM policies and regulations**

SCM in the public sector is controlled by more than 80 different legal instruments, executed through various independent statutory instruments (National Treasury, 2015:10). SCM in the public sector operates within a regulatory framework governed by the Constitution of South Africa, Act 108 of 1996. Some of the critical pieces of legislation that form the basis for demand management practices include,

among others, the Public Finance Management, Act 1 of 1999, and the Preferential Procurement Policy Framework, Act 5 of 2000, and its regulations (Khadija & Kibet, 2015:128).

The SCM regulatory framework further includes the Policy Strategy to Guide Uniformity in Procurement Reform Processes in Government, National Treasury Regulations, National Treasury Guidelines, National Treasury Circulars, National Treasury Practice Notes, and National Treasury Instruction Notes (Naidoo, 2016).

Demand management practices are vulnerable to everyday risks including, collusion, fraud, bribery, unethical behaviour, and demand management practitioners who procure goods, works and services that are not suitable for their intended purpose or are not cost-effective (Naidoo, 2019). A question can be asked whether demand management practices are conducted per SCM policies and regulations. In the past five years, the South African public sector has received many adverse Auditor General of South Africa (AGSA) audit findings due to demand management practices not being performed according to SCM policies and regulations (Ambe, 2016).

- **Alignment between demand planning, strategic objectives and budget**

According to the public sectors' SCM business model (2003), demand management practitioners must align demand planning, strategic objectives and budgeting (Ivanov & Das, 2020:1). Demand management practitioners must ensure that all the resources listed in demand and procurement plans are prioritised per the envisaged budget allocations (Ambe & Badenhorst-Weiss, 2012a:251). Demand management practitioners must revisit the demand plans after the budget has been allocated to ensure that the demand plans are aligned with the budget as most public institutions seldom receive the initially requested funding (Aku Kokor, 2014:21). Strategic plans which contain unrealistic objectives or are poorly compiled could ultimately result in compromised demand and procurement plans (NSG, 2017:52).

During the strategic planning exercise, public sector entities must identify the resources required to accomplish the objectives and activities, such as goods, works and services. After the strategic plan has been approved, demand and

procurement plans must be compiled according to budget allocations (Naidoo, 2016:20).

A question that can be posed is whether the South African public sector has successfully ensured alignment between demand planning, strategic objectives and budget. One of the challenges facing the public sector is improper alignment between demand planning and budgeting (Uromi, 2014). Tsei-Tseimou (2016), similarly argues that there is inadequate alignment between demand planning and budget within the public sector. According to Ambe (2016), many government entities face challenges related to the alignment of demand planning to strategic planning. Some public sector entities experience challenges in quantifying the needs of end-users and have indicated a need to ensure that scarce resources are efficiently and effectively procured (Setino, 2018).

- **Mechanisms necessary for efficient implementation of demand management**

Demand management practitioners must ensure that demand management practices are implemented correctly. One of the significant roles of demand management practitioners during the implementation of demand management practices is to decide whether the provision of a product or service will be sourced via insourcing or outsourcing (Masete & Mafini, 2018:3). A few of the mechanisms necessary for the efficient implementation of demand management include human skills, equipment, procedures, and adherence to supply chain prescripts (Ambe, 2016).

The effect for not implementing demand management efficiently within all public sector entities will result in increased irregular expenditure and increased fruitless and wasteful expenditure due to the following:

- Incomplete and inadequate drafting of specifications for goods and works;
- Incomplete and inadequate drafting of TOR for services;
- Underspensing on budget due to goods, works and services not being received timeously;
- Wasteful expenditure due to tenders being cancelled as a result of incorrectly drafted specifications and TOR;

- Wasteful expenditure as a result of incorrect goods, works and services being received due to poorly drawn specifications and TOR; and
- Delays in providing service delivery due to the non-receipt or inaccurate receipt of critical goods, works and services (Masete & Mafini, 2018:24).

1.3 PROBLEM STATEMENT AND RESEARCH QUESTION

The importance of implementing efficient demand management practices in the public sector in South Africa is critical for service delivery (Owuoth & Mwangangi, 2015:2). Demand management is a major SCM component, ensuring that customers and end-users receive goods, works, and services according to their specific requirements (Naidoo, 2019). According to Bizana *et al.* (2015), demand management ensures that the correct amount of the right item is in the proper place at the correct time and price.

Studies on SCM practices in the public sector in South Africa have identified a number of challenges that institutions face in terms of demand management. The studies of Migiro and Ambe (2008), Ambe (2009, 2016), Ambe and Badenhorst-Weiss (2011, 2012), Aku Kokor (2014), Nzau and Njeru (2014), Bizana *et al.* (2015), Maleka (2016), Selomo and Govender (2016), Odero and Ayub (2017), Masete and Mafini (2018), Omanji and Moronge (2018), Ezeanyim, Uchenu and Ezeanolue (2020), and Matloko (2021) are a case in point. The mentioned studies revealed that most public sector entities perform poorly due to the non-implementation of demand management practices, non-compliance with the SCM policies and regulations, and non-alignment between demand planning, strategic objectives and budget. This has resulted in fraud and corruption, increased irregular expenditure, and high operational costs in the public sector entities (Ezeanyim *et al.*, 2020:129).

Research has found that public sector entities have failed to successfully implement demand management, which is the first element in South Africa's SCM business model (Ambe, 2016:436), and consequently, they are experiencing challenges with the alignment between demand planning, strategic objectives and budgeting (Bizana *et al.*, 2015). According to Tsei-Tseimou (2016), there is inadequate demand planning and a misalignment between demand planning and budgeting within public sector entities. Maleka (2016:10) concurs and maintains that the improper market analysis and inadequate compilation of demand plans result in poor demand planning. Although demand management has been implemented in most public sector entities,

it is far from satisfactory (Ambe, 2016:434). SCM practices are not conducted in line with SCM regulations (Aku Kokor, 2014:20). Moreover, there is a lack of a needs analysis, current and future needs are not identified, and requirements are not incorporated in demand and procurement plans (Matloko, 2021).

The lack of demand management implementation at public sector entities points to a misalignment between strategic objectives, demand management and demand planning, resulting in public sector entities not receiving value for money (Masete & Mafini, 2018:8). The challenges identified in the demand management process include a lack of integrated demand planning, a lack of capacity to investigate the market thoroughly, and inadequate and poorly drafted specifications (Bizana *et al.*, 2015:679). As described by Ambe (2016:435), the poor alignment between the needs analysis, demand planning, and budget management in public sector entities are some of the challenges related to governance and legislative practices.

That notwithstanding, none of the abovementioned studies have recommended that a demand management framework be developed to improve demand management processes. Most of the studies on demand management frameworks that have been conducted globally, such as that of Burt, Petcavage and Pinkerton (2010), Hilletoft, Ericsson and Christopher (2010), Rampedi (2010), Sollish and Semanik (2012), Lambert (2014), and Van Weele (2016), focused on the private sector. The effect of the Covid-19 pandemic has propelled the need for a demand management system to enhance SCM practices globally, and specifically, in the South African public healthcare sector. As Ivanov and Das (2020:1) indicated, Covid-19 has exposed weaknesses in demand management.

1.3.1 Main research question

The main research question for this research study was formulated as follows:

- What framework is best suited to improve demand management processes in the South African public sector?

1.3.2 Secondary research questions

To answer the main research question, the following secondary research questions were formulated for the current study:

1. Which demand management practices are implemented in the South African public sector?
2. To what extent are demand management practices compliant with SCM policies and regulations?
3. To what extent is demand planning aligned with the public sector's strategic objectives and budgeting?
4. What mechanisms are necessary for the efficient implementation of demand management?
5. What challenges are experienced in the implementation of demand management?
6. What are the differences in demand management practices amongst hospitals in the GDoH?

These secondary research questions were posed to senior demand management practitioners on post level 7, and above, in hospitals within the GDoH.

1.4 RESEARCH OBJECTIVES

The primary purpose of the current study was to develop a demand management framework to improve demand management processes in the South African public sector.

1.4.1 Secondary research objectives

To support the achievement of the main objective, the following secondary research objectives needed to be fulfilled:

1. To identify which demand management practices are implemented in the South African public sector.
2. To assess the extent of compliance of demand management practices with SCM policies and regulations.
3. To assess the extent of alignment between demand planning, public sector strategic objectives and budget.
4. To determine what mechanisms are necessary for the efficient implementation of demand management.

5. To assess the challenges impacting the implementation of demand management.
6. To determine the differences in demand management practices amongst hospitals in the GDoH.

1.4.2 Hypothesis

The following hypothesis was formulated for the current study:

HO: there is no significant difference in demand management practices amongst hospitals in the GDoH.

H1: there is a significant difference in demand management practices amongst hospitals in the GDoH.

The hypothesis was intended to measure group/hospital invariance towards the framework.

1.5 RESEARCH DESIGN AND METHODOLOGY

A literature review was conducted to understand demand management practices, SCM policies and regulations, and the alignment between demand planning, public sector strategic objectives and budgeting. The literature review provided an understanding of demand management practices, SCM policies and regulations, and alignment between demand planning, public sector strategic objectives and budgeting. The outcome included insight into the challenges inhibiting the implementation of demand management.

Research methodology involves collection and analysing data (Reizebos, 2017). According to Creswell and Creswell (2018:3), the research methodology refers to the following: (1) from whom the researcher will collect the data, (2) how the researcher will select the respondents, (3) what method the researcher will use to collect the data, and (4) how the data will be analysed.

1.5.1 Research design

Research designs specify the particular strategy and procedure used to collect and analyse the data (Creswell & Creswell, 2018:3). The research design for the current study consisted of a combination of exploratory and descriptive research since the intention was to develop a framework that the South African public sector could utilise

to improve demand management processes. The research study design was, therefore, a mixed method approach (Apuke, 2017). This approach was suitable for the study, as it uses a survey to draw behavioural manifestations in social phenomena, for example, individuals' product choice or purchase intention amongst others (West, 2016).

1.5.2 Research strategy

According to Cloud (2019), a survey is used where the researcher must obtain facts and opinions by interacting with respondents. A survey was deemed necessary for this research study to be able to get points and ideas from a large pool of respondents, as related to improving demand management processes within the South African public sector (Gaille, 2018).

An online questionnaire collected data from 235 demand management practitioners on post level 7, and above, in hospitals in the GDoH. A survey assisted the researcher to answer the following: "why, when, what and where, and the responses received were utilised to describe certain situations" (Dudovskiy, 2019).

1.5.3 Target population

David (2018) defined a target population as potential participants in a research study. The population for the study concerning demand management comprised SCM directors, SCM managers and SCM practitioners from all hospitals in the GDoH. According to the GDoH database, there are 47 hospitals in the GDoH, consisting of 1 520 SCM practitioners.

1.5.4 Sampling and sampling size

Sampling is a process in which the researcher chooses a representation of the population to draw conclusions regarding the total population (Ladner, 2018). Van Druten (2019) identified two sampling methods: probability and nonprobability sampling.

This research study used probability sampling, more specifically, the simple random sampling technique. A random sampling technique was used to draw a smaller sample size of 235 demand management practitioners on post level 7 and above from the larger population of 1 520 SCM practitioners hospitals in the GDoH which constituted this study's sampling frame. The researcher considered a target sample size of 235

demand management practitioners on post level 7 and above from the 47 hospitals, equating to five demand management practitioners on post level 7 and above per hospital in GDoH as adequate, based on a 5% level of confidence and 95% confidence interval.

1.5.5 Measurement items and data-collection method

A questionnaire containing closed-ended and open-ended questions was designed to collect data for the current study. A 5-point Likert scale was used to evaluate the questions. Measurements ranged from 1 = strongly disagree to 5 = strongly agree (Harpe, 2015).

This questionnaire consisted of the following sections:

1. Section A measured the demographic information;
2. Section B measured demand management practices in the South African public sector;
3. Section C measured the compliance of demand management practices with SCM policies and regulations;
4. Section D measured the alignment between demand planning, strategic objectives and budget;
5. Section E measured the mechanisms necessary for the effective implementation of demand management; and
6. Section F measured the challenges impacting the implementation of demand management.

The research measurement items for each research variable listed above were developed by the researcher and were not adapted from previous research. Therefore, the researcher did not have to obtain permission to use the measurement items.

1.5.6 Data analysis

Data analysis provides reasoning in understanding the collected data (Kim, 2014). Secondary and primary data sources were utilised in the research study. Secondary data was sourced through an extensive literature review from journals, articles from the internet, papers delivered at conferences, academic dissertations and theses, and books. The three constructs, namely, implementation of demand management

practices, SCM policies and regulations, alignment between demand planning, strategic objectives and budgeting, were transformed into questions to form the research instrument. Primary data was collected through a questionnaire by emailing a link to the MS Forms website, where participants could complete the questionnaire.

The collected data was organised and analysed descriptively using the Statistical Package for Social Science (SPSS) version 27 to identify common relationships and trends on how to improve demand management processes in the public sector in South Africa. Descriptive statistics were presented as frequencies, expressed as percentages, and all associations between pairs of categorical variables were established using Pearson's chi-squared test (Van Druten, 2019). All inferential statistics were interpreted at a 0.05 error rate. With a cut-off point of 0.7, Cronbach's alpha was used to test for internal consistency, and factor analysis was used for data reduction.

1.6 SCOPE OF THE STUDY

Previous research studies have established that the poor implementation of demand management practices has led to service delivery protests within the South African public sector. The current research study, therefore, focused on investigating the implementation of demand management practices, supply chain prescripts, and aligning demand planning to strategic objectives and budgeting in the public sector in South Africa.

This research was interested in:

- Identifying which demand management practices are implemented in the public sector in South Africa;
- Measuring the extent of compliance of demand management practices with supply chain prescripts;
- The extent of aligning demand planning, strategic objectives and budgeting.
- Identifying the differences in demand management practices amongst hospitals in the GDoH.

1.7 CHAPTER OUTLINE

The research study is presented in the following chapters:

- **Chapter 1: Orientation of the study.** This chapter provided the introduction and background, problem statement, research objectives, research design and methodology, reasons for and contribution of the study, and an outline of the study. This chapter defined the title of the research study.
- **Chapter 2: Demand management in context.** This chapter provides an in-depth theoretical background to the concept of demand management based on available literature. In this chapter, the researcher analysed the available literature to understand what is meant by the idea of demand management.
- **Chapter 3: Demand management in the South African public sector.** This chapter provides an in-depth discussion of demand management in the South African public sector. In this chapter, the researcher analysed the available literature to understand demand management processes and SCM prescripts in the public sector in South Africa.
- **Chapter 4: Instruments for developing a demand management framework.** This chapter develops a summary of the instruments necessary to develop a framework for implementing demand management practices, ensuring compliance of demand management practices to SCM policies and regulations, and alignment between demand planning, strategic objectives and budgeting to improve demand management processes in enhancing service delivery in the South African public sector.
- **Chapter 5: Research design and methodology.** This chapter provides the background to the research objectives, research design, research instruments, and sampling procedures. Chapter 5 also presents a discussion of the data collection method, data analysis and validity and reliability.
- **Chapter 6: Data analysis and interpretation of results.** This chapter presents an analysis of the data collected from respondents. The chapter also provides the analysis and interpretation of the results. Results are presented against the aim of the study, research objectives and research questions.

- **Chapter 7: Discussion, conclusions and recommendations.** This chapter focuses on linking the results with the objectives of the research. The research questions are revisited, and the findings are discussed. The chapter concludes with a summary and the conclusions drawn from the results to inform the framework for improving demand management processes in the South African public sector. The chapter ends with the limitations of the research findings and provides scope for further research.

1.8 CONCLUSION

The research outline was presented in Chapter 1. This chapter further presented an overview of demand management, demand management practices in the public sector in South Africa, compliance to SCM prescripts, and the alignment of demand planning to strategic objectives and budgeting. In addition, an overview of the public healthcare sector was provided.

The discussion in Chapter 1 also focused on the linking of demand planning to strategic objectives and budgeting, which revealed the importance of demand management in the public sector in South Africa. It is assumed that improvements to the demand management processes in the South African public sector will enhance service delivery.

CHAPTER 2: DEMAND MANAGEMENT IN CONTEXT

2.1 INTRODUCTION

Chapter 2 provides a generic overview of demand management. Firstly, the background and definition of demand management are provided, and historical developments and theories supporting demand management are discussed. Secondly, the generic demand management process is outlined. The chapter concludes with a discussion of demand management and its critical success factors, including the challenges experienced in implementing demand management.

2.2 BACKGROUND AND DEFINITION OF DEMAND MANAGEMENT

Although Chapter 1 presented a generic perspective on demand management, this section outlines the background to and definitions of demand management.

2.2.1 Background to demand management

As a result of recent economic conditions, organisations are being forced to offer their customers excellent levels of customer service, including a greater variety of quality products in maintaining a competitive advantage over their competitors (Lysons & Farrington, 2016:227). Demand management, as a significant component of SCM, seeks to align demand management practices with the operational capability within and across organisations. Due to recent market changes, SCM has been forced to transition from using supply-driven models towards the utilisation of customer-centric and market-driven models (Santos & D'Antone, 2014). Demand management uses demand forecasts when compiling demand plans due to the volatility of the operational environment. A study by Mbanje and Lunga (2015:238) identified several influences that play a role in demand management, such as government policy changes, cyclical patterns, the availability of substitutes, economic changes, changes in consumer tastes, special events, and competition.

Customers demand the availability of a range of different goods, works and services, and it is the customer who indicates when they are required. This could lead to the specialisation of certain products to satisfy customers' demands. Therefore, demand management can be classified into two different approaches: demand management

as a component of SCM, and demand management as an integration of the marketing function (Chase, 2016). As such, demand management and SCM work closely together in providing accurate information to consumers, developing customer prioritisation strategies, building customer relationships, and establishing joint actions in balancing operational capabilities (Santos & D'Antone, 2014).

Demand management ensures that there is a balance between SCM capabilities, user requirements, and external customers, including balancing supply and demand, demand forecasting, and decreasing the inconsistencies in requests by managing inventory levels (Coker & Helo, 2016:567). According to Lysons and Farrington (2016:245), this can be closely aligned with the Material Resource Planning (MRP) and Just-in-Time (JIT) methods. Customer demands are constantly changing due to economic, political and social environments. As a result of these ongoing changes, organisations use demand management practices to manage the certainty of demand.

According to Monczka, Handfield, Giunipero and Peterson (2014:12), demand management and SCM, need to work together to improve organisational performance. Demand management can be classified as a pull strategy, where the flow in the supply chain is based on customer demand (Mtshali, 2017:12). Effective demand management practices assist organisations to meet customer expectations, to remain competitive and improve the profitability of specific items, and to accurately align the inventory levels with peaks and dips in customer demand. Organisations that have successfully implemented demand management practices have experienced an improvement in working capital, increased sales, and reduced operating expenses (KPMG, 2016:2).

Demand management has the most prominent performance gap and is often misunderstood by business executives. It is critical for organisations to provide a balance between supply and demand. However, several organisations across all industries are still experiencing significant challenges in this regard (Coker & Helo, 2016:564; Supply Chain Market, 2018).

The implementation of demand management practices is an emerging topic within SCM. The term commonly used to describe customers wanting a particular good or service is called 'demand'. A significant challenge for organisations is when they cannot meet customers' demands for goods and services. Demand management

practices assist organisations in managing the customer demand for products, including predicting and planning for future demand. According to Coker and Helo (2016:564), demand management works with and plans the future demand for goods and services.

Demand management processes assist organisations to become reactive to unanticipated demand by implementing procedures to anticipate future needs (Cassettari *et al.*, 2017:49–50). Demand management has an impact on service delivery by ensuring the correct item is always available, which assists organisations to increase customer loyalty. Improved demand forecasting dramatically reduces the volume of raw materials and finished goods (Cassettari *et al.*, 2017:49–50).

Demand management includes planning and forecasting, which balances the requirements for goods and services of internal and external customers. Organisations can, therefore, proactively match supply and demand if the proper demand management practices are implemented.

2.2.2 Defining demand management

Following the background discussion above, it can be concluded that demand management comprises several steps in calculating accurate and reliable forecasts (Cassettari *et al.*, 2017:49–50). Demand management can be a crucial component in improving SCM efficiencies (Basson, Kilbourn & Walters, 2019:1). According to Lambert (2014:11), demand management balances customer demands and supply capabilities. Furthermore, demand management enables organisations to procure goods at the right place, at the right time and at the correct cost (Bizana *et al.*, 2015:64). Demand management comprises several phases in developing reliable forecasts (Cassettari *et al.*, 2017:49–50).

According to Basson *et al.* (2019), demand management matches the capabilities of SCM with customer requirements. Demand management can be classified as a pull system, where the flow in the SCM process is based on demand (Mtshali, 2017:12). According to Lysons and Farrington (2016:227), demand management balances SCM capabilities, internal needs and customer demands.

From the various definitions of demand management as outlined above, it can be concluded that demand management assists organisations to procure at the correct time, at the right place and at the correct cost (Bizana *et al.*, 2015:64).

2.3 HISTORICAL DEVELOPMENT AND THEORIES SUPPORTING DEMAND MANAGEMENT

This section of the chapter outlines the historical development and theories supporting demand management.

2.3.1 Historical developments

The developments related to demand management in this study explore the key outcomes from the materials management era, the global age, to the integrated era in the 20th century. During each historical period, an event contributed to the development of demand management, (Handfield, Monczka, Guinipero & Patterson, 2011:26).

2.3.1.1 Materials management era (mid-1960s – late 1970s)

During the mid-1960s, the concept of materials management experienced dramatic growth which included inventory and materials planning. For example, during the 1970s, organisations encountered problems with raw materials due to oil shortages, (Wisner, Tan & Leong, 2016:13).

2.3.1.2 The global era (late 1970s – 1999)

Organisations experienced intense global competition during this period. During the worldwide (global) era, organisations realised the importance and function/role of demand management. During the 1980s, organisations still utilised their discretion in planning for customer requirements (Prater & Whitehead, 2013:10). However, organisations started using the World Wide Web (WWW) to coordinate global sourcing during this period, unlike previous periods. Handfield *et al.* (2011) summarise these differences as follows:

The term SCM was used to link logistics management with strategic management. During this period, organisations realised the importance of logistics management in controlling and managing the reduction in inventory levels (Ellram & Cooper, 2014:9). Various companies in the United States of America (USA) realised the growing

importance of demand management and started implementing demand management practices in their organisations. For example, in 1992, General Motor Company lost thousands of customers due to backlogs in production as a result of parts not being timeously available (Fisher, Hammond, Obermeyer & Raman, 1994:86). Ultimately, due to globalisation, organisations were forced to implement demand management (Aksoy, Azturk & Sucky, 2012:223).

2.3.1.3 Integrated supply chain management (20th Century)

Due to the growth in Information Technology (IT) and the many challenges experienced through globalisation, organisations changed how their SCM functioned. Organisations gained a greater realisation of the importance of demand management (Setino, 2018:29), and realised that SCM needed to be integrated with internal stakeholders and suppliers to satisfy customer demands. Due to the growth in technology, organisations are able to share information with their customers and suppliers and conduct business globally (Ellram & Cooper, 2014:9).

2.3.2 Theories supporting demand management practices

This section discusses the five theories supporting demand management practices namely the resource-based theory, the principal-agency theory, the structural-contingency theory, the socioeconomic theory of regulatory compliance, and the transaction cost theory.

2.3.2.1 Resource-based theory

The resource-based view (RBV) theory suggests that changes to internal resources will motivate low performers and further advantage high performers (Karim & Capron, 2015). According to the RBV, organisations with above-average internal resources will have a competitive advantage over those with below-average internal resources (Raduan, Jegak, Haslinda & Alimin, 2009:406; Lysons & Farrington, 2016:224, Vidal & Mitchell, 2018:131). The scholars, Davis and Simpson (2017:20) concur that the RBV suggests that internal resources assist organisations in gaining a competitive advantage.

Organisations with a sound business strategy will sustain their competitive advantage over their competitors (Davis & Simpson, 2017:21). The RBV is based on the following two theories:

- Firstly, organisations can organise and control their internal resources.
- Secondly, how organisations manage their internal resources may account for the performance differences amongst organisations (Leiblein, 2011)

The RBV explains how organisations can utilise their internal resources to gain a competitive advantage (Castillo, Orandini, Jara & Duque, 2019:14). Therefore, it is evident that organisations must value their inner resources and capabilities. Internal resources include the administrative skills of an organisation, the organisation's routines and processes, and information and knowledge (Castillo *et al.*, 2019:14).

The RBV identifies instances where incentives are more significant than contributors, and differences are more prominent than in other units/departments (Barney, 2018). This occurs when individuals in control of internal resources make investments in the internal resources in a particular bundle. Internal resources are more productive when they work together, while they are less productive when they work separately to produce specific goods or services (Castillo *et al.*, 2019:14).

According to the RBV, specialisation in a bundle brings resources together to create economic value for an organisation (Bailey, Farmer, Jessop & Jones, 2015). Thus, resources are used by organisations to implement their business strategies, and internal resources' specialisation creates economic value by reducing costs (Bailey *et al.*, 2015).

The RBV ensures that demand management has the potential to enhance the organisation's performance. The RBV supports demand management in ensuring that the resources required in the strategic plan are received on time, at the right place, in the right quantity and quality and at the right cost. This theory informed the following Secondary objective 2: To assess the extent of compliance of demand management practices with SCM policies and regulations and Secondary objective 3: To assess the extent of alignment between demand planning, public sector strategic objectives and budget.

2.3.2.2 Principal-agency theory

The principal-agent theory is "a model in which the leader who proposes the contract is called the principal" (Roach, 2016:29). "The principal-agency theory explains the relationship between the agent and principal". "Certain powers are delegated to the agent by the principal to enable the agent to carry out certain functions". "According to

Bendickson, Muldoon, Liguori and Davis (2016:437), the view of the agency theory was to identify any conflict between the political master and public officials”.

Agency theory assists organisations to understand why certain members of the organisation would want to exploit other members of the organisation. According to Fayezi, Zutshi and O’Loughlin (2014:4), one of the critical challenges in the principal-agent theory is the lack of effort that the principal provides to the agent. Another challenge of the principal-agent approach is the over-emphasis on economic drivers (Fayezi *et al.*, 2014). It becomes a challenge to monitor behaviour when there are multiple principal and agent relationships (Roach, 2016:29).

The principal-agency theory provides a mechanism to understand how members of the demand management team behave in cases of rational and non-rational behaviour. The principal-agency theory supports demand management through assisting managers to understand demand management behaviour by focusing on the following issues: the development of inter-and intra-organisational relationships; the maintenance of complex relationships between suppliers and customers, and the dynamics of risk-sharing, capital outlay, power and conflict between channel intermediaries; and identifying the costs and benefits of demand management integration (Setino, 2018:160).

2.3.2.3 Structural-contingency theory

In the 1950s and 1960s, the structural contingency theory was developed, (Drazin & Van de Ven, 1985:514). The structural contingency theory specifies that an organisation's performance depends entirely on a fit between the environmental structures and processes (Dikova & Veselova, 2021:75). "Fit generally refers to (a) the level of efficiency an organisation matches its strengths and weaknesses with the external opportunities and threats and (b) the degree of effectiveness of strategy implementation in a particular environment" (Dikova & Veselova, 2021:75).

According to Romero-Silva, Santos and Hurtado (2018:1343), the fit is central to the structural contingency theory and suggests that particular organisational practices are better suited to a particular environment. Organisations can thus improve their managerial performance by strengthening the fit between practices and procedures within the organisation and the external environment (McAdam, Miller & McSorley, 2019).

The structural contingency theory suggests that the way an organisation organises its business units will significantly impact its performance. For example, increased performance depends mainly on how their business units are arranged, resulting in a good fit (Romero-Silva *et al.*, 2018:1343). Organisations can improve their overall performance by improving the fit with a defined set of contingency variables (De Clercq, Thongpapani & Dimov, 2014:193). The structural contingency theory is instrumental when there is no established overarching theoretical framework (McAdam *et al.*, 2019:195).

The contingency theory indicates that the main responsibility of the demand management practitioner is to focus on achieving a strategic fit. The principal-agency theory and the concept of 'fit' can be applied in demand management by examining the alignment between demand planning, strategic objectives, and budget.

2.3.2.4 Socioeconomic theory of regulatory compliance

In 1968, Becker developed the socioeconomic theory. The main focus of this theory was ensuring compliance to regulations that governed economic activities. According to the socioeconomic theory, organisational activities should be controlled by surveillance and constant monitoring. Sutinen and Kuperan (1999) incorporated relevant approaches from the socioeconomic theory of regulatory compliance with relevant theories from psychology which provided appropriate reasons for the success of certain behaviours (Lisa, 2010).

Based on this theory, the perceived legitimacy of demand management rules has been identified as one of the antecedents of public procurement compliance behaviour. This theory informed Secondary objective 3: To assess the extent of compliance of demand management practices with SCM policies and regulations.

2.3.2.5 Transaction cost-theory

"The transaction cost theory (TCT) explains reasons why organisations exist, and what the boundary of the organisation is". Market and hierarchy are entirely separate structures, and any reason for choosing one over the other will depend entirely on their transaction costs (Yuan, Chu, Lai & Wu, 2020:55). According to the TCT, decision-makers act with opportunism, and display limited reasons when making a decision (Lai, Chu, Wang & Fan, 2013).

Transaction attributes, such as uncertainty, asset specificity and frequency, are considered essential factors affecting transaction costs (Yuan *et al.*, 2020:55). Uncertainty refers to the "computational inability to ascertain the structure of the environment" (Yuan *et al.*, 2020:55). Asset specificity refers to how an asset can be transferred for alternative uses. According to TCT, frequency refers to a particular type of transaction (Williamson, 1999). TCT is concerned with the ideal governance structure to minimise transaction costs and is well established within demand management (Schmidt & Wagner, 2019:3).

The transaction costs result from collecting and processing information, drafting agreements, and managing relationships (Wynstra, Rooks & Snijders, 2018). There are two critical assumptions regarding human behaviour that are essential to the TCT. Firstly, bounded rationality considers reasoning when conducting human behaviour. Individuals might want to act reasonably but may not process all the available information, limiting the reasons for their decision. Secondly, opportunism means that the other party may operate in a way that denotes self-interest. Opportunistic behaviour includes cheating and withholding vital information (Schmidt & Wagner, 2019:3).

According to TCT, organisations must minimise costs under exogenous conditions. Governance structures ensure that the flow of materials is coordinated throughout the value process. The original TCT focused on choosing between a firm and the market (Wynstra *et al.*, 2018). The firm is regarded as a governance structure, whereas the market consists of forces that affect the flow of goods. Due to theoretical extensions, complex spectrums of governance mechanisms between markets and firms have been conceptualised (Wynstra *et al.*, 2018). Reducing costs is central to TCT, hence, the importance of governance structures (De Massis & Foss, 2018).

This theory is relevant for this study as it explains that the public sector, through its SCM, can reduce the transaction costs associated with providing services to the citizens. This can be achieved through strategies such as supplier integration, increased coordination, and the establishment of shared goals between the buying organisation and the supplier. This theory lays the basis for price negotiation, and as a result, the lowering of transaction costs. The TCT suggests that several bidders should be allowed to participate in a competitive procurement process that can affect performance in a positive way through the lowering of costs.

2.4 GENERIC DEMAND MANAGEMENT PROCESSES

This section describes the generic demand management processes. It explores demand management as a component of supply chain management, demand management strategy, demand management and forecasting, the operational demand management process, demand planning, elements of demand management, phases of the demand management cycle, and its critical success factors.

2.4.1 Demand management as a component of supply chain management

SCM ensures that supply and demand management are integrated across and within an organisation. The demand management functions include marketing, finance, operations, new product selection, procurement and distribution (Mtshali, 2017:12).

Increased customer demands for new and improved products and the complexities in the global market have led to the development of SCM. Demand management has emerged as a component of SCM, due to improved information flow that resulted in reduced inventory levels.

Vollmann and Cordon first proposed the concept of demand management (1998:684-694). The emphasis of SCM has since shifted from focusing on the efficiencies of supply downstream to focus on customer demands. Demand management can be a pull strategy that focuses on customer demand, whereas SCM is considered a push strategy (Mtshali, 2017:12).

Christopher and Rayls (2014:29) identified that during the development of SCM, the definition of SCM focused on a supply push rather than a demand-pull. The above authors argued a case for demand chain management, whereby improved information flow and enhanced manufacturing techniques have enabled SCM to operate efficiently with lower inventory levels and quicker customer response time (Christopher & Rayls, 2014:29). Customers are the focal point of any value chain and should therefore be the focal point of an organisation's business strategy. The supply chain should be transformed into a demand-driven chain (Madhani, 2015:8).

Figure 2.1 below presents demand management as a component of supply chain management.

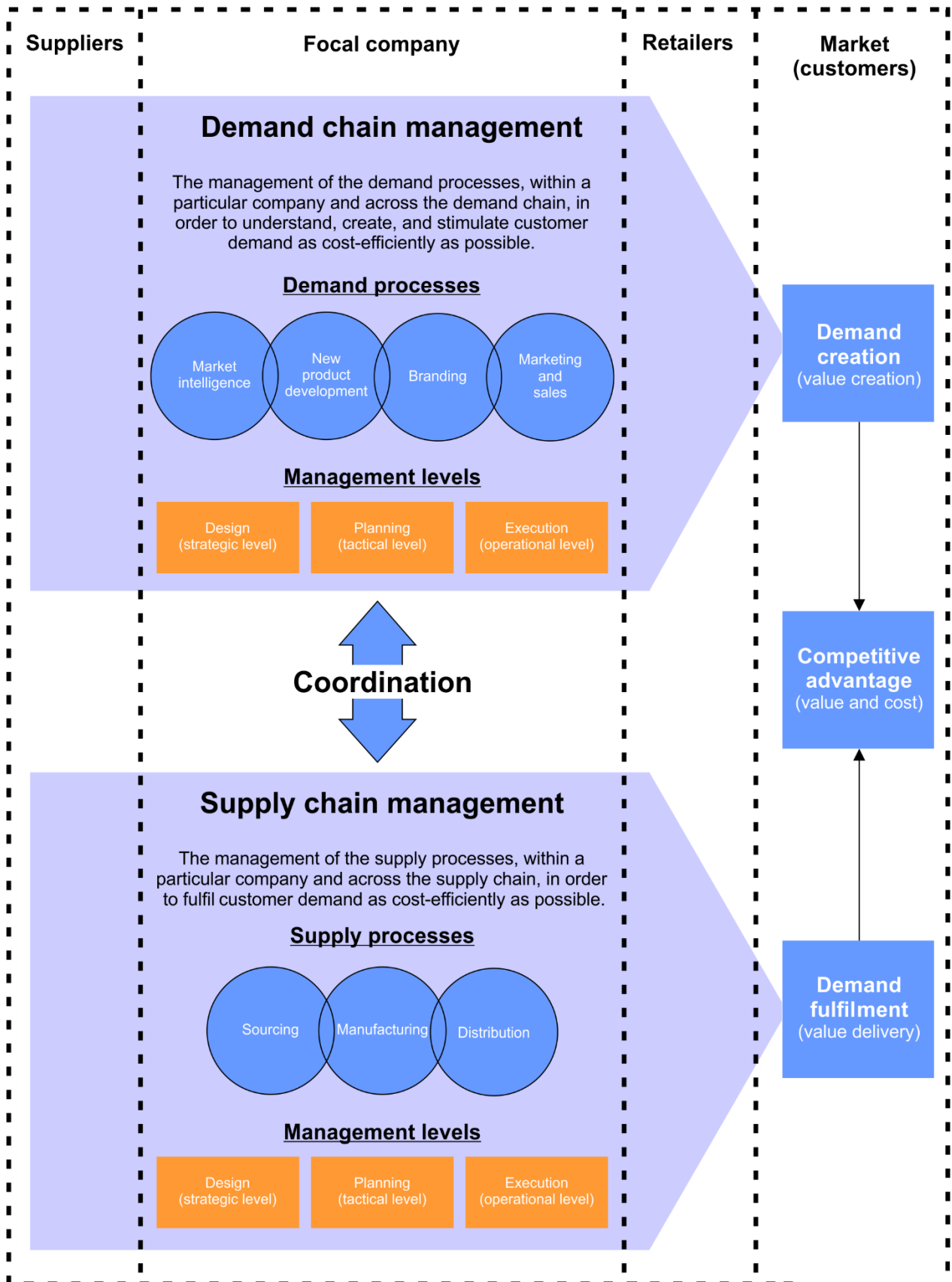


Figure 2.1: Demand management as a component of supply chain management

Source: Adapted from Lambert (2014:11)

2.4.2 Demand management strategy

Effective demand management requires the demand management strategy to be aligned with the overall business strategy (Matloko, 2021:28). The demand management strategy phase involves "all the activities required to divide a market into clearly identifiable market segments (segmentation), selecting the most appropriate and attractive market segments (targeting), and developing a unique value proposition and positioning strategy for each of the chosen market segments (positioning)" (Matloko, 2021:29).

The main objective of demand management strategy development is to identify specific markets and develop positioning strategies for each of the particular needs. Customer demands differ significantly; therefore, specific markets will require precise market positioning to enable customised products to be produced according to customers' requirements (Matloko, 2021:29). Due to customisation, there has been a move from mass production to mass customisation. Another reason for customisation is that only a few suppliers are large enough to supply the total needs of an entire market (Matloko, 2021:29).

The development of demand management strategies is performed in phases. In the first phase, market segmentation, customers are grouped into segments based on similar needs (Harrison & Van Hoek, 2005; Matloko, 2021:28). A segmentation model is developed by identifying appropriate segmentation criteria. Several methods for segmenting markets have been identified, namely, psychographic, demographic, geographic and behavioural (Demby, 1974; Stone, Bond & Foss, 2004; Harrison & Van Hoek, 2005; Kotler, Keller, Brady, Goodman & Hansen, 2009; Matloko, 2021:29).

Demographic segmentation divides the market into parts based on family size, age, income, and education. Geographic segmentation divides the market into segments based on different geographical units. In behavioural segmentation, the market is divided into parts based on customers' knowledge of the use of a product.

The segmentation variables can be combined to identify smaller target markets, which led to the development of the needs-based segmentation approach (Matloko, 2021:29). By understanding the key elements that drive customers, organisations can identify specific customer needs and find more customers with similar needs. These segments are the most actionable form, since the organisation knows the product's

performance attributes to satisfy the customer's requirement. These segments are also more stable, since they directly predict market share (Matloko, 2021:29).

2.4.3 Demand management and forecasting

Forecasting demand management has been a significant success factor in organisations globally (Aye, Balcilar, Gupta & Majumdar, 2015:67). Madhani (2015:246) states that forecasting is an essential support to the supply chain process. It directly impacts the supply chain and customer service level and other key performance indicators such as out of stock, capacity utilisation, and customer case fill and inventory levels. Therefore, improving the forecasting model can be an essential part of the overall supply chain.

Some studies have shown that the use of combined statistical methods has produced improved results, if compared to individual plans in terms of both accuracy of forecast and lowering forecast risk (Aye *et al.*, 2015:67). When Smith and Wallis (2005) conducted their research using combined methods, it showed substantially better results than the individual methods used by Clement (1989).

One researcher proposed that a rule-based forecasting technique that combines four extrapolation methods based on predefined rules should be used to analyse time series (Colloby & Armstrong, 1992:1398). This showed better forecasting accuracy, but some simple moving average techniques were better than this rule-based technique.

2.4.3.1 Developing a base forecasting (statistical forecasting)

Future demand forecasting is essential for the planning and operation of any organisation on both the micro and macro levels (Aye *et al.*, 2015:67). Forecasting for sales is an essential input for many decision-making activities in varying functional areas. The role of statistical forecasting is crucial in a mature demand planning process when sales performance is relatively stable (Triple Point Technology, 2012:6). Reliable forecasts can enable the purchasing of specific components using the JIT method, and also ensure the timeous and efficient allocation of sufficient manufacturing capacity and resources (Carbonneau, Laframboise & Vahidov, 2008:1141; Huawei, Aimin & Ruxin, 2012:4; Yan & Ma, 2011:245, Madhani, 2015:246).

The statistical analysis of historical sales can expose trends and seasonality (Triple Point Technology, 2012:6). Firms can use the statistical forecasting process to automatically evaluate a variety of mathematical forecasting techniques to identify one that is best suited for each item that is being forecast for (Triple Point Technology, 2012:6). Successful organisations collaboratively leverage statistical forecasting tools with market intelligence to create a solid demand plan (Madhani, 2015:246).

Madhani (2015:246) argued that the use of the traditional statistical methodology is no longer suitable as it cannot cope with market growth and high access to information. Furthermore, organisations do not solely rely on statistical forecasts in the development of future demand plans. The extended statistical forecast is used as a starting point, as well as other key stakeholders' input (such as human intuition and market intelligence) (Triple Point Technology, 2012:6).

The growing availability of data poses new challenges for these statistical models. The scholars, Carbonneau *et al.* (2008:1141), Huawei *et al.* (2012:4), Yan and Ma (2011:245), and Madhani (2015:246) recognised three approaches to deal with these challenges. The first approach is concerned with finding the most suitable group of predictors; the second approach establishes a predictive model based on summaries of the predictor variable; the third approach is a penalised L-1 likelihood method that automatically identifies influential variables through continuous shrinkage.

The selection of a group of predictors is commonly used in dimension reduction methods; this deals with identifying the most significant subset of predictors, which is selected for a larger group of potential predictors in predictive modelling (Madhani, 2015:246). Some challenges arise in the selection of the most influential predictors; therefore, heuristic optimisation algorithms have advanced as they include iterative improvement algorithms, as well as search methods that are stochastic (Melab, Cahon, Talbi & Duponchel, 2002:204, Meiri & Zahavi, 2006:843)

When forecasting using high dimensional data, the information summary approach is based on the premise that all the required information is captured by fewer factors common to the predictor variables (Madhani, 2015:246). The use of principal components (PCs) is a popular technique for combining relevant potential predictors into new ones. Using main components to summarise data in a forecasting model allows all the predictors to enter the forecast.

Several authors (Stock & Watson 2003:790) find a more minor mean squared error in a forecast, based on diffusion factors instead of a simple autoregression and elaborate structural models. The argument against using regression models is that the elements are estimated without considering the dependent variables. Therefore, if only a few factors are reserved to denote the variations of an entire explanatory variable space, there is a possibility that they may not have predictive power for the dependent variable (Madhani, 2015:246).

The third approach, the penalised L-1 likelihood, has been developed successfully in the last decade to deal with high dimensionality (Madhani, 2015:246). This method reduces the sum of squared errors with a sum of the absolute values of the coefficients (Tibshirani, 2011:275).

2.4.3.2 Accuracy of forecasting

Commonly, organisations begin with a statistical time series forecast; and thereafter, the business adjusts the figures based on expertise and knowledge (Davydenko & Fildes, 2013:510, Madhani, 2015:246). This process is executed at a high level of disaggregated stock-keeping units (SKUs) (Sanders & Ritzman, 2004:515; Fildes, Goodwin, Lawrence & Nikolopovlos, 2009:573; Hong, Koo & Kimc, 2016:885).

Empirical evidence shows that judgements under uncertainty are affected by biases or inefficiencies and are usually non-optimal (Davydenko & Fildes, 2013:510). The impact of inefficiencies highlights the importance of monitoring the accuracy of judgements in demand forecasting. The measurement of forecasting accuracy is inseparably linked with the error measure (Hong *et al.*, 2016:885).

Hong *et al.* (2016:885) stated that there are two types of accuracy when evaluating the performance of a forecasting model. Firstly, is estimation accuracy, it identifies how well the model fits the data at hand. This can be measured using the mean squared error (MSE). Secondly, forecasting accuracy deals with the proportional error of the actuals versus demand forecast. Mean absolute percentage error (MAPE) is commonly used to evaluate forecasting accuracy (Hong *et al.*, 2016:885).

2.4.4 The operational demand management process

The operational demand management process comprises seven steps in the design of an efficient active demand management process (Hilletofth *et al.*, 2010). These steps are as follows:

Step 1: Determine demand management goals and strategy

Organisations need to understand its customer demand, and then set the long-term and intermediate goals, linking them to the financial goals of the organisation.

Step 2: Determine forecasting procedures

Organisations need to establish forecasts prior to choosing the most appropriate methods and procedures.

Step 3: Conduct a gap analysis and identify the gap

Organisations must establish gaps between the goals of the demand management and the existing state and focus strongly on the gaps that have been identified.

Step 4: Plan information flow

Organisations need to identify initiatives needed to implement the strategy. Initiatives can range from systems integration, to developing a new inventory planning system.

Step 5: Determine synchronised procedures

Organisations need to prioritise the identified initiatives and set a sequence of procedures for efficient implementation.

Step 6: Develop a contingency management system

Organisations must develop a list of potential interruptions to the demand management process.

Step 7: Develop a framework of metrics

Organisations must develop metrics for critical performance criteria which include value maximisation, order fulfilment, customer service, total supply chain costs, inventory management, asset utilisation, relative delivery time, warranty costs, returns, and percentage of the expenses to the value of goods.

Figure 2.2 below outlines the seven steps in the operational demand management process.

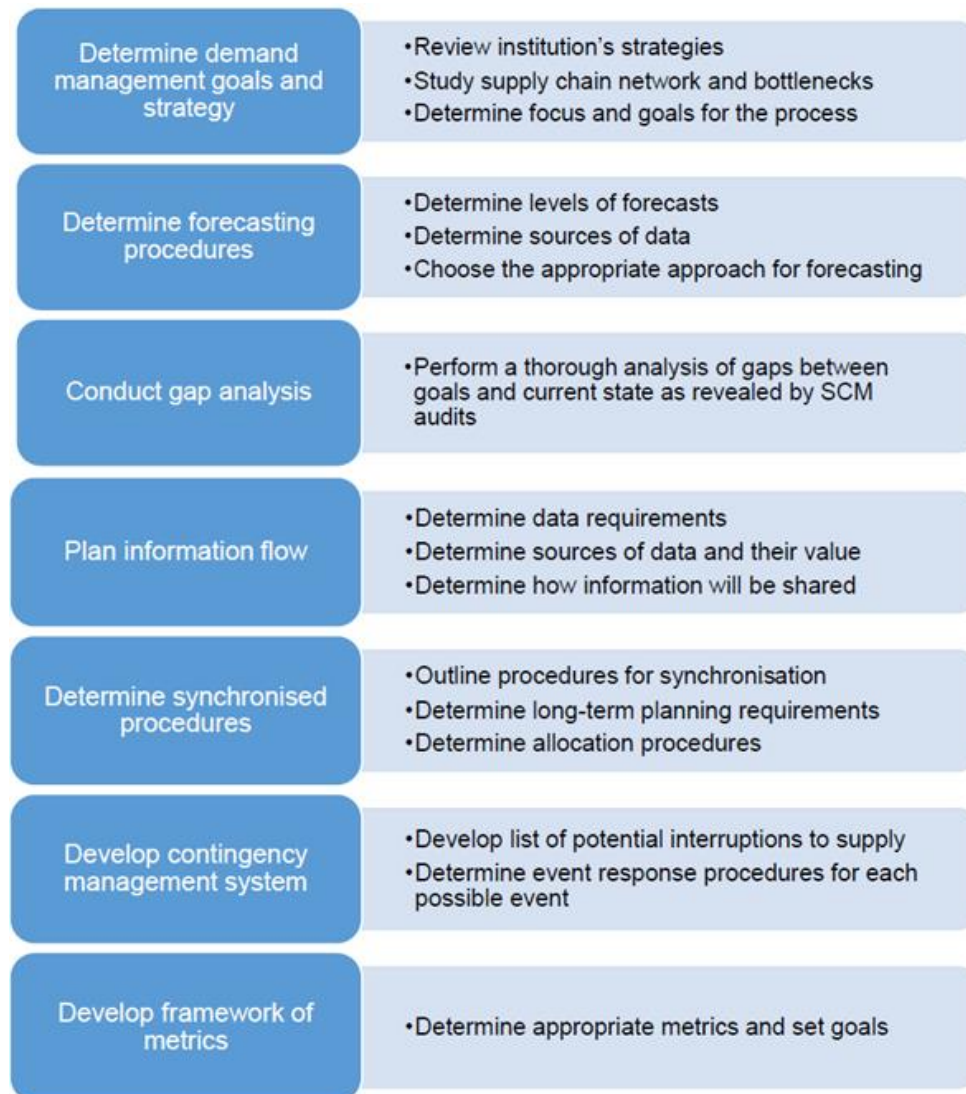


Figure 2.2: Steps in the demand management process

Source: Adapted from Hilletoft *et al.* (2010).

2.4.5 Demand planning

This section presents an overview of various aspects related to demand planning.

2.4.5.1 Background to demand planning

Demand planning is a critical step in the demand management process, and for many organisations, it can be the most challenging step. Demand management and demand planning are tied to strategic planning (Jurečka, 2013; Alexander, 2013). The goal of demand management is to have one set of plans that are relevant throughout the

organisation. Thus, demand management should contain the whole picture and connect programmes from all the various levels, ranging from operations to strategy.

2.4.5.2 Defining demand planning

Demand planning is defined as “estimating customer demands, and other planning measures and actions that illustrate planning with participants in the value chain” (Rexhausen, Pibernik & Kaiser, 2012:269).

2.4.5.3 Importance of demand planning

The competitive position of organisations can be improved by implementing proper demand planning (Mamani & Moinzadeh, 2013:95). An organisation can increase market share and, increase their customer base when demand planning is effectively implemented. On-time delivery of customer requirements is seen as a competitive advantage for an organisation.

2.4.5.4 Demand planning process

To obtain a comprehensive view of the requirements for the demand planning process, it should not be seen as an individual element, but it should be seen as a part of the selling process (Bindra, 2014). Sales forecasting and planning require various sources (Basu, 2016:38). For example, the marketing and sales plans need to be considered in the development of an informed forecast. Numerous sources also need the statistical forecast at an appropriate level and suitable horizon to develop effective strategies (Chase, 2016:106). Thus, information systems need to be in place to facilitate the forecasting process and the communication of the forecasts and plans to other functions to benefit from sales forecasting. Information systems and sales forecasting and planning should be intertwined with other business functions to manage the business successfully (Boult, 2014).

The flow of information should not be only in one direction, namely, from demand to supply. To develop the most efficient and profitable plans, the flow of information needs to go both ways (Basu, 2016:38). The data from finance to sales about the profitability differences of products can impact the actions from sales, and the information from operations about shortages of materials should inform the sales not to sell products that cannot be manufactured (Basu, 2016:38).

To function correctly, the demand planning process requires the commitment and interest of top management (Bindra, 2014). The support shown by the administration often also tells the lower levels of the organisation that the process is valuable (Chase, 2016:106). The demand planning process usually occurs monthly, although the proposed meetings range from daily meetings to event-driven when-needed conferences.

The demand planning process often includes the following (Chase, 2016:106):

- the statistical forecasting and its review and aggregation;
- forecasting of new products;
- forecasting of new order volumes (especially in make-to-order companies);
- application of external factors;
- financial conversion; and
- executive authorisation.

The demand planning process is concentrated on the side of the organisation that faces the customers (Bindra, 2014). The future demand can be predicted, for example, from scheduled customer orders or by extrapolating demand from the main market conditions, or the demand influencing activities of the organisation or its competitors (Chase, 2016:106). Support for decision-making can come from quantitative models, decision support systems or by outsourcing the planning to third parties (Basu, 2016:38). Different approaches to forecasting can be taken, depending on the characteristics of the industry and organisation.

Demand planning balances customers' requests with an organisation's supply abilities. Setting up a demand planning process is the first step towards a best-in-class demand-planning environment (Chase, 2016:106). A demand planning system must include the following: classifying or identifying purchasers' essential products, ensuring location visibility, setting objectives for demand plans; developing metrics for business units; and formalising the frequency of the forecasting process (such as, creation, review and publishing of demand plans), with specific time horizons attached, and ensuring that the right IT is implemented to support these activities (Bindra, 2014).

It is essential to recognise and understand the different planning horizons within the value chain ecosystem. In addition, it is necessary to formulate a plan to cleanse

historical data. Data cleansing is the process of identifying, amending or removing inconsistencies in a set of data (Muro, 2016). Historical data is the primary input into the statistical models used to generate the demand plan (Muro, 2016). The level at which the forecast must be generated can then be decided, and the following processes should be implemented (Muro, 2016):

2.4.6 Components of demand management

This section discusses the various components of demand management. Figure 2.3 below presents the crucial elements of demand management.

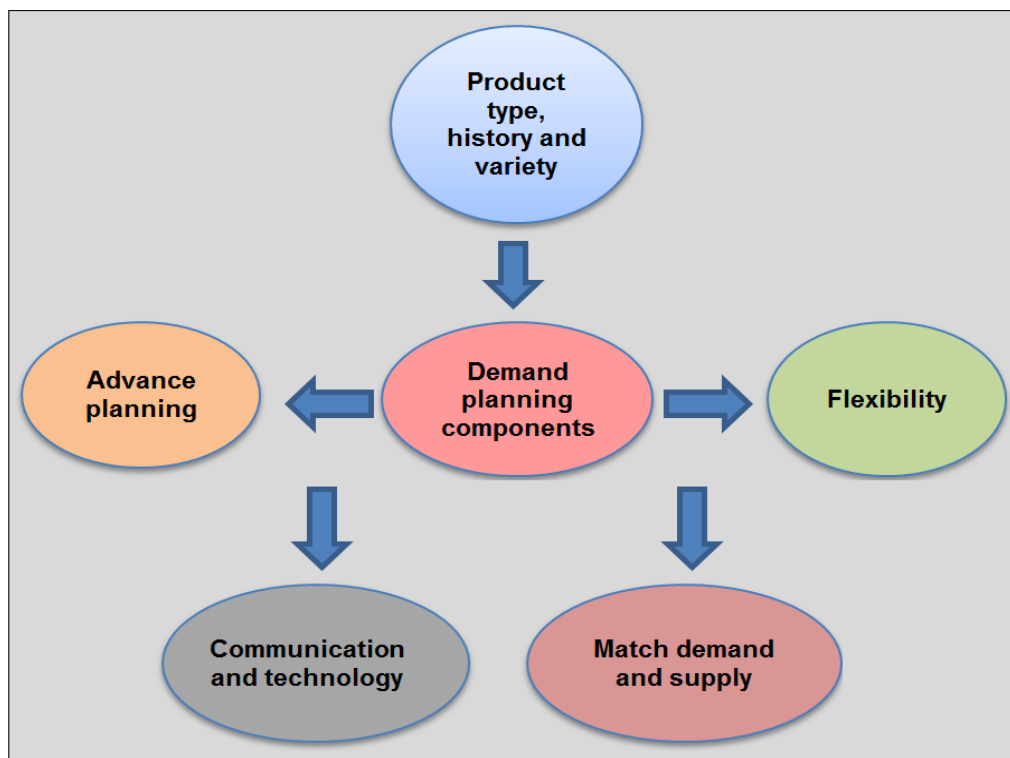


Figure 2.3: Components of demand management

Source: Researcher's own compilation

Each of these components is discussed in the sub-sections below.

2.4.6.1 Product type and sales history

Efficient processes must be implemented to ensure the proper implementation of demand management. Planning is essential in demand management to account for the different product types (Jonsson & Tolstoy, 2014:61).

2.4.6.2 Implementing flexibility in demand management

Implementing flexibility between customer demand and product demand must be considered in demand management (Oyatoye & Fabson, 2011:133). Therefore, demand management will require a high level of flexibility from organisations (Barnes & Lea-Greenwood, 2010:762).

2.4.6.3 Matching the demand with the supply of products

Stock shortages can be reduced by ensuring a match between the demand for products and supply of products (Nenni, Guistiniano & Pirolo, 2013:1).

2.4.6.4 Communication and technological implementation

Communication becomes vital when implementing demand management practices. When information is shared between the various stakeholders in the SCM process, communicating customer demands will be improved (Oyatoye & Fabson, 2011:132).

2.4.6.5 Planning implementation in demand management

“Planning ahead assists in fast-tracking the process of demand management and improves planning” (Bhardwaj & Fairhurst, 2010:165).

2.4.7 Phases of the demand management cycle

The section discusses the various phases of demand management cycle.

Phase 1: Recognition of the need

The requirements that are specified for goods come from the end user (Burt *et al.*, 2010:21). The end user communicates their requirements to SCM through a requisition.

Phase 2: Determining specifications

End users compile specifications according to their specific requirements to avoid any unclear descriptions and assist in clarifying the user's acceptance standards (Sollish & Semanik, 2012:29).

Phase 3: Selecting suppliers

Demand management practitioners conduct supply market research, determine the contracting methods, negotiate, and select suppliers using specific evaluation criteria (Van Weele, 2016:34).

2.4.8 Demand management and its critical success factors

Masete and Mafini (2018:3) outlined the following essential aspects of success for effective demand management:

- **Better risk allocation:** Effective risk allocation is a critical consideration in demand management.
- **Greater visibility:** Visibility of a credible process creates subcontracting opportunities for various organisations that can bring increased competition, dynamism and particular skills or strengths to the public sector.
- **More significant opportunities for innovation:** Supplier innovation in SCM can contribute to better quality, quicker delivery and reduced whole life costs.
- **Better-defined requirements:** Clear requirements enhance the ability of managers to obtain high-quality goods and services.
- **Improved ability to identify risks or bottlenecks:** In contract delivery, greater authority creates awareness of exactly how the contract will be implemented.
- **Better quality:** Solutions offered by suppliers as opportunities, can improve quality, increase delivery times and reduce costs.

2.5 INFORMATION AND COMMUNICATION AS AN ENABLER OF DEMAND MANAGEMENT

This section outlines the role of information and communication as an enabler of demand management.

The role of information in demand management is widely acknowledged (Hilletoft *et al.*, 2010). Information systems are crucial to the design of efficient and effective demand management. They are required to support the demand management process, as well as the coordination between demand management and SCM. Moreover, they should facilitate intra- and inter-organisational integration across SCM by integrating different information systems across the chain and by enabling collaboration between the key stakeholders (Hilletoft *et al.*, 2010).

The purpose of utilising information systems in demand management is to support organisations in understanding, creating, stimulating and fulfilling customer demand

costs efficiently. Strategic collaboration between the chain participants is required to achieve a balance between cost, quality, speed, and flexibility.

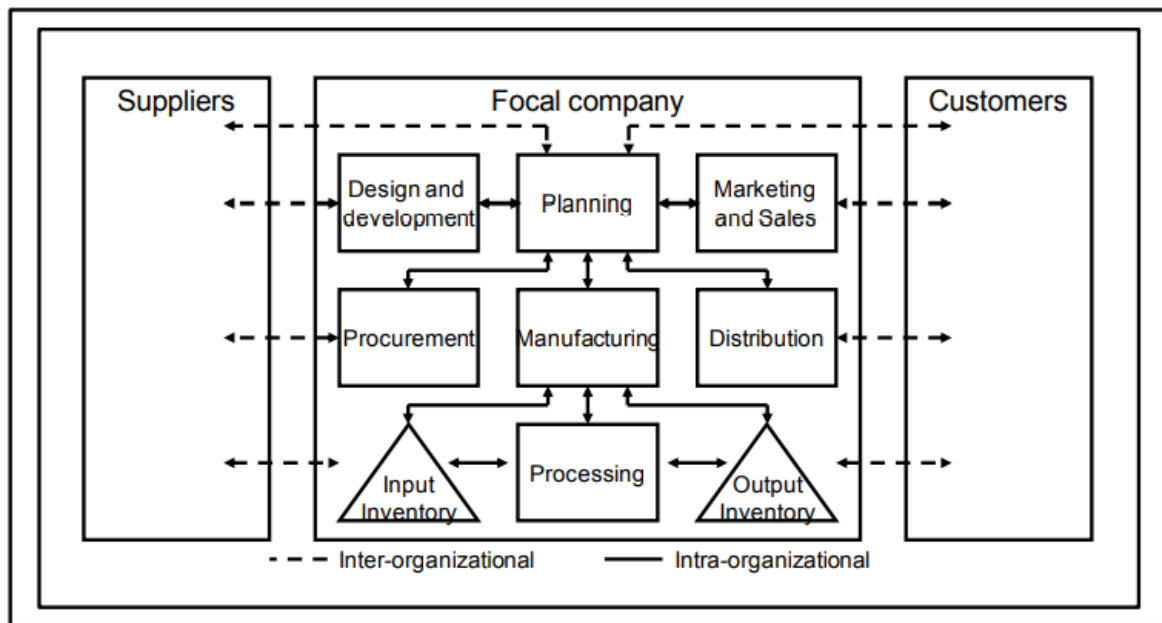


Figure 2.4: Application and information integration in demand management

Source: Adapted from Hilletoft *et al.* (2010).

The utilisation of information in demand management has numerous advantages. At a strategic level, Alkadi, Alkadi and Totaro (2003) highlighted that the use of information can increase the efficiency of demand management. Moreover, Williams, Nibbs, Irby and Finley (1997) argued that the use of information can increase the alignment between demand management strategy and business strategy. In addition, Byrd and Davidson (2003) maintained that the exploitation of information in demand management can increase overall growth and profitability. At an operational level, Kincade, Vass and Cassil (2001) linked the utilisation of information to an increase in product offerings and customer service levels, while Brandyberry, Rai and White (1999) linked the employment of information to an increase in the quality and timeliness of demand information.

Information systems should be designed on the basis of the requirements in the different demand and supply processes, and the coordination between them. However, this kind of demand-supply integration information system is not commonly found. Instead, information systems are often developed based on the discrete needs of separate demand or supply functions. Thus, information can sometimes reinforce

walls between functions rather than help overcome them (Korhonen, Huttunen & Eloranta, 1998).

Most of the available information systems support either the demand or supply side of the company. The information systems supporting the demand side are called front-office systems, while the information systems supporting the supply side are called back-office systems. These types of systems are rarely integrated, and hence, there is a need for further improvements to the information technology. For example, information systems must be able to support the company's capability of serving differentiated customer segments by providing the ability to search for and develop alternative supply solutions (Jüttner, Christopher & Baker, 2007).

2.6 CHALLENGES WITH THE IMPLEMENTATION OF DEMAND MANAGEMENT

This section outlines the typical challenges that demand management practitioners can expect when implementing demand management.

Sikhosana (2014:23-24) stated that the following challenges can inhibit demand management:

- Lack of strategic view and orientation towards SCM, specifically demand control.
- Shortage of talent management and leadership in the field of supply and demand.
- Inadequate examples of demand management optimisation and risk minimisation.
- Inadequacy of process coordination with information sharing and integrating measures.
- Poor relationships and lack of trust between supply chain participants and role players.
- Not enough examples of prevailing methodologies of supply chain network design, including real-time information visibility.

Callender and Grasman (2010:12-19) maintain that the following challenges top the list of barriers to implementing demand management, namely:

- lack of executive support;
- conflicting goals;

- skills and knowledge;
- constantly evolving technology;
- physician preference;
- lack of standardised codes; and
- limited information sharing.

2.7 CONCLUSION

The chapter provided a generic overview of demand management. Demand management contributes to ensuring correct items are delivered in the correct quantity and correct quality and at the correct time. For demand management to be effective, there needs to be effective implementation of demand management, effective demand planning and forecasting, and an alignment between the demand plan and the organisation's strategic plan. It was established that demand management is a significant component of SCM. The topic of demand management was discussed from seven perspectives, background and definition, historical development and theories supporting demand management, demand management processes, strategy, forecasting, demand planning, and challenges. Forecasting is critical in demand planning and should be performed accurately.

The next chapter focuses on demand management in the South African public sector.

CHAPTER 3: DEMAND MANAGEMENT IN THE SOUTH AFRICAN PUBLIC SECTOR

3.1 INTRODUCTION

An overview of the generic concept of demand management was provided in Chapter 2. Firstly, the background and various definitions of demand management were provided. Secondly, the historical developments and theories supporting demand management were discussed. Thirdly, an overview of the generic demand management process was provided. The chapter concluded with a discussion of demand management and its critical success factors, including the challenges experienced in implementing demand management.

This chapter, Chapter 3, firstly, presents an overview of the South African public sector environment. Secondly, procurement in the South African public sector is discussed. Thirdly, a detailed discussion on demand management practices is provided. Fourthly, a detailed discussion of the SCM regulatory framework is supplied. Fifthly, a detailed discussion is provided on the alignment between demand planning, strategic objectives and budgeting. The chapter concludes by outlining the mechanisms necessary for the effective implementation of demand management, including the challenges in implementing demand management in the South African public sector.

3.2 OVERVIEW OF THE SOUTH AFRICAN PUBLIC SECTOR ENVIRONMENT

This section of the chapter will review South Africa's administrative structure and the Gauteng Department of Health.

3.2.1 Review of South African administration structure

The South African government system is modelled on the British parliamentary system and comprises three government levels, namely, central, provincial, and local levels. The central level of government is the highest level of government, comprising Parliament, Cabinet and the National Assembly. The municipal or local level of government is the lowest level of government in South Africa. South Africa is a

sovereign, democratic state, divided into nine (9) provinces, each with its provincial legislature (Thornhill, Van Dijk & Ile, 2014).

The three levels of government derive their powers and functions from the Constitution of the Republic of South Africa (Van der Waldt, 2016). After implementing the Constitution of the Republic of South Africa Act 1993 (Act 200 of 1993), the structure and composition of government institutions changed significantly. As already mentioned, there are three levels of government, and three types of institutions constituting the government, namely, the executive (Cabinet), the legislature (Parliament) and judiciary (the courts) (Howlett, Ramesh & Perl, 2015). Government departments are responsible, for example, for health, education and sport. The executive is a committee comprising all the heads of these departments. This is called the Cabinet (Van der Waldt, 2016).

National Assembly

The National Assembly comprises 400 members elected for five years. One of the members is selected as the Speaker of the House at the first sitting after an election, and another member as the deputy speaker. Proceedings of the National Assembly are generally open to the public and the media (Thornhill *et al.*, 2014).

The provincial legislative authority

South Africa has nine provinces (Van der Waldt, 2016), each with its own provincial government. Table 3.1 below lists the provinces in South Africa.

Table 3.1: Provinces in South Africa

▪ Eastern Cape	▪ Northern Cape	▪ Free State
▪ Mpumalanga	▪ Limpopo	▪ Gauteng
▪ KwaZulu Natal	▪ North-West	▪ Western Cape

Source: Researcher's own compilation

The Premier heads each province together with the Executive Council. Provincial legislatures may pass their constitutions, subject to the provisions of the Constitution of RSA (Thornhill *et al.*, 2014). The provincial authority is divided between the central and the provincial governments.

The legislative authority of each province is vested in the provincial assembly, which has the authority to make laws that apply only within the province. Furthermore, these laws must be consistent with Acts of Parliament.

A provincial legislature in terms of the Constitution must consist of no fewer than 30 and not more than 100 members elected following proportional representation. The provincial legislatures continue for five years (Howlett *et al.*, 2015). The provincial legislature may make laws regarding agriculture, cultural affairs, casinos, racing, gambling and wagering, education, environment, nature conservation, health, housing, welfare services, language policy, trade and industry, traditional authorities, urban and rural development, provincial public media, public transport and roads, road traffic regulation and local government.

Local authorities / Local governments

Local government consists of the municipalities whose objectives are, amongst other things, to ensure the provision of services to communities and to promote social and economic development. Local authorities in South Africa are relatively autonomous bodies representing local communities (Thornhill *et al.*, 2014). The legislative powers of a local authority are vested in a municipal council which is empowered to make laws, called by-laws. This level of government, more than any other, determines the nature of the environment within which the South African citizens find themselves (Howlett *et al.*, 2015).

Although the municipal council has the power to make laws, they must be consistent with the provisions of the Constitution. It can levy property rates, levies, fees, and tariffs to perform its functions. It is entitled to an equitable share of provincial funds on which the Financial and Fiscal Commission makes recommendations (Van der Waldt, 2016).

The sections below present a perspective on the Gauteng Province and the Gauteng Department of Health.

3.2.2 The Gauteng province

Of the nine provinces in South Africa, Gauteng is the smallest with an area covering 18 178 square kilometres (1.39% of the total square kilometres of the whole country), supporting the largest population of 13.2 million (24.04%) the entire 55 million people

in the country (Statistics SA, 2015). This makes it the most populous and densely populated province in the country. Gauteng is the country's central economic hub. Currently, it contributes over 34.3% to the national gross domestic product (GDP), with most of the activities centred around the City of Johannesburg, City of Tshwane, and City of Ekurhuleni (Moeletsi, 2021:167).

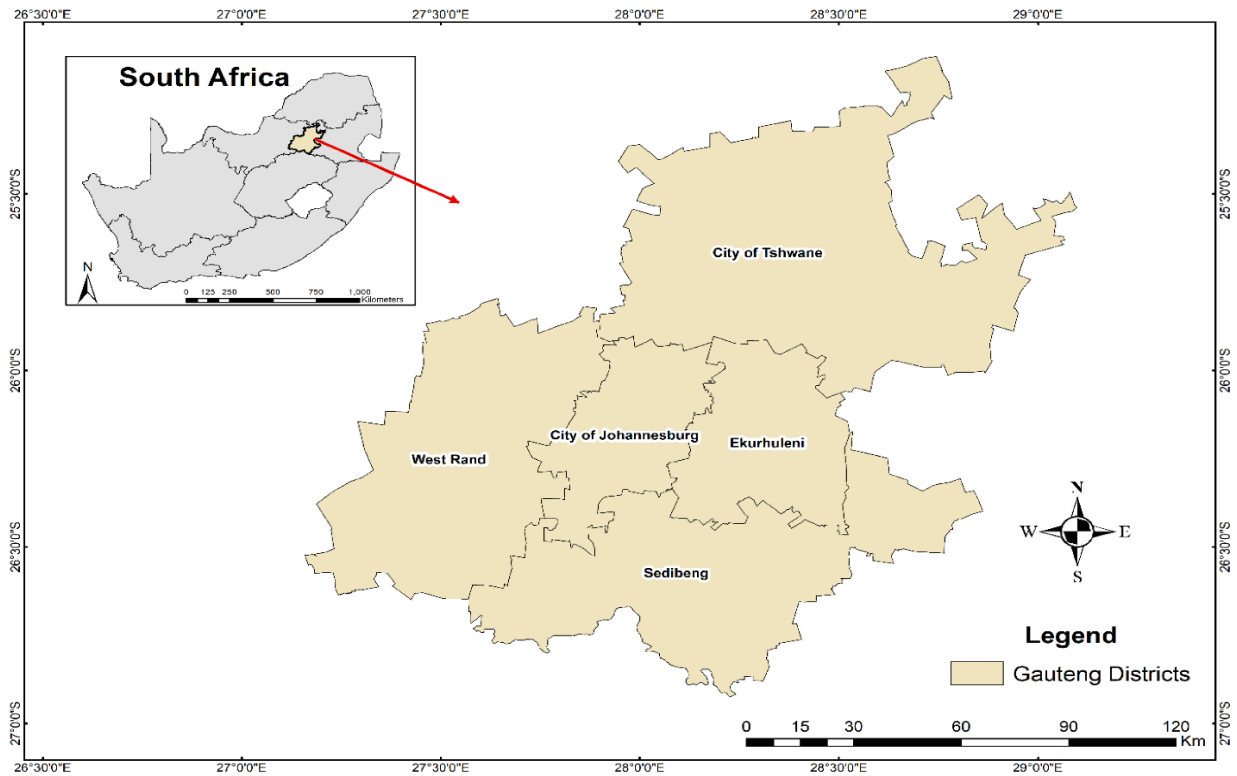


Figure 3.1: Gauteng districts

Source: Researcher's own compilation

The Premier is the province's head, a power that is sometimes exercised together with Members of the Executive Council (MECs). The Premier can appoint members of the Executive Council and assign their functions. The Premier, working with the Executive Council, is responsible for implementing national legislation in the province, and is further responsible for developing and implementing provincial legislation in the province and coordinating the functions of the provincial administration.

Just as in all the other provinces in South Africa, Gauteng has a group of representatives who fill specific portfolios and are concerned with everything that happens on a provincial scale (Du Toit & Van der Walt, 2011). The Gauteng provincial government consists of the following 13 departments, as listed in Table 3.2 below.

Table 3.2: Departments in the Gauteng provincial government

<ul style="list-style-type: none"> ▪ Agriculture and Rural Development ▪ Cooperative Governance and Traditional Affairs ▪ Community Safety ▪ e-Government 	<ul style="list-style-type: none"> ▪ Economic Development ▪ Education ▪ Health ▪ Human Settlements ▪ Infrastructure Development 	<ul style="list-style-type: none"> ▪ Roads and Transport ▪ Social Development ▪ Sport, Arts, Culture and Recreation ▪ Treasury
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Source: Researcher's own compilation

3.2.3 Gauteng Department of Health

The GDoH renders public healthcare services to the citizens of the Gauteng province in South Africa. As introduced in Section 1.2.1, public sector hospitals are categorised as district hospitals, regional hospitals, specialised hospitals, tertiary hospitals and central hospitals (Gauteng Provincial Government, 2020/21:7) (see Table 1.1).

The GDoH provides public healthcare services to 13.2 million citizens in the Gauteng Province, equating to 24% of South Africa's population through hospitals, clinics, and community health centres (Gauteng Provincial Government, 2020/21:8). The GDoH consists of 377 clinics and community centres, 13 district hospitals, 19 specialists' hospitals, eight regional hospitals, three tertiary hospitals and four central hospitals. Despite Gauteng's ever-expanding population and the harsh economic climate, the department has a massive responsibility to utilise the limited resources to improve the quality of public healthcare for the benefit of all citizens in the Gauteng province (Gauteng Provincial Government, 2020/21:7). The various categories of hospitals in Gauteng are briefly discussed below

3.2.3.1 Central hospitals

Central hospitals consist of highly specialised referral units, which provide an environment for multi-speciality clinical services, innovation and research. The services provided will generally be of high cost and low volume, and are services that require high technology and multi-disciplinary teams of people with scarce skills to provide sustained care of high quality (National Department of Health, 2018).

3.2.3.2 Tertiary hospitals

Tertiary hospitals receive referrals and provide sub-specialist support to several regional hospitals. Most of the care provided should be level III (three) care that requires the expertise of clinicians working at a sub-specialist level, or in rarer areas

of speciality, such as in surgery, for example, urology, neurology, plastic surgery, and cardiothoracic surgery (National Department of Health, 2018).

3.2.3.3 Regional hospitals

Regional hospitals receive referrals from and provide specialist support to several district hospitals. Most care will be level II (two) care that requires the expertise of general specialist-led teams. This includes general surgery, orthopaedics, general medicine, paediatrics, obstetrics and gynaecology, radiology and anaesthetics. However, most regional hospitals will provide some of the level I (one) services generally provided by district hospitals (National Department of Health, 2018).

3.2.3.4 District hospitals

District hospitals will generally receive referrals from community health centres and clinics and provide generalist support. They provide level I (one) care, delivered by general practitioners, medical officers or primary health care nurses in the absence of a specialist other than a family medicine specialist. Each district hospital should have a minimum of 30 up to 400 beds. Facilities with less than 30 beds will generally be classified as community health centres or clinics (National Department of Health, 2018).

3.2.3.5 Specialised hospitals

Specialist hospitals will provide care only for certain groups of patients. They will include acute and chronic psychiatric and tuberculosis (TB) hospitals and specialised spinal injury and acute disease hospitals (National Department of Health, 2018).

3.3 PROCUREMENT IN THE SOUTH AFRICAN PUBLIC SECTOR

This section outlines procurement in the South African public sector. This review includes a discussion of the public procurement practices pre-1994, the public procurement practices post-1994, procurement reforms, joint country procurement assessment review, the implementation strategy, and position of demand management within the SCM business model.

SCM can assist Government in achieving its socioeconomic goals (Zitha, Sebola & Mamabolo, 2016:69). The concept of SCM was introduced to the South African public sector in 2004.

According to Fourie (2015:38), "the introduction of an integrated SCM function will address the inefficiencies in Government's method of procurement, contract management, inventory/asset control and obsolescence planning". It is vital to gain a perspective on the South African public sector procurement environment by reflecting on the period pre-1994, and the period post-1994.

3.3.1 Public procurement practices pre-1994

During the apartheid era, public sector procurement consisted of procurement departments responsible for buying goods, works and services, and provisioning administration that was accountable for inventory and stores management (Ambe, 2016:277). The procurement system was rule-based and not an integrated SCM system aligned with SCM best practices (SCMBPs). There were significant inconsistencies in applying procurement policies, a lack of accountability by public sector SCM officials, a lack of support from the National Treasury, and fragmented procurement processes (Turley & Perera, 2014:8). The procurement system was characterised by significant socioeconomic inequalities that included many discriminatory laws and practices that showed a preference for established and multi-national suppliers, and that ignored the existence of small and emerging suppliers (Bizana *et al.*, 2015:679).

Before 1994, South Africa's economy consisted of a 'mainstream' economy led by a minority of 13% of the population in contrast to the 'emerging economy' of small, medium, micro enterprises (SMME) owned by historically disadvantaged individuals (HDIs), comprising of the balance (87%) of the population. The government identified public sector procurement as a vehicle with which to close the gap between the two economies (Fourie, 2015:39).

3.3.2 Public procurement processes post-1994

In 1994, the democratic government initiated budgetary and financial reforms to public sector procurement (Madonsela, 2014). The procurement reforms were meant to make the public sector more people-friendly and sensitive to meeting the needs of the citizens (Bizana *et al.*, 2015:679). The government understood the importance of implementing an integrated SCM system. This meant that the government had to commence with a review of the public sector procurement system in use at the time, to align it with SCMBPs (Glas, Schaupp & Essig, 2017:580). An essential principle of

the reform was that managers had to manage within a framework that ensures transparency and accountability (NSG, 2017:19).

3.3.3 Procurement reforms

The first main programme that impacted procurement reforms in South Africa was the Reconstruction and Development Programme (RDP) that was developed in 1994, and that outlined the broad economic strategies to transform the South African economy by 2014. To support the RDP, the government initiated the procurement reform process in 1995.

During this period, it was recognised that a consistent legislative framework would be required to give effect to the government's procurement reform objectives (Marokana, 2012:14).

For this purpose, the government created a Task Force in 1995, which was headed by the State Tender Board (STB) under the Ministry of Finance and the Department of Public Works, with technical and financial support from the World Bank (WB) (Ambe & Badenhorst-Weiss, 2012b:11004). The task team interviewed public officials and private-sector organisations, major donors, business associations, training institutions and non-governmental organisations (NGOs) (Marokana, 2012:14). The team focused on rules and procedures, issues and possible solutions for improving public procurement, the legal framework, and the prevalent procurement practices (World Bank, 2003:2).

The procurement reform initiative was given further impetus when in November 2000, the "report on the Opportunities for Reform of Government Procurement in South Africa served before Cabinet". "Cabinet endorsed the report's thrust and directed that the Minister of Finance address the details where necessary in consultation with other relevant ministers" (Ambe, 2009: 427).

3.3.4 Joint Country Procurement Assessment Review

To assist the National Treasury in reaching a more uniform implementation approach, a Joint Country Procurement Assessment Review (CPAR) was conducted during 2001/02 with the assistance of the WB (Ambe & Badenhorst-Weiss, 2012b:11005). The CPAR identified several deficiencies that needed to be addressed (Migiro & Ambe, 2008:232). Moreover, the findings of the CPAR research prompted the South

African government to replace the outdated and rules-driven procurement and provisioning practices.

Following this CPAR study, National Treasury, in conjunction with provincial treasuries, developed a policy to guide uniformity in public procurement processes (National Treasury, 2003:2). In September 2003, Cabinet adopted an integrated SCM Policy Strategy to Guide Uniformity in Procurement Process Reform Processes in Government (National Treasury, 2003:1). In December 2003, the Minister of Finance approved the Regulations regarding the Framework for SCM. Based on this, SCM was implemented across all spheres of government.

3.3.5 Implementation strategy

A three-phase implementation strategy was devised to move from the current position to the desired position (Ambe, 2016:280). These phases can be categorised as:

- Firstly, the pre-tender board abolition or preparation phase;
- Secondly, the immediate post-tender board abolition or complete implementation phase; and
- Lastly, the monitoring phase.

The implementation strategy included establishing the SCM Office in the National Treasury to oversee the implementation of the SCM policy (National Treasury, 2004:18).

Secondly, National Treasury issued SCM Practice Note 3 of 2003, which provided a checklist tool to assist departments in implementing and interpreting the Supply Chain Management Policy Framework (National Treasury, 2003:18). Public sector entities were required to institutionalise the SCM function by developing an organisational structure aligned with the Supply Chain Management Policy Framework (Sandler, 2009:30).

Thirdly, departments had to build capacity within their departments to cope with the SCM functions. Training was provided through accredited service providers such as the South African Management Development Institute (SAMDI), Public Administration Leadership and Management Academy (PALAMA) and the Institute of Public Finance Agency (IPFA). National Treasury provided monitoring and guidance through the respective provincial treasuries (National Treasury, 2004:18).

3.3.6 Position of demand management within the SCM business model

According to Section 16A (3.2) (d) of the SCM Regulations of 2005, public sector SCM must consist of the elements of demand management, acquisition management, logistics management disposal management, risk management and performance management (Moeti, 2014:148).

Figure 3.2 illustrates the position of demand management within the SCM business model.

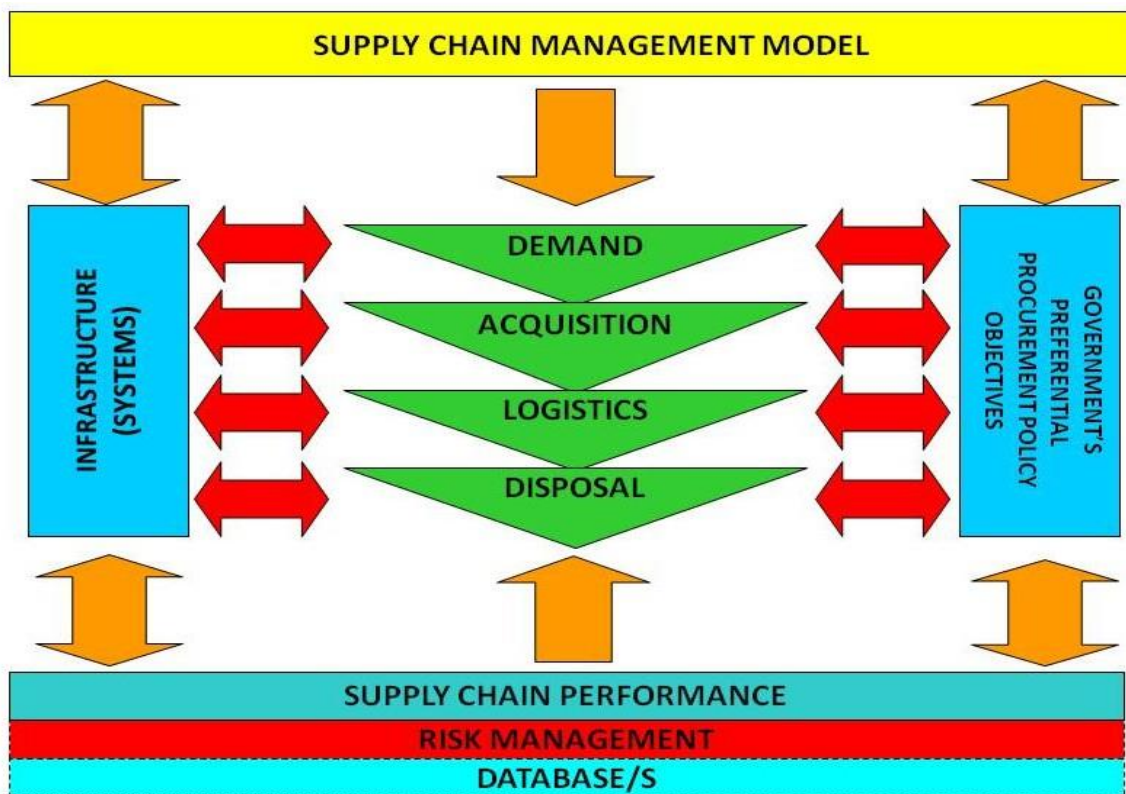


Figure 3.2: Position of demand management within the SCM business model.

Source: Moeti (2014:148)

The core elements of the SCM model mentioned above are all interlinked to form an integrated SCM per SCMBPs. It is essential to ensure a value-add in each element to maximise the eventual outcome. The SCM business model intends to strengthen the SCM regulatory framework by providing that the performance of SCM is monitored and effectively applied (Fourie & Opperman, 2011:339).

The core elements of the SCM system, are discussed below.

Demand management

Demand management assists in ensuring that the resources required to fulfil the activities identified in the strategic plan are delivered at the right price, time, place, quantity and quality to satisfy the needs. Demand management sets the trend for all subsequent actions associated with SCM. It refers to identifying the requirements that will ultimately achieve the South African public sector's objectives, as set out in the strategic plans of public sector entities (Naidoo, 2016:20).

Acquisition management

The purpose of acquisition management is to ensure that the market is assessed, and a sourcing strategy is determined, bid documents are compiled, bids are solicited, responses are received, evaluated, assessed and awarded (Bizana *et al.*, 2015: 64).

Logistics management

Logistics management refers to, among other things, recording, coding of items, setting of inventory levels, placing of orders, receiving and distribution, stores/warehouse management, expediting orders, transport management, and vendor performance monitoring (Bent, 2014:37).

Disposal management

The purpose of disposal management is to dispose of immovable assets to ensure the best value for money for the state (Bowersox, Closs, Cooper & Bowersox, 2013:29). Disposal management involves doing away with or dismantling assets or goods that can no longer be used within a department for its initially acquired purpose. Disposal occurs when assets are obsolete, redundant or unserviceable (Tshamaano, 2012:16).

Risk management

The risk management function identifies, considers, and avoids potential risks in the SCM process. Risk refers to any unintended or unexpected decision during an action (Mnguni, 2012:23).

Performance management

Performance management is a monitoring process that undertakes a retrospective analysis to determine whether the proper procedures have been followed and whether the desired objectives have been achieved (Deshpande, 2012:4). Performance

management measures the performance of each of the elements of SCM. This will explain how an effective performance evaluation system can influence effective and efficient service delivery and support the pillars of public sector procurement. The monitoring of suppliers should form the basis of contract management activities where certain aspects should be monitored and reported on (Bent, 2014:37).

To understand the benefits of a successful SCM system in the public sector, it is essential to start and establish a good foundation, as the entire SCM system could otherwise collapse. Demand management is the first element in the SCM business model, and once successfully implemented, the succeeding SCM elements will build on the solid foundation that has been laid. Therefore, the public sector must be cognisant that if the demand management element has been implemented well and has no flaws, the SCM elements that follow will achieve the desired result.

Therefore, the focus of this study is to develop a framework to improve demand management processes within the public sector in South Africa. This section of the chapter was very relevant to this study as it provided an overview of procurement in the South African general section pre-1994 and post-1994. Before 1994, the South African public sector SCM system comprised a rule-based purchasing and procurement system that did not incorporate all the fully integrated SCM system elements. Clarity was provided on the positioning of demand management within the SCM model and the other elements of the SCM model.

3.4 DEMAND MANAGEMENT PRACTICES

This section presents an overview of demand management practices, and includes a discussion of demand management considerations, specifications and TOR, and role players.

3.4.1 Demand management considerations

Demand management practitioners must assist end-users to embark on a range of different analyses, such as a needs analysis, an expenditure analysis, a commodity analysis. Demand management practitioners must also assist end-users to conduct a market and industry analysis (NSG, 2017:52). The demand management practitioners must further assist end-users in compiling specifications for goods and TOR for services. These analyses will be briefly discussed below.

3.4.1.1 Needs analysis

The need for goods and services typically arises from and is initiated by the end-users of public sector entities to enable them to perform their functions in a specific cost centre/section or division within a department. The need should support the department's costs and quality objectives, and the resources required to fulfil its obligations/objectives should be identified and analysed (Ambe, 2009:429). A thorough assessment of what is required and a plan and budget should be undertaken. Proper demand planning by line managers/functionaries, at this stage, assisted by the demand management practitioner, will ensure that the required goods, works and services are obtainable at a reasonable cost that will support the 'value for money' objective (Ambe & Badenhorst-Weiss, 2012b:11005).

According to the National School of Government (NSG) (2017:55), the following aspects could be taken into consideration during the needs analysis, namely, why is there a need for such a commodity, what will be the service delivery, what benefits will be obtained if such a need is satisfied, what was used before the market had been identified, and why is the existing equipment/service no longer feasible. The following aspects also need to be considered, namely, if the demand is procured what will the possible human resource impact be, who initiated the need, which strategic sourcing options are available in terms of acquiring the market, what are the pros and cons of relevant legislation linked to the requirement, is the need connected with the disposal plan, does the institution have officials in employment who have relevant and broad exposure or skills regarding the provision, and what are the internal entities policy prescripts around the requirement.

At the planning stage, the institution should identify which goals are to be achieved by the provision; whether it may have an empowerment impact directly or indirectly on women, specific communities, certain/specific group/s, and so on (NSG, 2017:55).

3.4.1.2 Expenditure analysis

The analysis of past expenditure patterns on a commodity plays an imperative role in the planning stage as it will assist in the understanding of past, current and likely future requirements. According to Burt *et al.* (2010:21), the expenditure can be gathered in terms of the following spending patterns: per department/entity within a

province/district/region, per division, per site, per supplier, per item/commodity and market.

The expenditure analysis initiative promotes a more strategic and collaborative analysis of purchasing data by enabling demand management to conduct a formal review of a department's purchased data across all buying methods; to determine the appropriateness of buying decisions; use of approved buying methods; sources of supply; and compliance with government procurement policies and procedures (NSG, 2017:44).

According to NSG (2017:44), in terms of the expenditure analysis, the focus will be on the following:

- what the public sector entity buys,
- how the public sector entity buys,
- who the public sector entity buys from, and
- when is the peak and low of needs relative to expenditure?

According to Van Weele (2016:34), the following types of price analysis could be done: price escalation per commodity or asset groups, price comparisons between divisions, business units, and cost centres. Price movements also need to be tracked against crucial indicators such as Producer Price Index (PPI), Consumer Price Index (CPI), exchange rates or commodity indices at either supplier or commodity level.

3.4.1.3 Commodity analysis

Commodity analysis refers to the actual goods and services required, and this should be analysed to see what is available to satisfy the identified need. Institutions should identify personnel with the necessary knowledge, competence and experience to carry out a commodity analysis (National Treasury, 2011:52).

According to Bailey *et al.* (2015:201), the following elements and characteristics regarding certain commodities could be analysed, price, inventory costs, transportation costs, availability of spare parts, the period in the market, after-sales support, maintenance costs, supply costs, functionality and features, essential product or process characteristics, customer specifications and requirements, future trends, additional value-added after purchases, pre-assembling or post-assembling of the items, extent to which labour is intensive or regulated, availability of substitutes if

necessary, latest technology applied, to which quality control is required, level of customisation, brands supplied, analysis of the brand and trademark of similar commodities that the public institution has purchased; and analysis per product, make, model and compatibility.

3.4.1.4 Market analysis

Market analysis entails analysing the market to ascertain where and how the specific commodity can be sourced (NSG, 2017:53). If performed correctly, the buyer will target the correct suppliers most cost-effectively and efficiently. Analysing the market contributes to developing detailed knowledge around the need in order to be better positioned for effective future sourcing strategies.

A public sector entity can also analyse the market per commodity and its related competitive dynamics, whilst establishing the various types of suppliers that may be utilised. A proper market analysis will also allow the public sector entity to identify possible enterprises that are earmarked for sub-contracting to advance certain designated groups, as stipulated in the Preferential Procurement Policy Framework Regulations of 2017.

Carrying out a market analysis could be an effective way to fulfil the public sector entity's set of goals in terms of its procurement plan (NSG, 2017:57). Through market analysis, the public sector entity would also understand the frustrations and obstacles faced by small companies competing with big companies. The market analysis further assists in understanding supplier costs and performance drivers within an industry (NSG, 2017:57). A market analysis will largely determine the correct sourcing strategy, including local and international sourcing, limited bidding vs competitive bidding, and quotations vs bids.

3.4.1.5 Industry analysis

Analysing the industry contributes to developing detailed knowledge around the market to better position for effective future sourcing strategies. A public sector entity can also analyse the market and industry per commodity and determine its related competitive dynamics, whilst establishing the various types of suppliers that may be utilised.

Industry analysis should be carried out as part of the demand planning stage before a public sector institution determines a strategy to approach the market (NSG, 2017:53). The following supply groups within the industry could be analysed: SMME, Broad Based Black Economic Empowerment (BB-BEE) companies, emerging companies, large corporate companies, foreign suppliers and local suppliers and manufacturers.

Carrying out an industry analysis could also be seen as an effective way to fulfil a public institution's goals in terms of its procurement plan (NSG, 2017:53). Similar to the market analysis, the industry analysis will enable the public sector institution to understand the frustrations and obstacles small companies face in competing with big companies. Industry analysis further assists in understanding suppliers cost and performance drivers within an industry. Supplier costs include, among others, raw material, labour, training of employees, maintenance costs and overheads.

3.4.1.6 Supplier analysis

It is essential to know the suppliers that will support the functions and needs of the public sector entity. Analyses could be done on various aspects regarding the suppliers. According to Van Weele (2016:34), the following supplier's research could be done regularly, namely, ranking of suppliers, expenditure per supplier, the support of 'locally based' suppliers, cost of doing business with suppliers, lead-time analysis, supplier's performance and geographical location, commodities supplied and price-analysis of the supplier's price policies.

It can be concluded that linking the budget to the requirements is vital, as it is often true that end-users do not conduct proper research that results in either over-budget or under budget.

Table 3.3 below outlines the critical demand management practices that must be undertaken.

Table 3.3: Demand management practices

Demand management practices	Needs analysis
	Expenditure analysis
	Commodity analysis
	Market analysis
	Industry analysis
	Supplier analysis
	The total cost of ownership

Source: Researcher's own compilation

3.4.2 Specifications and terms of reference

This section discusses specifications and TOR as related to procurement in the South African public sector.

3.4.2.1 Specifications

A specification is usually drafted when an item must be procured, for example, the purchase of an magnetic resonance imaging (MRI) for a hospital. This implies that a specification refers to tangible characteristics of the required item. Specifications must be compiled in such a manner as to promote the broadest possible competition between potential suppliers, whilst ensuring those critical elements of performance or other requirements for the goods being procured are achieved (Swink, Melnyk, Cooper & Hartley, 2011:358).

Accepted standards issued by Standards South Africa, the International Standards Organisation (ISO) or the South African National Accreditation System (SANAS) must be included in bid documentation (NSG, 2017:58). The end-user requiring a specific product will usually initiate the drafting of the specification or identify an existing specification that meets the requirement (Ambe & Badenhorst-Weiss, 2011:81).

3.4.2.2 Terms of reference

It is essential for the Bid Specification Committee (BSC) to prepare proper TOR. The purpose of the TOR is to inform the potential supplier what the needs of the public-sector entity are, and to determine if those needs can be satisfied by the supplier (Gauteng Provincial Government, 2020/21:19). The scope of the work will give a detailed description of the needed services. During this phase, as much information

as possible must be supplied, and the services required must be identified in the smallest of details. The scope of the assistance needed forms the basis on which the supplier will calculate prices. It must include all aspects of the services required, as no significant changes to the scope can be allowed after the award has been made or after the contract has been concluded. The practice of agreeing (contract) with a supplier and initiating changes to the TOR is an unfair practice, since it changes the scope outside the benefits to be derived from the competitive bidding processes (NSG, 2017:62).

The following aspects are a crucial part of the scope of service (NSG, 2017:62):

- which services are required;
- where and when the services are needed (timeframes linked to various tasks/goals);
- the critical performance areas;
- minimum performance requirements;
- possible phases and how the project will move from one step to another;
- detailed project implementation methodology;
- responsibilities of the service provider;
- plans and drawing, if applicable;
- milestones and date of completion of service; and
- payment conditions.

Once the strategic plan has been compiled, the resources required to achieve the activities must be received. This is attained by procuring appropriate goods/items or services from suppliers. For this reason, it is essential that proper specifications or TOR are drafted to ensure that the correct goods or services are procured to satisfy the identified need optimally. In addition, this will prevent unnecessary delays in the procurement process or increased fruitless and wasteful expenditure due to cancellation of tenders (Gauteng Provincial Government, 2020/21:19).

Treasury Regulation 16A dictates that all bids must be processed through a bid committee system. The BSC is responsible for drawing up the specification or TOR related to the needs identified. The BSC also makes decisions around the

administrative applicability of the issues related to a bid invitation. Therefore, the BSC is seen as one of the most crucial role players in the demand management process (Ambe & Badenhorst-Weiss, 2011:81).

The drafting of specifications and TOR is a critical step in ensuring that the required items and services are acquired. Therefore, this step must be done by officials who have the necessary technical and administrative expertise to ensure correctness and compliance with standards. Incorrect specifications and TOR will undoubtedly lead to delays and may compromise the fairness of the procurement action. Practice has shown that oversights or mistakes made during the drafting of the specifications stage directly affect the evaluation process, including the correctness and openness of decisions made later in the acquisition process.

3.4.3 Role players in the demand management process

This section discusses the critical role players in the demand management process.

Planning the supply chain also implies planning collaboratively with the internal and external environment consisting of customers, suppliers and other role players in the demand management process. In a collaborative relationship, these role players' strategies, goals, and objectives need to be considered when planning demand management strategies (De Villiers, Nieman & Niemann, 2017:285).

Table 3.4 below presents the most important of these role players in the demand management process. Each of these is briefly discussed below the table.

Table 3.4: Key role players in the demand management process

Key role players	Accounting Officer/Authority
	Chief Financial Officer (CFO)
	Cost centre manager
	End-users
	Suppliers
	Demand Management practitioners
	Members of bid committees; <ul style="list-style-type: none"> ▪ Bid Specification Committee (BSC) ▪ Bid Evaluation Committee (BEC) ▪ Bid Adjudication Committee (BAC)

Source: Researcher's own compilation

3.4.3.1 Bid specification committee

The BSC is the first of the three bid committees prescribed by the National Treasury. It is the foundation upon which honest evaluation and, eventually, adjudication will rest. The BSC must secure the best deal for the department in preparation for the bid specification (Gauteng Provincial Government, 2020/21:19). This can be done through a thorough planning and needs analysis process that includes the following steps (NSG, 2017:62):

- Ensuring the identification of all activities for the implementation of successful demand management;
- Ensuring procurement obligations are adequately analysed and identified;
- Identifying and determining the potential risks that may be associated with the requirement;
- Establishing the possible existence of transversal or other ad hoc agreements targeting the exact requirements or needs; and
- Ensuring the alignment of a department's procurement activities with the budget and strategic plans for the effective planning and purchasing of goods and services according to pre-determined key performance indicators and service delivery mandates.

3.4.3.2 Bid evaluation committee (BEC)

Bid Evaluation Committee (BEC) evaluates bids received from prospective bidders. This step is known as the tender evaluation stage. The cross-functional committee comprises of SCM practitioners and the officials requiring the goods and services (NSG, 2017:62).

3.4.3.3 Bid adjudication committee (BAC)

Bid Adjudication Committee (BAC) considers recommendations for awards. The Chief Financial Officer (CFO) is appointed as the chairperson of the BAC. The BAC is responsible for making recommendations to the accounting authority for approval (NSG, 2017:62).

Table 3.5 summarises and explains the bid committee system.

Table 3.5: Bid committee system and its functions in public procurement in South Africa

Bid committee	Composition	Responsibility
Bid Specification Committee	One or more officials (end-user department compulsory) from the procuring institution may include external specialists; Chairperson to be appointed by Accounting Officer /Authority or delegated official.	<ul style="list-style-type: none"> ▪ Compile specifications and terms of reference (TOR); ▪ Determine preference point system; ▪ Confirm availability of funds; ▪ Determine special conditions of contract.
Bid Evaluation Committee	Multi-disciplinary team (SCM practitioner, technical expert, end-user department); Accounting Officer/Authority or delegate to appoint chairperson and members.	<ul style="list-style-type: none"> ▪ Evaluate all bid responses per approved criteria and preference points system; ▪ Confirm preferred bidder's tax matters are in order; ▪ Check the list of restricted bidders and database of tender defaulters; ▪ Submit recommendation to Bid Adjudication Committee (BAC).
Bid Adjudication Committee	Comprises at least four senior managers, including the Chief Financial Officer (CFO), an Supply Chain Management (SCM) practitioner and a technical expert. Appointments made by Accounting Officer/Authority or delegate.	<ul style="list-style-type: none"> ▪ Consider recommendation from Bid Evaluation Committee (BEC); ▪ Scrutinise all bid documentation; ▪ Depending on delegation, may make a final award or recommend to Accounting Officer/Authority to make a final award or make an alternate recommendation.

Source: Ambe (2009:430)

An understanding of demand management practices in the South African public sector is relevant and applicable to this field of study, as the current study aims to improve demand management processes in the South African public sector.

Therefore, this section relates to Research question 1, namely, which demand management practices are implemented in the South African public sector. Section B of the questionnaire that was compiled for the current study consisted of 23 statements relating to demand management considerations.

3.5 SCM REGULATORY FRAMEWORK

Although Chapter 1 provided an overview of the SCM regulatory framework, this section provides a detailed overview of SCM policies and regulations, including the Constitution, PFMA and PPPFA.

As stated in Section 1.2.3, the Regulatory Framework for SCM became effective on 5 December 2003 (National Treasury, 2015). The framework stipulates that accounting officers are duty-bound to ensure the following (Owuoth & Mwangangi, 2015:2):

- there is an understanding of current and future needs,
- requirements are linked to the budget,
- specifications are determined,
- there is an analysis of past expenditure,
- consideration is given to the optimum method to satisfy the need,
- the frequency of the requirement is specified,
- the economic order quantity is calculated,
- industry analysis is conducted, and
- a commodity analysis is undertaken.

SCM in the public sector operates within a regulatory framework governed by the Constitution and is further governed by several SCM legislations (Tshamaano, 2012:10). The SCM Regulatory Framework pertains to all key legislation that provides the cornerstone for managing the SCM system in the South African public sector.

As previously mentioned, but which bears repeating, the various pieces of legislation that form the basis of the South African SCM Regulatory Framework include, among others, the Constitution Act 108 of 1996 (South Africa, 1996:127), Public Finance Management Act 1 of 1999 (South Africa, 1999) (PFMA), and Preferential Procurement Policy Framework Act 5 of 2000 (South Africa, 2000) (PPPFA), The SCM Regulatory Framework (South Africa, 2003b), Preferential Procurement Policy Framework Regulations of 2011 (South Africa, 2011b) (PPPFR), and Preferential Procurement Policy Framework Regulations of 2017 (South Africa, 2017b) (PPPFR).

The SCM regulatory framework further includes the following important regulations and guidelines: the Policy Strategy to Guide Uniformity in Procurement Reform Processes in Government, National Treasury Regulations, National Treasury Guidelines, National Treasury Circulars, National Treasury Practice Notes, and National Treasury Instruction Notes (Khadija & Kibet, 2015:128).

The public sector SCM system is susceptible to real and everyday risks which include collusion, fraud, bribery and unethical interference (Mauki, 2014:9). There is the further risk of procurement being done in a manner that does not protect the best interests of the procuring entity by procuring goods and services that are not suitable for its intended purpose nor cost-effective (Tukamuhabwa, 2012:34). Recent AGSA findings have, for example, revealed non-compliance by several Government entities to the SCM regulatory framework. The SCM system is regulated by more than 80 different legal instruments (National Treasury, 2015:10). These laws and regulations relating to public sector SCM are implemented through many independent statutory agencies (Khadija & Kibet, 2015:128).

The SCM regulatory framework, as described above, supports demand management processes in the public sector in South Africa. The SCM Regulatory Framework pertains to all the key legislation and that it provides the cornerstone for managing the SCM system in the South African public sector.

The South African public sector must ensure that goods and services are readily available to enable public sector entities to provide quality services to the citizens of South Africa, and to ensure that goods and services are procured in line with the SCM regulatory framework. Failure to procure goods and services in line with the SCM regulatory framework will result in irregular expenditure and negative audit findings for public sector entities.

The sub-sections below discuss the critical legislation and how the relevant legislation's complexity has shaped how demand management processes should be applied in all public sector entities.

3.5.1 The Constitution

The principles on which the 'new' (post-apartheid) South Africa was built is contained in the Constitution that was signed into law on 10 December 1996 (Kaye, 2014). The

new Constitution aimed to support HDIs and eliminate previous discriminatory practices (Quinot & Arrowsmith, 2013:179). The principles of the public entity SCM regulatory framework were incorporated into the new Constitution (Quinot & Arrowsmith, 2013:179). For example, section 217 of the Constitution (Act 108 of 1996) states: "When an organ of the state procures goods, works and services it must be done in accordance with a system which is fair, equitable, transparent, competitive and cost-effective" (Khadija & Kibet, 2015:128).

Table 3.6 lists the primary and secondary objectives of procurement, as contained in the Constitution.

Table 3.6: Supply chain management objectives contained in the Constitution

Objective	Description	Reference
Primary	Supply Chain Management (SCM) is conducted in a fair, transparent, cost-effective, equitable and competitive manner.	Section 217 (1)
Secondary	Procurement policy may provide for: <ul style="list-style-type: none"> ▪ Categories of preference in the allocation of contracts, and ▪ The protection or advancement of persons, or classes of persons, disadvantaged by unfair discrimination. 	Section 217 (2)

Source: Watermeyer (2011:3)

Fairness and equity

During the apartheid era, black individuals were prevented from participating in public procurement processes (Green Paper, 1997). Equity, means compliance with Government policies to advance individuals previously disadvantaged by unfair discriminatory practices (National Treasury, 2004:9; Mbanje & Lunga, 2015:68).

Transparency requires openness and accountability

Transparency is the availability of information on supply chain prescripts, and procurement opportunities. Shafritz, Russel, & Borick (2015:473) emphasised that the public sector must be transparent in what they do with public money and SCM must be conducted publicly and in a transparent manner.

Competitiveness and cost-effectiveness

SCM practices should encourage competitiveness between prospective suppliers, and cost-effectiveness in ensuring value for money (National Treasury, 2016:1).

Table 3.7: Primary pieces of legislation that regulate supply chain management

Act	What it does in respect of procurement.
Public Finance Management Act 1 of 1999	Establishes a regulatory framework for Supply Chain Management (SCM), which includes procurement in national and provincial departments and state-owned enterprises.
Preferential Procurement Policy Framework Act 5 of 2000	Establishes how preferential procurement policies are to be implemented.

Source: National Treasury (2016:1)

3.5.2 Public Finance Management Act and regulations

Section 217 of the Constitution is the cornerstone on which the SCM requirements contained in the PFMA are based (Constitution, 1996:127). The enabling section of the Public Finance Management Act (Act No 1 of 1999) (PFMA) that underpins SCM is encapsulated in section 217 of the Constitution (Pooe, Mafini & Makhubele, 2015).

The PFMA was promulgated to regulate financial management in the public sector, and to provide leadership for persons entrusted with financial management responsibilities. The PFMA provides Accounting Officers/Authorities with considerable independence and specific responsibilities (Moeti, 2014:45). The PFMA requires accounting officers/authorities to emphasise management principles, and it places less emphasis on following a set of rules to achieve results (Shafritz *et al.*, 2015:474). Therefore, the public sector must ensure they receive value for money when procuring goods and services regarding quality, timing and price (Pooe *et al.*, 2015).

3.5.3 Preferential Procurement Policy Framework Act and regulations

According to section 217(3) of the Constitution, "there should be a policy framework that provides for preferences in the allocation of contracts and protects the advancement of persons or categories of people previously disadvantaged as the result of unfair discrimination" (Shafritz *et al.*, 2015:474). The purpose of the Preferential Procurement Policy Framework Act (Act No. 5 of 2000) (PPPFA), and its associated regulations, 2011 and 2017, are "to enhance the participation of black

people and SMME in the public sector procurement system" (Shafritz *et al.*, 2015: 474).

National Treasury developed the regulations contained in the PPPFR of 2011 according to section 217(3) of the Constitution, as published under Government Notice R502 of 06 June 2011 (National Treasury, 2011). This was subsequently replaced by the PPPFR of 2017 (Ambe, 2016).

This section related to Research question 2, namely, do demand management processes comply with supply chain prescripts. Section C of the questionnaire consisted of 11 statements relating to SCM policies and regulations.

3.6 ALIGNMENT BETWEEN DEMAND PLANNING, STRATEGIC OBJECTIVES AND BUDGETING

Chapter 1 provided an overview of the alignment between demand planning, strategic objectives and budgeting. However, this section provides a detailed discussion of the alignment between demand planning, strategic objectives, and budgeting.

3.6.1 Demand planning

Demand planning estimates customer needs and implements other planning measures (Rexhausen *et al.*, 2012:269). Companies use different demand management approaches to make sound decisions to alleviate improper demand planning practices (Bowersox *et al.*, 2013:139).

Public sector entities must compile annual demand plans aligned to the strategic plan (Eyaa & Ntayi, 2010:83). Every year, demand management practitioners must request end-users to prepare demand plans that articulate the financial year's departmental requirements, the budgeted amounts for each provision, and possible delivery dates. The compilation of the demand plans requires inputs from finance, end-users, and the demand management function.

The demand plan should describe the goods, works or services (Gauteng Provincial Government, 2020/21:12). The purpose is to align demand plans with the institution's strategic objectives and priorities. Therefore, the relevant public sector's institutional strategy must focus on meeting the business needs to ultimately be able to provide

effective services to communities. The strategic objectives must inform the demand plans of the institution (Burt *et al.*, 2010:21).

Every public sector entity should compile demand plans, and ideally, every programme manager should compile one for that specific commodity. In an ideal scenario, the demand plan will form the basis of budget allocation, and indicate how the allocated funds will be spent during the financial year (Willy & Njeru, 2014:62). Therefore, the demand plan should be compiled as soon as the allocation of funds is known. If monitored continuously and correctly, the demand plan will assist managers in the financial management of their responsibilities. Demand plans can also determine priorities, thereby ensuring that funds are spent to optimise service delivery.

The public sector must ensure that their entities have a demand plan, and develop strategies to realise the plan (Eyaa & Ntayi, 2010:83). Demand plans must align with a procuring entity's strategic plan and appropriation and be adequately costed, and budgeted for.

3.6.2 Strategic objectives

In Section 1.2.3 an outline on how demand plans are linked to the strategic objectives was provided, the next section discusses strategic planning and strategic objectives.

The correct implementation of demand management entails different stakeholders participating in the strategic planning processes of a government institution to ensure that the products needed are budgeted for and approved by authorities in the strategic planning session (Eyaa & Ntayi, 2010:83).

The various activities to be executed during the financial year must be identified during the strategic planning process, such as human resources, goods, works and services (Naidoo, 2016:20). The estimated costs of the required resources are essential, as these resources must be included in the institution's budget. Demand planning should be coordinated by demand management practitioners in consultation with end-users. Demand plans must consist of a detailed list of the goods, works or services required, such as what should be executed, how quickly and with what materials, resources, equipment, and so forth (National Treasury, 2011:2).

Managers must understand and utilise sound techniques to help them plan, implement and control activities. The strategic plan must analyse the utilisation of resources for

its desired obligation (Gauteng Provincial Government, 2020/21:12). The analysis should include a detailed explanation of the goods, works and services required, such as how much can get accomplished, how quickly, and with what materials and equipment, and so forth (Tshamaano, 2012:15). As the demand management function primarily links the demand plan to an institution's strategic plan and objectives, an in-depth understanding of the concept of strategic planning is essential.

Strategic management is the planning, implementation and evaluation of specific actions in assisting public sector entities to achieve their set goals and objectives (Ambe & Badenhorst-Weiss, 2012a:251). The strategic plan begins with the formulation of a vision and mission for the institution, converting these into measurable objectives that the institution will attempt to achieve, and finally, the development of strategies (course of action) to address such (Gauteng Provincial Government, 2020/21:12). In general, a strategic plan will comprise of the following elements:

- The vision – **WHERE**
- The mission and purpose – **WHY**
- The goals, objectives and activities – **WHAT**
- The method – **HOW**
- The timeframe – **WHEN**

Table 3.8 below outlines the different levels of planning.

Table 3.8: Different levels of planning

TOP MANAGEMENT Vision, mission and long-term objectives	Long-term or strategic planning
SUPPLY CHAIN MANAGEMENT Integrated objectives	Medium-term or integrated functional planning
COST CENTRE MANAGEMENT/ PROGRAMME MANAGEMENT Operational objectives	Short-term or tactical planning

Source: Adapted from NSG (2017:19)

The strategic planning process within government is complex. The strategic plan addresses economic and socio-political issues, and usually ends in a trade-off between the two. An institution must convert its reason for existing and values into

actions. The Accounting Officer/Authority is responsible for preparing strategic plans, which must be tabled in Parliament during February/March after the Minister of Finance has tabled the annual budget in Parliament. Figure 3.3 below outlines the elements of a strategic plan.

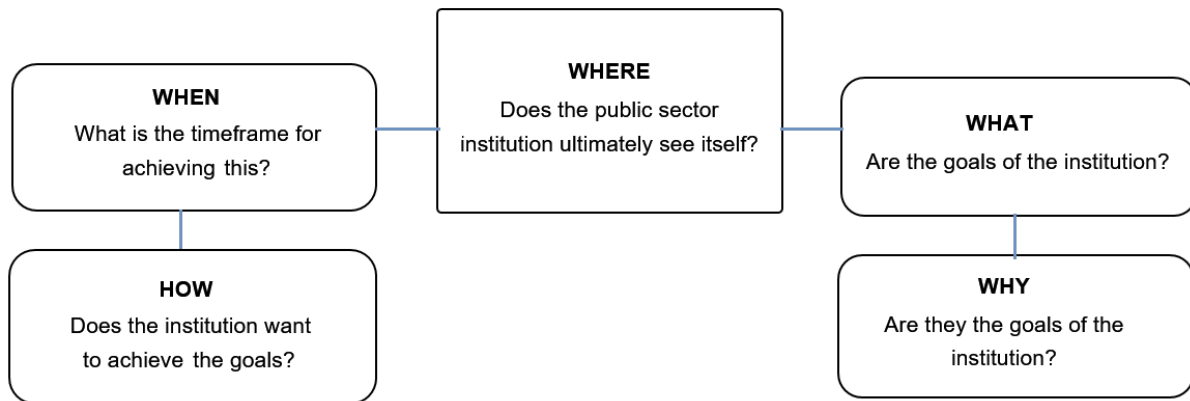


Figure 3.3: Elements of a strategic plan

Source: Researcher's own construct

3.6.3 Budgeting

To ensure that priorities and key government objectives are budgeted for and attained, demand plans must be linked to public sector institutions mandates and budgets. However, at the time of the current study, there was a low level of integration and collaboration between the budgeting principles and strategic planning principles in public sector institutions in South Africa (Rugman & Eden, 2017).

There must be a link between budgets and demand plans, thereby ensuring that service delivery mandates are reflected in the programmes and sub-programmes of every government institution (Setino, 2018). Long-term and medium-term service delivery targets should be incorporated into the budget allocations and strategic priorities to ensure that the activities of each government institution correlate and have continuity to avoid changing strategic goals from one year to another.

To successfully implement demand management to improve operational public procurement effectiveness, a collaboration between procurement plans, strategic plans, and budget allocation is paramount. Therefore, to ensure that priorities and key government objectives are budgeted and attained, the budget plans must be linked to the government institution's mandate and strategic plans to avoid irregular expenditure.

When the demand plan is linked to the budget, the following aspects should be considered: depreciation of the rand; contingency costs; improved technology; manufacturers' costs; past expenditure trends; planned future expenditure; processes in place, and so forth (Kiage, 2013:66). Once the public sector entity has done the needs analysis, their requirements should be prioritised in terms of the envisaged funds expected to be received through the financial budgetary system as part of the strategic planning (Ambe & Badenhorst-Weiss, 2012a:251).

The same prioritisation should be done generally after the financial year's budget allocations. The practice has shown that institutions are rarely allocated the funds that were budgeted for. In such cases, all the projects and procurement should be reevaluated to fit the budget allocation. Due to the said budget constraints, departments/entities might opt to search for alternative ways to satisfy their needs, provided that it is cost-effective (Ambe & Badenhorst-Weiss, 2012a:251). In this regard, alternatives should be considered, especially where the requirement is high tech and expensive, as the depreciation rate will render the items obsolete within a brief period. Alternatives include leasing equipment, renting equipment, borrowing equipment, part ownership of the equipment, and sharing equipment (Willy & Njeru, 2014:62).

Great care and accuracy should be taken when compiling the estimates/budget. Accounting officers/authorities must ensure proper and careful selection of goods and services required within the ambit of their available budget (Rugman & Eden, 2017). The needs requirements must be satisfied to the best advantage of the state in pursuit of an accounting officer's/authority's budget programme objectives. Before embarking on the acquisition of goods or services, it must be ensured that the requirements were budgeted for, and that funds are available and approved to cover the expenditure. Any contemplated acquisition, irrespective of whether the item is obtainable on an existing contract or not, is referred to the relevant programme manager for consideration and approval (Rugman & Eden, 2017).

This section related to Research question 3, namely, to what extent is demand management aligned with public sector strategic objectives and budgeting. Section D of the questionnaire consisted 14 statements relating to the alignment between demand planning, strategic objectives and budget.

3.7 MECHANISMS NECESSARY FOR THE EFFECTIVE IMPLEMENTATION OF DEMAND MANAGEMENT

In Chapter 1 the mechanisms necessary for the effective implementation of demand management were discussed, this section provides a detailed discussion of the mechanisms necessary for the effective implementation of demand management.

Demand management practitioners play a significant role in implementing demand management. SCM officials need to know how to manage SCM functions and processes, such as demand management. Demand management practitioners must understand the institution's goals and strategies in the public sector and possess particular demand management skills.

According to Masete and Mafini (2018:3), the mechanisms necessary for the efficient implementation of demand management include a complete set of human skills, equipment, procedures, rules and regulation, which work in harmony to achieve a set of pre-determined goals. A generic model for capacity building for public sector organisation is generally used to determine capacity. The variables of this model are (1) mission statement, (2) goals and objectives, (3) organisational structure, (4) human resource management system comprising: (i) recruitment, (ii) training, (iii) performance evaluation, (iv) professional skill development and (v) incentives.

This section of the chapter was very relevant to this study as it outlined the mechanisms necessary for the efficient implementation of demand management. A questionnaire was compiled to answer research question 4, namely, what mechanisms are necessary for efficient implementation of demand management. Section E of the questionnaire consisted of 5 statements relating to mechanisms necessary for efficient implementation of demand management.

3.8 CHALLENGES IN IMPLEMENTING DEMAND MANAGEMENT IN THE SOUTH AFRICAN PUBLIC SECTOR

This section discusses the challenges experienced in implementing demand management in the South African public sector.

Since the inception of demand management in the South African public sector, various studies have been carried out to evaluate the challenges experienced in implementing

demand management within public sector institutions. Researchers, such as Migiro and Ambe (2008), Ambe (2009, 2016), Ambe and Badenhorst-Weiss (2012), Nzau and Njeru (2014), Odero and Ayub (2017), Omanji and Moronge (2018), Setino (2018), and Ezeanyim *et al.* (2020), have done extensive research and contributed to the literature on the challenges experienced in implementing demand management. Table 3.9 below represents some of the studies conducted on demand management challenges in the public sector in South Africa.

Table 3.9: Studies on demand management in the South African public sector

Author	Description of study
Ambe and Badenhorst-Weiss (2012)	Procurement challenges in the South African public sector.
Migiro and Ambe (2008)	A case study of the central district municipality, North West Province, South Africa.
Ambe (2016)	Public procurement trends and developments in South Africa.
Ambe (2009)	An exploration of supply chain management practices in the central district municipality.
Setino (2018)	Alignment of supply chain management practices with policies and regulations in state-owned entities in South Africa.

Source: Researcher's own compilation

In the sections below the challenges in implementing demand management are discussed.

3.8.1 Lack of organisational structure

Callender and Grasman (2010:12-19) maintained that a lack of an SCM organisational structure incorporating demand management is a significant challenge in implementing demand management. Even though the SCM system may contain excellent people, competency assessments show considerable gaps in the skills, knowledge, and experience, particularly in terms of demand management (National Treasury, 2015:52).

Research has shown that the quality of demand management practitioners' skills, knowledge and experience are well below standard (Ambe & Badenhorst-Weiss, 2012a:251). Sikhosana (2014:24) identified that a lack of senior management backing

in implementing the SCM business model is a challenge to the implementation of demand management. Due to inappropriate organisational structures, public sector entities have failed to successfully implement demand management (Ambe, 2016). Although the element of demand management has been implemented in most public sector entities, it is far from satisfactory (Ambe, 2009:434).

3.8.2 Non-implementation of demand management practices

Public sector entities have not successfully implemented demand management practices (Ambe & Badenhorst-Weiss, 2012b:11011). Similarly, Migiro and Ambe (2008: 231) found that public sector entities have not successfully implemented demand management practices. In the "2015 Public Sector SCM Review", the Director-General of National Treasury, Mr Lunga Fuzile, highlighted that the implementation of consistent demand management practices across all spheres of government was all but satisfactory. In some instances, demand management practices have been implemented in the public sector, but it is far from adequate (Ambe, 2009:434).

Omanji and Moronge (2018) studied the influence of demand management practices on the performance of public sector entities. The study established that poor demand practices influenced 77.1% of the performance of public sector entities. Odero and Ayub (2017) investigated the effect of demand practices on procurement performance of public sector entities. The study's findings revealed that poor demand planning hindered the procurement performance of public sector entities. There is a lack of a needs analysis, and current and future needs are not incorporated in the demand plan (Matloko, 2021). Ambe (2016) ultimately described the poor links between the needs analysis, demand planning, and budget.

3.8.3 Overspending on budget

To ensure that priorities and key government objectives are budgeted for and attained, the demand plans must be linked to government entities' mandates and budgets to avoid fruitless and wasteful expenditure. The majority of public sector entities are performing poorly, which has led to increased expenditure and overspending on the budgets of public sector institutions (Ezeanyim *et al.*, 2020:129). Meanwhile, public sector entities experience challenges in obtaining enough funding (Ambe & Badenhorst-Weiss, 2012a:251). However, the 2015 public sector SCM review

identified that items were procured that were not budgeted for (National Treasury, 2015:17).

3.8.4 Poor alignment between demand planning and strategic planning

According to Rexhausen *et al.* (2012:269), demand planning can be defined as estimating customer needs and other planning measures and actions that illustrate planning in conjunction with other participants in the value chain. Public sector entities must compile annual demand plans aligned to the strategic plan (Eyaa & Ntayi, 2010:83). Ezeanyim *et al.* (2020) carried out a study on the alignment between demand planning and strategic planning, which found poor alignment between demand planning and strategic planning. Nzau and Njeru (2014) carried out a study on factors affecting the alignment between demand planning and strategic planning. The study found that although departments prepared demand plans, these did not incorporate the activities and resources outlined in the strategic objectives.

Public sector entities experience challenges with regard to the alignment between demand planning, strategic objectives and budget (Ambe & Badenhorst-Weiss, 2012a:251). Similarly, studies have shown that there is inadequate demand planning and alignment between demand planning and strategic objectives within public sector entities (Tsei-Tseimou, 2016). Furthermore, there is improper market analysis and non-compilation of demand plans, resulting in poor demand planning (Maleka, 2016:10). The lack of a committed demand management implementation drive at public sector institutions points to poor alignment between institutional strategies, demand management and demand planning. Public sector entities do not receive value for money (Masete & Mafini, 2018: 8).

3.8.5 Non-compliance with SCM policies and regulations

According to Ambe (2016:288), practitioners are unfamiliar with SCM policies and regulations, resulting in demand management practices not complying with SCM policies and regulations. The lack of proper training for demand management practitioners on SCM policies and regulations is a challenge. Poor communication of SCM policies and regulations is one of the challenges facing the smooth implementation of demand management (Ameyaw, Mensah & Osei-Tutu, 2012). In the 2017/18 financial year Audit Report (2018:19), the Auditor General stated that irregular expenditure levels were high as a result of poor demand management

practices, and accounting officers did refer such cases to the internal control unit to investigate the irregular expenditure to determine if anyone was liable for the spending.

According to Ezeanyim *et al.* (2020:129), most demand management units are performing poorly due to non-compliance with the SCM policies and regulations, resulting in fraud and corruption, increased irregular expenditure, increased fruitless and wasteful expenditure, and high public sector entities operational costs. There is non-compliance of demand management practices with supply chain prescripts (Aku Kokor, 2014:20).

3.8.6 Poor compilation of specifications and terms of reference

The 2015 Public Sector SCM review identified that public sector entities experience challenges in compiling unbiased specifications (National Treasury, 2015:17). Bizana *et al.* (2015:679) agreed that public sector entities experience challenges with regard to compiling complete and adequate specifications.

Obtaining and understanding the challenges impacting the implementation of demand management in the South African public sector was relevant and applicable to this field of study. The study aims to improve demand management processes in the South African public sector. A questionnaire was compiled to answer Research question 5, namely, what challenges are experienced in implementing demand management. Section F of the questionnaire consisted of six statements relating to the challenges encountered in implementing demand management in the South African public sector.

3.9 CONCLUSION

Demand management assists the public sector entities to carrying out their mandate of providing service delivery to the citizens of South Africa by ensuring that the resources required in supporting the strategic and operational commitments of the department are delivered at the right time, at the right price and the right location, and that the quantity and quality satisfy the requirements of the healthcare facilities. Despite the progress made thus far, several gaps persist in fully implementing demand management within the various public healthcare facilities.

The next chapter outlines the instruments necessary to develop a demand management framework.

CHAPTER 4: INSTRUMENTS FOR DEVELOPING A DEMAND MANAGEMENT FRAMEWORK

4.1 INTRODUCTION

In Chapters 2 and 3, the critical analysis of the literature related to this research study revealed a gap of improving demand management in the public sector in South Africa. This resulted in the formulation of the research problem and questions, the objectives and identified the instruments for developing a demand management framework for the current study.

Chapter 4 discusses the instruments for developing a demand management framework. Firstly, demand management frameworks are reviewed. Secondly, the chapter outlines the benchmarking of demand management in the public sector. Thirdly, the chapter identifies instruments for developing a demand management framework in the public sector. The chapter concludes by providing a summary of the instruments necessary to develop a demand management framework for improving demand management processes in the public sector in South Africa.

4.2 REVIEW OF DEMAND MANAGEMENT FRAMEWORKS

This section analyses various demand management frameworks in the literature study to gain an understanding of the common trends, similarities, differences and how these can be utilised in developing a demand management framework for the current study. The sections below review existing demand management frameworks considered in developing a demand management framework for this study.

4.2.1 Hierarchical demand planning approach

The Hierarchical Demand Planning Approach (HDPA) was examined to understand demand planning. The HDPA is based on the assumption that independence exists amongst variables, allowing for the separation of demand plans and data (Nielsen & Steger-Jensen, 2008:57). The scholars, Hax and Meal (1975:75) who first presented the HDPA in 1975, based it on the assumption that the market only considers the perspective of manufacturing and planning. The HDPA provided a simple algorithm to

produce plans through different steps, starting with an aggregate plan (Mtshali, 2017:15-17).

Critique of the hierarchical demand planning approach

According to the HDP, all the variables related to planning are interdependent, whilst marketing only considers manufacturing and planning. These assumptions no longer exist in the current complex world of buyer and supplier relationships (Nielsen & Steger-Jensen, 2008:2).

The HDP includes several planning levels that are dependent on the utilisation of demand plans (Bitran, Haas & Hax, 1982:237). The disadvantage is that several planning stages could exist (Bitran *et al.*, 1982:237; Hax & Meal, 1975:80). The HDP is based on the assumption that plans could be separated within the boundaries of an organisation without any interference (Nielsen & Steger-Jensen, 2008:59). Currently, organisations are faced with complex interactions across several levels within the company's boundaries and within the supply network (Mtshali, 2017:15-17).

The HDP underestimates the need to combine plans across business units (Forrester, 1958:38). Figure 4.1 illustrates significant gaps in the HDP. The left area shows the dynamic external context and the demand planning system. On the right-hand side, the hierarchy approach to demand planning delivers multiple plans in various control areas (Mtshali, 2017:15-17).

The hierarchical approach is simple, while the external context is multifaceted. When applying the hierarchical system in a complex environment, an organisation could experience poor performance (Mtshali, 2017:15-17). The main focus is on achieving only one particular outcome (Moon, Mentzer & Smith, 2003). A broader perspective on (1) the performance of an organisation, and (2) the design of a demand planning system must be achieved.

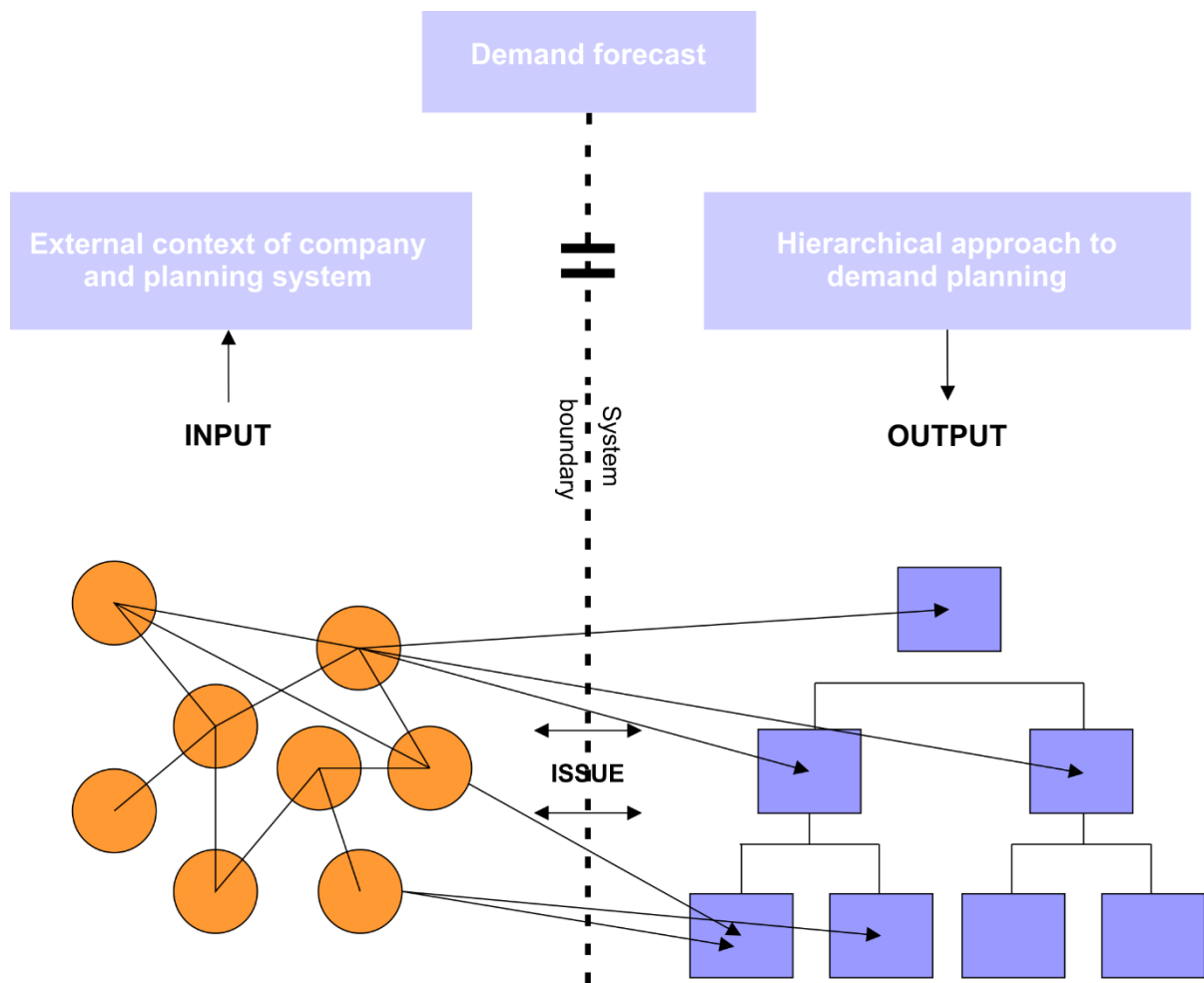


Figure 4.1: Hierarchical demand planning approach

Source: Nielsen & Steger-Jensen (2008)

4.2.2 Holistic demand planning framework

The Holistic Demand Planning Framework (HDPF) was examined to enable a deeper insight into demand planning. The HDPF was developed from the HDPA due to the limitations of the HDPA, as identified by scholars such as Nielsen and Steger-Jensen (2008), Folan and Browne (2005) and Lapide (2000). The HDPF was further developed by Nielsen and Steger-Jensen (2008) to adapt demand plans to multiple perspectives. These authors identified that a demand planning system's success depends on a match between various systems.

Demand planning must be coordinated by relevant stakeholders who consider the external context, including various objectives (Nielsen & Steger-Jensen, 2008:6). According to Nielsen and Steger-Jensen (2008:6), key performance indicators (KPIs) must be utilised to evaluate the performance of the planning process (forecast error,

inventory turnover, total production lead time and rescheduling frequency). KPIs should only be used to identify the level of performance, as the factors influencing these KPIs are omitted.

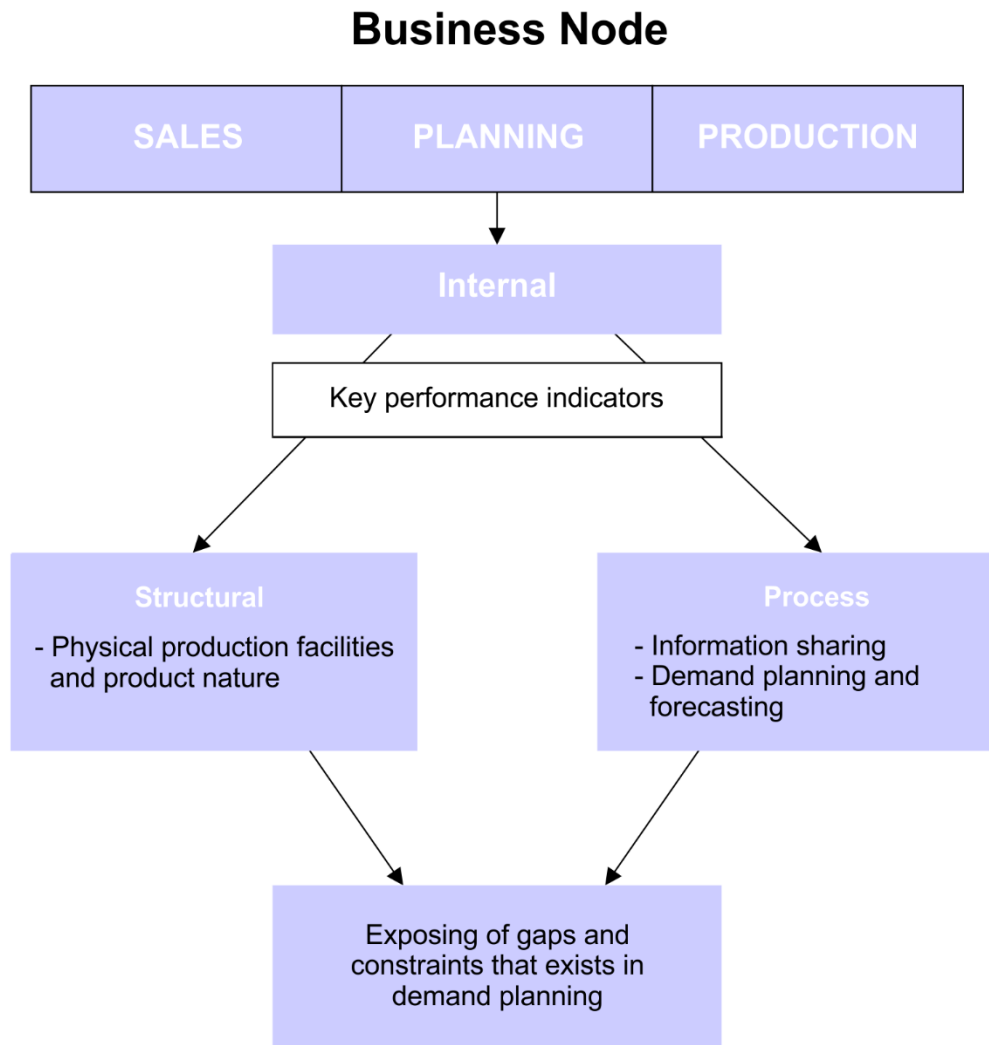


Figure 4.2: Holistic demand planning framework

Source: Nielsen & Steger-Jensen (2008)

4.2.3 Collaborative, planning, forecasting and replenishment model

The Collaborative Planning, Forecasting and Replenishment (CPFR) model was examined to gain a deeper insight into demand management. The CPFR is described as a web-based format that coordinates the various activities between production and purchases planning, demand forecasting, and inventory replenishment (Attran & Attran, 2007: 396).

Figure 4.3 illustrates the position of demand management within the CPFR model.

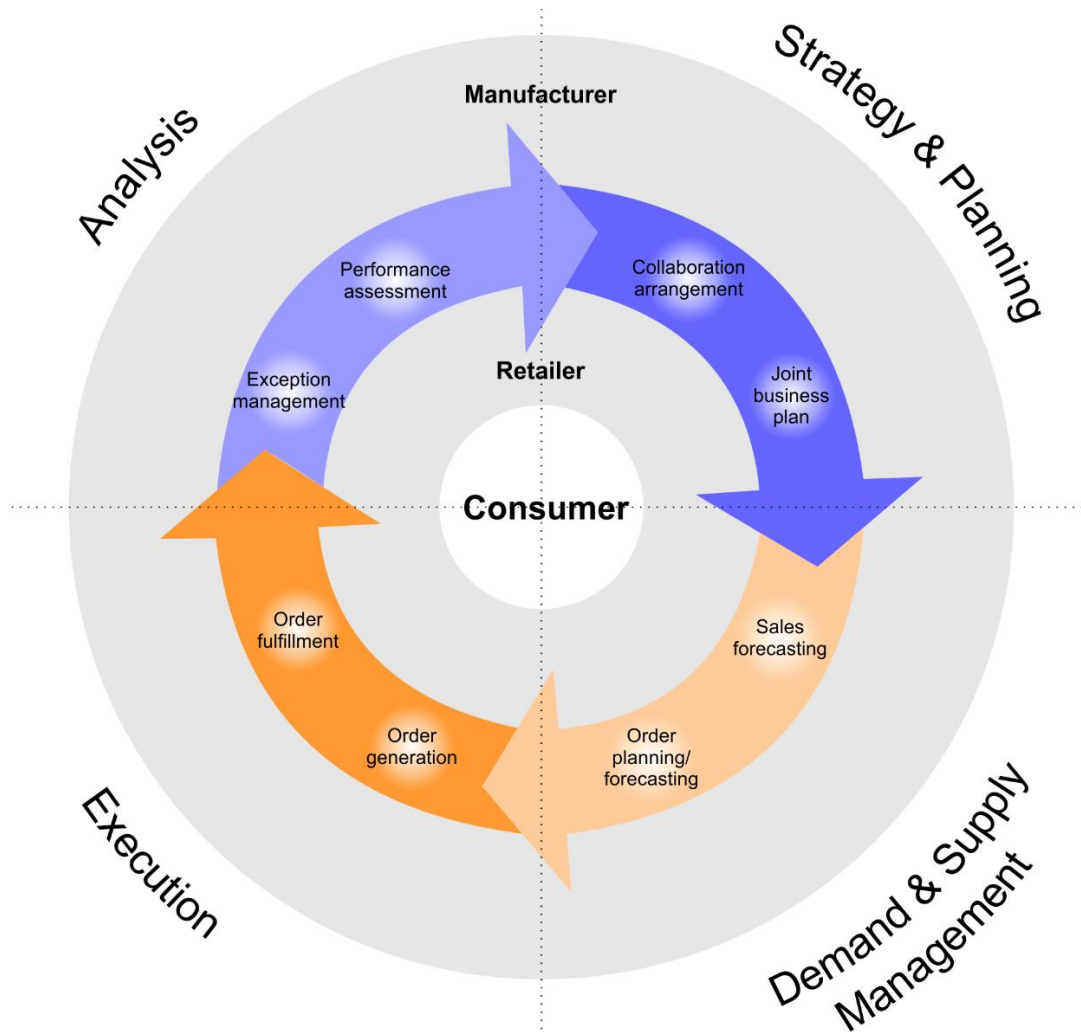


Figure 4.3: CPFR Model

Source: Attran & Attran (2007:396).

The CPFR process is divided into four phases. Phase 1 involves a collaborative agreement and a joint business plan between the organisation, supplier and customer. Phase 2 consists of the creation of sales forecasts and planning forecasts. In Phase 3, the order is generated, and the products are shipped, received and stocked on retail shelves. In Phase 4, trading partners can share insights and adjust strategies to improve planning and execution performance going forward (Attran & Attran, 2007:396).

The CPFR model is relevant to the current study as the model includes Phase 1, strategic and planning and Phase 2, demand and supply management, which involves the development of a strategic plan and order planning and forecasting. The CPFR authenticated the possibility of aligning strategy with demand planning.

4.2.4 Summary of demand management frameworks

The first framework that was analysed was the HDP. The HDP was founded on the assumption that independence exists amongst variables, which allows for the separation of demand plans and data. The HDP was based on the belief that the market is simple, and only considers the perspective of manufacturing and planning. These assumptions are no longer applicable where complex buyer and supplier relationships exist.

The second framework that was analysed was the HDPF. The HDPF proposes that demand planning systems succeed when there is a match between planning systems. The demand planning process should be coordinated by identifying several stakeholders, considering the external environment, and various other objectives.

The third framework that was analysed was the CPFR. The CPFR revealed that the SCM process is divided into four phases: strategy and planning, demand and supply management, execution and analysis. The framework analysed the coordination between production and purchase planning, demand forecasting, and inventory replenishment. The framework authenticated the possibility of aligning strategy with demand planning.

The analysis of the three demand management frameworks established that not one of them addresses all three the constructs that are being considered for this study, namely, critical demand practices, compliance to supply chain prescripts, and aligning demand planning with strategic objectives and budgeting. The literature study revealed that there was no demand management framework tailored to align the three constructs can be found in the South African public sector.

The intention of the study is to develop a demand management framework for the implementation of demand management practices, in ensuring compliance of demand management practices to SCM policies and regulations, and aligning demand planning, to strategic objectives and budgeting to enhance performance in the South African public sector. In developing the framework, the study will consider various aspects from the HDPF and CPFR in conceptualising the demand management framework.

4.3 BENCHMARKING DEMAND MANAGEMENT IN THE PUBLIC SECTOR

This section reviews demands management systems in selected countries, namely, Ethiopia, Germany, Uganda, Zimbabwe and Kenya in an effort to determine the best practice internationally and to benchmark the demand management model being developed against them.

4.3.1 Demand management in Ethiopia

Demand management in Ethiopia begins with the identification of needs. Pursuant, proclamation article 61.2 (a) and Article 27.3(a) of directive Federal Public Procurement Property Administration Agency (FPPAA) has mandated all public bodies to identify everyday user items, compile lists of such things and communicate these lists of items to the Public Procurement and Property Disposal Services (PPPDS), including all public bodies (Tadesse, 2017:55). Based on the contents of the list of items, public bodies are required to submit their annual procurement requirements to the PPPDS. The PPPDS prepares a consolidated procurement plan based on the needs of various public bodies, and forwards the consolidated procurement plan to the FPPAA (Tadesse, 2017:55).

Procurement planning starts once all public bodies' needs have been received and compared to the approved budget. In aligning the procurement plans with the budget, each public body must submit a detailed list of all items to be procured together with the expenditure budget codes. After a complete reconciliation between the detailed lists of goods and services and the budget, the procurement plan is prepared and submitted to the procurement endorsing committee for approval (Tadesse, 2017:55). Once the procurement plan is approved by the procurement endorsing committee, the procurement plan is sent to the FPPAA and PPPDS. The PPPDS handles items identified as common user items, while the balance of the goods and services is controlled by the procurement unit of the various public bodies. Approved specifications are used for everyday user items (Tadesse, 2017:55).

4.3.2 Demand management in Germany

The German public sector SCM starts with the identification of needs. Demand management marks the beginning of the general procurement processes. The method

comprises four sub-processes: demand management, market research, awarding contracts, and execution. Demand management and market research are essential components, as they determine the specific needs in the procurement processes. Market research includes systematic research, collecting, and preparing all current and prospective information connected with the markets (Thai, 2009: 313, 316).

To ensure transparency, all procurement activities are published in public notices. All information relating to procurement is published in newspapers, official bulletins, or journals. Depending on the procurement value, the data is published in the Official Bulletin of the European Union. When using the restricted method of procurement, the buyer must obtain information about suppliers in the market (Muller, 2011:23).

4.3.3 Demand management in Uganda

In the public sector in Uganda, demand planning is regarded as a legal requirement (Ceaser, 2019:16). Public sector entities must prepare procurement plans that are aligned to approved budgets. Public sector entities must begin with procurement at the beginning of each financial year. It is, therefore, not necessary to wait for the release of funds from the Ministry of Finance, Planning and Economic Development (Ceaser, 2019:16). However, public sector entities delay commencing with the procurement process because they are waiting for budget approval, as per the Public Procurement and Disposal of Public Assets Authority (PPDA) annual Procurement and Disposal Audit Report of 2012 (Ceaser, 2019:16).

In public sector entities, demand planning forms part of the traditional planning, which is commonly found in public sector entities. The mandate for compiling demand plans is derived from Regulation 62 of the Local governments (the PPDA of 2006) which requires public entities to prepare annual work plans based on the approved budget (Ceaser, 2019:19). The demand plan should be aligned to the annual expenditure programme to enhance financial predictability, accounting and control over procurement budgets. The consolidated demand plan includes details of activities related to goods, works, and services to be procured; a schedule of procurement requirements; a statement of required resources, including the budget; a plan of the likely method of procurement; and the time needed for each stage in the procurement cycle (Ceaser, 2019:19).

Article 190 of the Ugandan Constitution mandates district councils to prepare comprehensive development plans, including the strategies of lower-level governments for submission to the National Planning Authority. Article 194 of the Constitution mandates the national government to transfer funds to local governments to implement decentralised public services. Demand management is one of the core functions critical for achieving the strategic objective in all local governments (Ceaser, 2019:19).

4.3.4 Demand management in Zimbabwe

The Zimbabwean public sector requires demand planning for the procurement of goods, works and services. Demand planning assists the public entity in deciding what is to be procured, when and how it is to be procured, and it assists in ensuring procurement remains within the allocated budget for the particular financial year. Each public entity's Procurement Management Unit (PMU) leads the demand planning process. It involves inputs from all relevant staff, including the user departments, technical experts and those responsible for budgets (Chimberengwa, Masuka, Gombe, Tshimanga & Bangure, 2015:1). The demand management cycle follows specific steps to identify a need to the final step in awarding the contract.

However, the absence of a budget will not prevent a public entity (PE) from concluding a contract, as long as the purchase orders are created on the date when budgets become available (Zimbabwe Government, 1999). Before commencing procurement processes for awaiting a contract that will commit the public entity to make payments in subsequent financial years, the PE must obtain approval from the Minister responsible for Finance. In such cases, the public entity must ensure that funds are included in budgets for the outer years (Chimberengwa *et al.*, 2015:1).

According to Section 21 of the Public Procurement and Disposal of Public Assets Act (PPDPA), the PE must plan its procurement in ensuring maximum value for money and ensure procurement is carried out within the available budget (Zimbabwe Government, 2002). Before commencing any procurement, the PE must establish if the requirements could be met by transferring goods from one department to another (Chimberengwa *et al.*, 2015:1).

Section 22 of the Act makes it mandatory for a procuring entity to prepare a procurement plan according to a template designed by the Authority (Zimbabwe

Government, 1999). Procurement plans must be published on the Procurement Regulatory Authority of Zimbabwe (PRAZ) website. In terms of section 22, procuring entities must prepare procurement plans for each procurement above US\$50 000.00.

Section 7 of the PPDPA regulations states that annual procurement plans must contain a detailed breakdown of the procurement requirement (Chimberengwa *et al.*, 2015:1). Section 94 sub-section 4 of the regulations states that a PE engaging in procurement proceedings that are not specified in the annual procurement plan are guilty of an offence (Zimbabwe Government, 1999).

4.3.5 Demand management in Kenya

The Public Procurement Oversight Authority (PPOA) of Kenya was given the mandate to guide the execution of the provisions by all PEs throughout the country (Manyathi, 2019:44). The PPOA is further responsible for preparing and distributing manuals, circulars, directives, tender documents, advising procuring practitioners and compiling procurement policies. The PPOA was also mandated to train all public sector procurement practitioners (Omanji & Moronge, 2018).

Kenya's Public Procurement and Disposal Regulations of 2016 provide details on the public procurement processes which govern public sector procurement. The above legislation requires all PEs to comply when planning procurement activities, contract management, inventory management and budgeting (Manyathi, 2019:44).

TOR and specifications may not be compiled in a biased manner to favour specific bidders. Successful procuring of goods, works or services depends on the correct drafting of specifications and TOR to ensure prospective bidders understand user requirements. Requirements and TOR must be drafted by experienced officials and assisted by officials from the procurement unit. Specifications and TOR must be appropriately drafted, which incorporates the total cost of ownership (Manyathi, 2019:44).

4.3.6 Summary of key demand management practices discussed

Table 4.1 below summarises key demand management practices from the various countries.

Table 4.1: Key demand management practices from the various countries

Country	Demand management practice
Ethiopia	<ul style="list-style-type: none">▪ Identification of needs▪ Compilation of annual procurement plan.▪ Procurement plan aligned and approved according to budget
Germany	<ul style="list-style-type: none">▪ Identification of needs▪ Demand plans compiled▪ Market research conducted
Uganda	<ul style="list-style-type: none">▪ Compilation of annual procurement plan aligned to budget▪ Development plans compiled
Zimbabwe	<ul style="list-style-type: none">▪ Identification of needs▪ Procurement plans compiled aligned to budget
Kenya	<ul style="list-style-type: none">▪ Identification of needs▪ Procurement plan compiled aligned to budget▪ Compilation of complete, accurate and unbiased specifications

Source: Researcher's own compilation

4.4 INSTRUMENTS FOR THE DEVELOPMENT OF A DEMAND MANAGEMENT FRAMEWORK IN THE HEALTH SECTOR

This section presents the instruments that are vital for the development of a demand management framework.

4.4.1 Understanding essential demand management practices

The literature review identified six common demand management practices, namely, needs analysis, expenditure analysis, commodity analysis, market analysis, industry analysis, and supplier analysis. All conditions must support the public sector entities' strategic objectives, and all resources must be identified (Ambe, 2009:429).

An analysis of previous expenditure will assist the demand planning process in understanding the past, current and future requirements (Burt *et al.* 2010:21). A commodity analysis identifies the goods, works and services available in the market to satisfy the identified need (Bailey *et al.*, 2015:201). A market analysis is performed to ascertain the goods, works, and services being procured, and an industry analysis assists in identifying methods of implementing sourcing strategies (National Treasury, 2017:53).

Table 4.2 provides a summary of demand management practices.

Table 4.2: Summary of demand management practices

Practices	Descriptions	Sources
Demand management Considerations	<ul style="list-style-type: none"> ▪ Understanding end users' specific requirements. ▪ Analysis of Basic Accounting System (BAS) reports weekly. ▪ Analysis of Systems Applications and Products in Data Processing (SAP) reports daily. ▪ Implementation of effective sourcing strategies. ▪ Identification of suppliers for sub-contracting opportunities. ▪ Analysis of suppliers' cost structures. ▪ Quarterly consulting with contracted suppliers. 	<p>Ambe, 2009:429 Burt <i>et al.</i>, 2010:21 Bailey <i>et al.</i>, 2015:201 National Treasury, 2017:53 Van Weele, 2010:34 Sollish <i>et al.</i>, 2012:29 Gauteng Provincial Government, 2018:12 Ambe, 2012:251</p>
Specifications and terms of reference (TOR)	<ul style="list-style-type: none"> ▪ Compilation of specifications according to the Specific, Measurable, Achievable, Realistic, Timely (SMART) principle. ▪ Compilation of term of reference (TOR) according to the Specific, Measurable, Achievable, Realistic, Timely (SMART) principle. ▪ Specifications drafted in an unbiased manner. ▪ BSC members appointed by Head of Department (HOD). ▪ BSC members attend meetings regularly. ▪ Specifications include acceptable standards. ▪ Fruitless and wasteful expenditure reported to Loss Control unit. ▪ Irregular spending reported to the Loss control unit. 	<p>Swink, 2011:358 National Treasury, 2017:58 Ambe, 2011:81</p>
Role players	<ul style="list-style-type: none"> ▪ Head of Department (HOD) approves contracts above R1million. ▪ Chief Financial Officer (CFO) is appointed as the chairperson of Bid Adjudication Committee (BAC). ▪ Cost centre managers approve all procurement requests. ▪ Demand plan utilised for procurement of all goods, works and services. 	

Practices	Descriptions	Sources
	<ul style="list-style-type: none"> ▪ Only goods listed on demand plans are procured. ▪ Bid Specification Committee (BSC) compile evaluation criteria. ▪ Bid Evaluation Committee (BEC) evaluated bids according to pre-determined criteria. ▪ Bid Adjudication Committee (BAC) members are conversant with Supply Chain Management (SCM) prescripts. 	

Source: Researcher's own compilation

It is vital to identify suppliers that will support the needs of the public sector entity (Van Weele, 2016:34).

Specifications are compiled, describing specific user requirements to avoid unclear and ambiguous descriptions (Sollish & Semanik, 2012:29). TORs are collected to inform suppliers of the particular need of the public-sector entity (Gauteng Provincial Government, 2020:19). According to the Gauteng Provincial Government (2020:12), the following are vital role players in the demand management process: accounting officer/authority, CFO, cost centre managers, end-users, suppliers and demand management practitioners.

4.4.2 Compliance of demand management practices to SCM policies and regulations

The literature review revealed that demand management in the South African public sector operates within a regulatory framework governed by the Constitution of the Republic of South Africa Act 108 of 1996, and which includes several SCM policies and regulations (Ambe, 2016:279). More than 80 different pieces of legislation govern SCM and demand management in the South African public sector. The Constitution prescribes that "when an organ of the state procures goods, works and services, it must be done according to a fair, equitable, transparent, competitive and cost-effective" (Mnguni, 2012:31).

The SCM requirements contained in the PFMA are based on Section 217 of the Constitution (Naidoo, 2019). The PFMA aims to control financial management and outlines the responsibilities of government officials who are entrusted with financial management. The PFMA mandates accounting authorities to ensure more significant

emphasis on management principles, while placing less emphasis on merely following a set of rules (Naidoo, 2019).

Section 217(3) of the Constitution stipulates that "there should be a policy framework that provides for categories of preference in awarding contracts and protects the advancement of persons or categories of people previously disadvantaged as the result of unfair discrimination" (Setino, 2018). The purpose of the PPPFA, No. 5 of 2000 (South Africa, 2000) and its associated regulations, are "to enhance the participation of historically disadvantaged individuals and SMME's in the public sector procurement system".

Table 4.3 presents a summary of demand management practices' compliance, as discussed in this section.

Table 4.3: Summary of compliance of demand management practices with SCM policies and regulations

Prescripts	Descriptions	Sources
The Constitution	<ul style="list-style-type: none"> ▪ Procurement is conducted in a fair manner. ▪ Procurement opportunities are provided to previously disadvantaged individuals. ▪ Tenders advertised on the National Treasury eTender portal. ▪ Bids are requested from suitably qualified suppliers. ▪ Prices are negotiated with prospective suppliers. 	<p>Owuth & Mwangangi, 2015:20</p> <p>Tshamaano, 2012:10</p> <p>Khandija & Kibert, 2015:128</p> <p>Mauki, 2014:9</p> <p>Khadija & Kibert, 2015:128</p>
PFMA	<ul style="list-style-type: none"> ▪ The Supply Chain Management (SCM) unit reports to the Chief Financial Officer (CFO). ▪ Prospective bidders complete standard bid document (SBD) forms. ▪ Evaluation criteria are stipulated in bid documents. 	
PPPFA	<ul style="list-style-type: none"> ▪ 80/20 price point up to R50 million. ▪ 90/10 price point system more than R50 million. ▪ Sub-contracting a pre-requisite above R30 million. 	

Source: Researcher's own compilation

4.4.3 Alignment between demand planning, strategic objectives and budgeting

Public sector entities must compile demand and procurement plans that must be aligned to the strategic objectives (Eyaa & Ntayi, 2010:83).

The relevant stakeholders who participated in the strategic planning sessions must form part of the demand management process to ensure that the required goods, works, and services are sufficiently funded and approved. After participating in the strategic planning sessions, the demand planning stage starts, where procurement plans are compiled in collaboration with relevant stakeholders such as the CFO and user departments (National Treasury, 2011).

In the South African public sector, research has shown that there are low levels of alignment between budgeting principles and strategic planning principles. The Medium-Term Expenditure Framework's (MTEF) budgeting principles cater for short-term public sector goals. In contrast, strategic plans, such as the National Development Plan (NDP), cater for the public sector's long-term goals.

Table 4.4 provides a summary of the alignment factors, as discussed in this section.

Table 4.4: Summary of alignment between demand planning, strategic objectives and budgeting

Practices	Descriptions	Sources
Demand planning	<ul style="list-style-type: none"> ▪ Demand plans include all the requirements for the financial year. ▪ Demand plans approved in line with budget allocations. ▪ Demand plans indicate the full description of goods required. ▪ Demand plans aligned with the institution's strategic objectives. ▪ Procurement plans compiled for requirements above R500 000. 	<p>Rexhausen <i>et al.</i>, 2012:269</p> <p>Eyaa & Ntayi, 2010:83</p> <p>Bowersox <i>et al.</i> 2013:139,</p> <p>Burt <i>et al.</i>, 2010:21</p> <p>Willy & Njeru, 2014:62</p>
Strategic objectives	<ul style="list-style-type: none"> ▪ Strategic objectives focus on the achievement of specific outcomes. ▪ Resources required for the fulfilment of obligations are identified. ▪ The head of Supply Chain Management (SCM) is involved in the strategic planning process. ▪ Strategic objectives are reviewed on an annual basis. 	<p>Setino, 2018</p> <p>Naidoo, 2019</p>

	<ul style="list-style-type: none"> ▪ The Head of Department (HOD) approves the annual performance plan. 	
Budgeting	<ul style="list-style-type: none"> ▪ Demand management practitioners attend budget bilateral meetings. ▪ End-users present detailed budget bids during budget bilateral meetings. ▪ Demand plans are compiled during budget bilateral meetings. ▪ Demand plans approved in line with budget allocations. 	

Source: Researcher's own compilation

4.5 CONCEPTUAL FRAMEWORK

A conceptual framework will be presented for the implementation of demand management practices, compliance with SCM policies and regulations, and the alignment between demand planning, strategic objectives and budget.

The following three constructs were identified: demand management practices, SCM policies and regulations, and alignment between demand planning, strategic objectives and budgeting. According to Kinyua (2011), a conceptual framework illustrates a choice or presents the preferred approach to an idea. Theories are formulated to understand, predict and explain phenomena, and in many cases, to extend and challenge knowledge within the limits of bounding assumptions (Swanson, 2013). A theoretical framework is a structure that supports a theory of a research study (Swanson, 2013).

From the above discussions, an appropriate demand management strategy needs to be chosen to implement demand management properly. Firstly, the South African public sector must ensure that the critical demand management practices such as needs analysis, expenditure analysis, commodity analysis, market analysis, industry analysis and supplier analysis are fully implemented. Secondly, public sector entities must ensure that demand management practices comply with SCM policies and regulations. Thirdly, public sector entities must ensure the alignment between demand planning, strategic objectives and budgeting. This will improve demand management within the South African public sector.

Table 4.5 presents the instruments for developing a demand management framework.

Table 4.5: Instruments for developing a demand management framework

Practices	Descriptions
Demand management practices	
Demand management considerations	<ul style="list-style-type: none"> ▪ Understanding end users' specific requirements. ▪ Analysis of Basic Accounting system (BAS) reports weekly. ▪ Analysis of Systems Applications and Products in Data Processing (SAP) reports daily. ▪ Implementation of effective sourcing strategies. ▪ Identification of suppliers for sub-contracting opportunities. ▪ Analysis of suppliers' cost structures. ▪ Quarterly consulting with contracted suppliers.
Specifications and TOR	<ul style="list-style-type: none"> ▪ Compilation of specifications according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principles. ▪ Compilation of terms of reference (TOR) according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principles. ▪ Specifications drafted in an unbiased manner. ▪ BSC members appointed by Head of Department (HOD). ▪ BSC members attend meetings regularly. ▪ Specifications include acceptable standards. ▪ Fruitless and wasteful expenditure reported to Loss Control unit. ▪ Irregular spending reported to the Loss control unit.
Role players	<ul style="list-style-type: none"> ▪ Head of Department (HOD) approves contracts above R1million. ▪ Chief Financial Officer (CFO) is appointed as the chairperson of Bid Adjudication Committee (BAC). ▪ Cost centre managers approve all procurement requests. ▪ Demand plan utilised for procurement of all goods, works and services. ▪ Only goods listed on demand plans are procured. ▪ Bid Specification Committee (BSC) compile evaluation criteria. ▪ Bid Evaluation Committee (BEC) evaluated bids according to pre-determined criteria. ▪ Bid Adjudication Committee (BAC) members are conversant with Supply Chain Management (SCM) prescripts.
SCM policies and regulations	
The Constitution	<ul style="list-style-type: none"> ▪ Procurement is conducted in a fair manner. ▪ Procurement opportunities are provided to previously disadvantaged individuals. ▪ Tenders advertised on the National Treasury eTender portal. ▪ Bids are requested from suitably qualified suppliers. ▪ Prices are negotiated with prospective suppliers.
PFMA	<ul style="list-style-type: none"> ▪ The Supply Chain Management (SCM) unit reports to the Chief Financial Officer (CFO). ▪ Prospective bidders complete standard bid document (SBD) forms. ▪ Evaluation criteria are stipulated in bid documents.

Practices	Descriptions
PPPFA	<ul style="list-style-type: none"> ▪ The 80/20 point system is used for transactions from R30 000 to R50 million. ▪ The 90/10 point system is used for transactions above R50 million. ▪ Sub-contracting is considered a pre-requisite for transactions above R30 million.
Alignment between demand planning, strategic objectives and budgeting	
Demand planning	<ul style="list-style-type: none"> ▪ Demand plans include all the requirements for the financial year. ▪ Demand plans approved in line with budget allocations. ▪ Demand plans indicate the full description of goods required. ▪ Demand plans aligned with the institution's strategic objectives. ▪ Procurement plans compiled for requirements above R500 000.
Strategic objectives	<ul style="list-style-type: none"> ▪ Strategic objectives focus on the achievement of specific outcomes. ▪ Resources required for the fulfilment of obligations are identified. ▪ The head of Supply Chain Management (SCM) is involved in the strategic planning process. ▪ Strategic objectives are reviewed on an annual basis. ▪ The Head of Department (HOD) approves the annual performance plan.
Budgeting	<ul style="list-style-type: none"> ▪ Demand management practitioners attend budget bilateral meetings. ▪ End-users present detailed budget bids during budget bilateral meetings. ▪ Demand plans compiled during budget bilateral meetings. ▪ Demand plans approved in line with budget allocations.

Source: Researcher's own compilation

Table 4.5 above, presents the instruments that will be utilised in developing a demand management framework to improve demand management processes in the South African public sector.

4.6 CONCLUSION

The chapter presented a review of the literature on demand management frameworks and the benchmarking of demand management in the public sector. The various instruments which were perceived to be vital for the development of a demand management framework in the public sector were presented. The chapter ended by introducing the instruments for developing a demand management framework that defines demand management practices, compliance with SCM policies and regulations, and alignment between demand planning, strategic objectives and

budgeting. The next chapter outlines the research design and methodology employed in the current study.

CHAPTER 5:

RESEARCH DESIGN AND METHODOLOGY

5.1 INTRODUCTION

In Chapters 2 and 3, the critical review of the literature on demand management revealed a gap in the body of knowledge on improving demand management practices in the South African public sector. This resulted in the development of the conceptual framework, and the formulation of the research problem, research questions and the research objectives for the current study.

Chapter 5 presents the design and methodology of the research study. The chapter defines the research design and justification for the selected methods related to the research problem. The chapter provides clear objectives derived from the research questions and specifies the sources from which the data was collected and how the data was collected and analysed. Finally, the chapter concludes with some ethical considerations concerning the research study.

5.2 RESEARCH PHILOSOPHY AND PARADIGMS

A research philosophy is regarded as a systematic prearrangement of assumptions based on beliefs and progression (O'Gorman & MacIntosh, 2015). In the history of research philosophy, several assumptions have been made, such as the epistemological assumptions known as human knowledge; ontological beliefs denoted to the realism encountered by the researcher; and axiological assumptions signified to a magnitude where specific values influenced the research process (Thorne, 2016). These research philosophies are discussed below.

5.2.1 Positivism paradigm

The French philosopher, August Comte, postulated positivism as a pattern that was based on the philosophical ideas that referred to the empiricism of positive knowledge, observation through confirmed and substantiated data with natural phenomena that used scientific methods and their properties. In addition it was related to positive facts, interpreted through reason and logical observation as empirical evidence (Crossman, 2019).

In sociology, there are two basic approaches to research known as positivism, which considers quantitative scientific methods, and interpretivism (discussed in the next section), which considers humanistic qualitative methods.

In positivism research, positivists prefer quantitative methods such as social surveys, structured questionnaires and official statistical analysis to guarantee the reliability and representativeness of the data collected. Furthermore, positivists perceive society according to the notion that social facts shape individual actions, and as such, provide the advantage that quantitative research can be conducted on large-scale surveys to get an overview of a community or population as a whole. It can also uncover social trends, such as the relationship between enterprise application architecture (EAA) and SCM, known as the comparative method (Crossman, 2019). In terms of natural phenomena, the researcher adopted an extreme positivist position, as evident in data collection, where enterprises were treated and managed as physical substances for data collection.

For the purpose of the current study, it is evident that a positivistic approach can lead to an understanding of the human behavioural patterns related to the adoption of EAA for SCM (Crossman, 2019). For credible and meaningful data, epistemologically, the researcher focused on discovering apparent and measurable facts leading to the adoption or rejection of EAA for SCM.

5.2.2 Interpretivism paradigm/Constructivist paradigm

Interpretivism is used to group together some diverse approaches in research that include social constructivism, phenomenology and hermeneutics. The interpretive paradigm is assigned within the structure of the domain for self-sufficient consciousness, which is associated with the philosophical stance of optimism (Kivunja & Kuyini, 2017). Interpretivism emphasises that humans are different from physical singularities and assign their own meaning to any problem (Dudovskiy, 2019).

Interpretivism argues that human beings and their social worlds cannot be studied in the same way as physical phenomena are studied. Social sciences research should be different from natural sciences research, rather than emulate the previous research results. The purpose of interpretivism research is to create new, rich understandings and interpretations of social worlds and contexts (O'Gorman & MacIntosh, 2015). Interpretivism denotes that individuals are sophisticated beings with complex different

personalities and experiences that lead them to experience their subjective reality in very different ways.

5.2.3 Epitome of pragmatism

The epitome of pragmatism is reflected as a general viewpoint that strengthens mixed methods in research through a method such as methodological triangulation to address the problem-oriented philosophy that verifies the research hypotheses (Kivunja & Kuyini, 2017). Pragmatism declares that the research concepts or terminologies are relevant to the study through a thorough understanding of and flow of information that serves as an interpretation of complex terminologies. It attempts to reconcile objectivism and subjectivism with facts and values that accurately understand different contextualised experiences.

5.2.4 Critical realism

Epistemologically, critical realism is regarded as a philosophy of scientific knowledge based on the relations between the concepts and categories in a subject area or domain being grounded in theoretical explanations about the phenomena, and which operates the same way as positivism and interpretivism (Kivunja & Kuyini, 2017).

In the late twentieth century, critical realism was developed as an approach that occupies a middle ground between two positions, such as positivism and interpretivism (Cloud, 2019). Critical realism functions and depends on tangible evidence and the involvement of practices for mastering the fundamental underlying structures of reality that constructed the observed events (Kent & Tsang, 2010). In epistemological relativism, secondary and tertiary information responds to social constructions and phenomena (Sharrock & Button, 2016).

5.2.5 Postmodernism

Postmodernism provides answers to the inquiry that acknowledges that there is a way of rational thinking that provides a voice to alternative views based on language and power relations (Kent & Tsang, 2010). Postmodernism was historically entangled with the intellectual movement of poststructuralism. Postmodernists went even further than interpretivism in their critique of positivism and objectivism, attributing even much more importance to the role of language (Martínez, 2017). In postmodernism, the modern objectivist is rejected based on a realist ontology of things that emphasises the chaotic

primacy resulting from the change, such as in the context of the industrial revolution (O’Gorman & McIntosh, 2015).

5.3 RESEARCH APPROACH

“Research approaches which are mostly used in literature are the inductive, deductive and abductive approaches” (Saunders, Lewis & Thornhill, 2016:143; Bryman, Bell, Hirschsohn, dos Santos, du Toit & Masenge, 2014:9).

“The deductive approach represents a view on the relationship between theory and research and the researcher formulates hypotheses based on what is already known” (Bryman *et al.*, 2014:9).

“The inductive approach begins with specific observations and then develops a conclusion based on the observations” (Saunders *et al.*, 2016:125).

Table 5.1 summarises “deductive, inductive and abduction approaches to research”.

Table 5.1: Major differences between the three main research approaches

	Deduction	Induction	Abduction
“Generalisability”	“Generalising from the general to the specific”.	“Generalising from the general to the specific”.	“Generalising from the interactions between the specific and the general”.
“Use of data”	“Data collection is used to evaluate propositions or hypotheses related to an existing theory”.	“Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework”.	“Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework, and test this through subsequent data collection”.
“Theory”	“Theory falsification or verification”.	“Theory generation and building”.	“Theory generation or modification; incorporating existing theory, where appropriate, to construct new theory or modify the current approach”.

Source: Researcher’s own compilation

Data collection explores a phenomenon, identifies themes, and explains patterns to generate a new, or modify, an existing theory. An abductive approach is used when the theory is subsequently tested through additional data collection (Table 5.2).

5.4 RESEARCH METHODOLOGICAL CHOICE

According to Bryman et al. (2014:17) and Gaille (2018), there are three types of research designs: qualitative research, quantitative research, and mixed methods. This section outlines the various research designs.

5.4.1 Qualitative research

According to Brynard, Hanekom and Brynard (2014:39), qualitative research explores and provides the researcher with an understanding that all individuals contribute to a particular problem. Qualitative research emphasises the qualities of specific entities and their processes and meanings (Wegner, 2015). Qualitative research provides significant insight into respondents' feelings, motivations and attitudes (Wegner, 2015).

5.4.2 Quantitative research

According to Apuke (2017), quantitative research entails collecting numerical data. Quantitative research uses numbers to describe and resolve problems (Maree, 2016:162). According to Bryman *et al.* (2014:31), quantitative analysis tests particular theories by examining relationships amongst a set of variables. Quantitative research is based on positivism (Bless, Higson-Smith & Sithole, 2016).

5.4.3 Mixed methods research

The mixed-methods approach combines or integrates both qualitative and quantitative forms of research. It involves philosophical assumptions and mixing both techniques in a single study (Creswell & Creswell, 2018:249). The mixed-methods approach is an inquiry concerning collecting quantitative and qualitative data and integrating the two forms of data. Its central premise is that combining qualitative and quantitative methods will lead to a better understanding of the research problems than either approach individually (Leedy & Ormond, 2015:259).

Table 5.2 illustrates the three research designs.

Table 5.2: Alternative research design

Quantitative	Qualitative	Mixed methods
Experimental designs Non-experimental designs, such as surveys Longitudinal studies	Narrative research Phenomenology Grounded theory Ethnographies Case study	Convergent Explanatory sequential Exploratory sequential Complex designs with embedded case designs

Source: Researcher's own compilation

5.4.4 Justification for using the mixed-method approach

This study utilised a mixed-method approach (namely, qualitative and quantitative methods). The qualitative approach was used to obtain an in-depth understanding of the problem at hand, while the quantitative approach was used to determine the perception of the respondents on measures that their institution can employ to improve the demand management process. A mixed-methods research approach was deemed appropriate for the current study. The reason for utilising the mixed-method approach is that it yields additional insight beyond the information provided by the qualitative or quantitative methods alone.

5.5 RESEARCH STRATEGY

“A research strategy assists the researcher in planning to answer the research questions” (Saunders *et al.*, 2016:173). A survey was used as the data-collection method for the study. “A survey can be defined as an assessment of the status, opinions, beliefs and attitudes by questionnaires or interviews from a known population” (McMillan & Schumacher, 2010:602). “Surveys use a simple question format and are valuable ways of creating quantitative data” (Bryman *et al.*, 2014:17). “Surveys can be conducted in different ways, for example, online, email, post, by telephone or in person” (Saunders *et al.*, 2016:180).

The study utilised a semi-structured questionnaire as the data-collection method. Due to the Covid-19 pandemic, questionnaires were distributed and completed via MS Forms. Questionnaires were emailed to 235 demand management practitioners on post level 7 and above and 207 completed responses received (n=207) representing a return rate of 88.08%.

5.6 TIME HORIZON

“A research study can be longitudinal or cross-sectional” (Saunders *et al.*, 2016:190). “A longitudinal study is conducted over an extended period and focuses on studying changes or developments in a controlled environment over a long period of time and a cross-sectional research study takes place over a short period of time, thus being more cost-effective” (Quinlan, 2011:180). A cross-sectional approach was used for this study as the research was conducted over a short period of time.

5.7 SAMPLING DESIGN

When preparing a sampling design, the researcher must determine how the arrangement is going to influence the reliability of the results (Saunders *et al.*, 2016:190). “This analysis is essential, since an entirely inaccurate sampling design may lead to the acquisition of inconsistent results, followed by wrong interpretations, which may have disastrous consequences” (Saunders *et al.*, 2016:190).

Figure 5.1 below graphically illustrates the steps in developing a sampling plan.

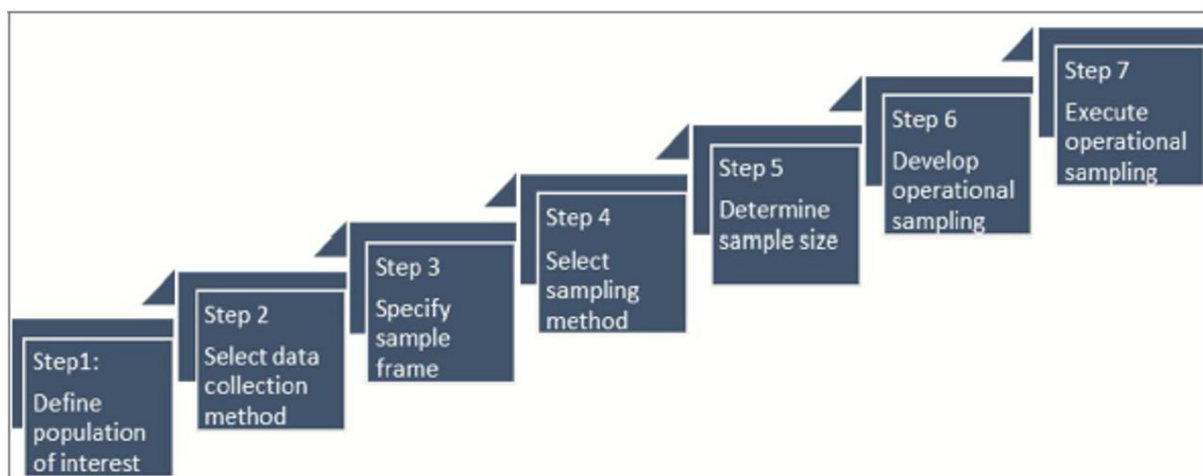


Figure 5.1: Steps in developing a sampling plan

The sections below provide details of the sampling plan, as illustrated in Figure 5.1 above.

5.7.1 The population

According to Clow and James (2014:36), the population of a research study refers to potential respondents in the research study. The population is "a set of people,

websites, stores, or other objects the researcher wants to study [and] from whom the researcher wishes to collect data" (Clow & James, 2014:36).

There are 47 public hospitals in the GDoH (Gauteng Provincial Government (2020/21:7), as stated in Table 5.3.

Table 5.3: Category of public hospitals

Count of hospital	Category of hospital
13	District hospital
8	Regional hospital
19	Specialised hospital
3	Tertiary hospital
4	Central hospital

Source: Researcher's own compilation

The population for the current study comprised SCM directors, SCM managers and SCM practitioners from all the hospitals in GDoH. According to the GDoH database, there are 1 520 SCM practitioners at the 47 public hospitals in Gauteng. The GDoH was chosen because of its size and proximity to the researcher. Therefore, the population for this research study comprised 1 520 SCM practitioners from all the public hospitals in the GDoH.

5.7.2 Sampling methods

Representation refers to how a sample is drawn from a population to represent the population (Quinlan, 2011:209). According to Saunders *et al.* (2016), sampling refers to the act of choosing a selection of individuals from the entire population for the researcher to draw conclusions about the whole population. According to Hair, Black, Babin and Anderson (2014:113), there are two main sampling methods: probability and nonprobability sampling.

Nonprobability sampling is defined as "a sampling technique in which units of the sample are selected based on personal judgement or convenience; the probability of any particular member of the population being chosen is unknown" (Zikmund, Babin, Carr & Griffin, 2013:395). Nonprobability sampling requires researchers to select samples from a large population (Quinlan, 2011:212; Van Zyl, 2014:103).

“Probability samples are selected so that the entire population has a known likelihood of being selected” (MacDaniels & Gates, 2011:332). The researcher relates the findings to the entire population (Van Zyl, 2014:103).

Sampling is identified as comprising of six types: simple random sampling, systematic sampling, stratified sampling, cluster sampling, stage sampling and multiphase sampling (Cohen, Manion & Morrison, 2013:132).

The current study used probability sampling, more specifically, the simple random sampling technique. Random sampling provided greater precision to randomly select a small sample size without any bias to the research and to make generalisations about the larger group. A random sampling method was used to draw a smaller sample size of 235 demand management practitioners on post level 7, and above, from the larger population of 1 520 SCM practitioners. Demand management practitioners on post level 7, and above, with relevant knowledge of demand management in the South African public sector were selected for the study. This was done to randomly select demand management practitioners on the GDoH database without any bias to the research, and to be able to make generalisations about the larger group.

5.7.3 Sample frame

According to Lombardo (2018) and Saunders *et al.* (2016:391), the term 'sampling frame' refers to the individuals who will be utilised by the researcher to create the sample. The sampling frame contains a list of all individuals within a population sample. The sampling frame for this research study was the GDoH personnel system. The 235 demand management practitioners on post level 7, and above, with relevant knowledge of demand management in the South African public sector constituted this research study's sampling frame.

5.7.4 Sample size

The sample size estimates the number of individuals the researcher requires for the research study (Ladner, 2018). Generally, researchers choose larger sample sizes as the results provide more accurate statistical findings than those of smaller samples that provide less factual findings (Saunders *et al.*, 2016:209). The sample consisted of 235 demand management practitioners from hospitals in GDoH. Due to the complexity of the survey, only demand management practitioners on post level 7, and

above, who were knowledgeable in demand management in the South African public sector were included in the sample.

5.8 DATA-COLLECTION METHODS

This section focuses on the data-collection methods selected for this research study.

According to Leedy and Ormrod (2015:83), data collection is the structured process that is used to collect data. There are various data-collection methods, for example, structured interview schedules, structured observation schedules, questionnaires, indexes, and scales.

There are two types of data sources, namely, primary and secondary data sources (Saunders *et al.*, 2016:45). Primary data is gathered for the first time for a specific purpose (Cant, Gebber-Nel, Nel & Kotze, 2003:48; Wilson, 2013:147; Hair *et al.*, 2014:39). "Primary data refers to the data collected by the researcher for the current research" (Quinlan, 2011:242). Primary data for this study was collected over two months through an online survey using MS Forms.

Secondary data is gathered from textbooks, conference proceedings, journal articles, theses, dissertations, newspapers, reports, government documents and websites (Mouton, 2001:71). "Secondary data is used in research studies as it can be obtained at less time and cost as opposed to collecting primary data" (Wilson, 2013:148).

The secondary objectives of the study required a review of the literature on demand management, and therefore, secondary data sources were consulted during the literature review on demand management.

Collected data comprised of demand management, compliance to SCM policies and regulations and alignment between demand planning, strategic objective and budget, and the participants' demographic information.

5.8.1 Cover letter

Covering letters are an important part of the study, used for providing a background to the study and to obtain consent from respondents to participate in the research. Furthermore, a cover letter is used to highlight the purpose of the study. A copy was attached to the questionnaire which briefly introduced and defined the reason for the study (Bryman *et al.*, 2014:194).

5.8.2 The questionnaire design

According to Saunders *et al.* (2016:677), a questionnaire allows a respondent to answer a set of questions without an interviewer being present. There are various types of questionnaires, such as self-completion questionnaires, telephone surveys, online questionnaires, and face-to-face interviews (Quinlan, 2011:220; Saunders *et al.*, 2016:12). “A questionnaire is used for collecting information, presenting structured, often numerical data, and is typically relatively simple to analyse” (Zikmund *et al.*, 2013:46; Quinlan, 2011:220).

The questionnaire that was developed for the current study consisted mainly of closed-ended questions, with a few open-ended questions.

The data-collection instrument for the research was a survey questionnaire. The questions were based on the following constructs: demand management practices (23 items), SCM policies and regulations (11 items) and the alignment between demand planning, strategic objectives and budget (14 items). The respondents in the study had to rate their agreement with statements according to a 5-point Likert scale that was rated from 1=Strongly disagree to 5=Strongly agree (Saunders *et al.*, 2016:677).

The survey questionnaire (see Appendix D) comprised of six sections and contained 63 items as follows:

- **Section A:** This section contained four statements related to the respondents' demographic information.
- **Section B:** This section contained 23 statements regarding demand management practices.
- **Section C:** This section contained 11 statements regarding the compliance of demand management practices with SCM policies and regulations.
- **Section D:** This section contained 14 statements regarding the alignment between demand planning, strategic objectives and budgeting.
- **Section E:** This section contained five statements relating to the mechanisms necessary for the effective implementation of demand management.
- **Section F:** This section contained six statements regarding the challenges impacting the implementation of demand management.

The research measurement items for each research variable listed above were developed by the researcher and were not adapted from previous research. Therefore, the researcher did not have to obtain permission to use the measurement items.

5.8.3 Measurement and scaling

A 5-point Likert scale or rank correlation was used to determine the extent to which participants agreed with the statements that support a demand management framework to improve demand management practices in the public sector in South Africa (Harpe, 2015). The Likert scale was used in sections B, C, D, E and F of the questionnaire with the following rating scale: 1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, and 5=Strongly agree (Harpe, 2015).

Demand management practitioners on post level 7, and above, from the GDoH head office were considered for participating in pilot testing of the questionnaire. The purpose of the pilot test was to ensure the questions covered the critical aspects of the research study, and whether valid results and conclusions could be made (Saunders *et al.*, 2016:451).

5.8.4 Collecting the data

According to Saunders *et al.* (2016:437), collecting the data refers to selecting specific variables and collecting the data related to those variables. Primary data in this research study was collected through a self-administered online questionnaire completed by demand management practitioners on post level 7, and above, from various hospitals in GDoH. They were selected by utilising the total sampling method. The demand management practitioners were chosen because of their expertise and knowledge of demand management in the South African public sector.

MS Forms, a software tool, was used to collect the data. MS Forms ensures that data capturing and input are straightforward steps for self-administered questionnaires. It consists of open and closed-ended questions, where participants select and mark their answers electronically from a predetermined list.

The link to access the questionnaire on MS Forms was emailed to all 235 participants. Each participant received a link to access the online questionnaire through the MS Forms website. The email contained instructions on how to access and complete the questionnaire. The questionnaire was administered by a data-collection expert and

registered user of MS Forms software. The advantage of using an online questionnaire is that the Gauteng province's more extensive geographical area could be covered. The respondents could complete the questionnaire at their leisure. Reminders were sent via the software to participants who did not respond timeously. This ensured that the survey obtained the required responses for the findings to be regarded as representative. A final return rate of 207 responses was realised, representing 88.08% of the population. According to the statistician in the study, a response rate of 88.08% was completely acceptable.

Before inviting participants, the researcher obtained permission from the Gauteng Department of Health's Provincial Protocol Committee (PPRC), the Chief Executive Officers (CEOs) from the central, tertiary, regional, district and specialised hospitals, and the "University of South Africa's (UNISA) College of Economic and Management Sciences Research Ethics Review Committee".

5.9 DATA PREPARATION

The scholars, Aaker, Kumar and Day (2011:356) explain that the process of data preparation involves "editing the collected data, coding of responses into categories and tabulating answers into frequencies or tables" The main activities in data preparation are the editing and coding of the data, as explained below (Hair *et al.*, 2014:78).

5.9.1 Editing the data

The editing of data means that all the questions in the questionnaires are checked to make sure that they have been correctly answered, and to ensure that all the questions have been answered (MacDaniels & Gates, 2011; Aaker *et al.*, 2011:25).

5.9.2 Coding

The coding process requires of the researcher to categorise the collected data and to assign numeric codes to the responses (McDaniels & Gates, 2011:321; Cooper & Schindler, 2011:491). For the purpose of the present study, numbers were used for coding (Aaker *et al.*, 2011:25). The statements that were measured using the Likert scale were coded by assigning a number (from 1 to 5) to each response (Hair *et al.*, 2014:78).

5.9.3 Data screening

The process of data screening ensures that the data that has been collected is suitable for further statistical analysis (Cooper & Schindler, 2011:400). “The collected data was coded with an identification number related to a specific question and each item was run through frequency analysis” (Saunders *et al.*, 2016:316).

5.10 DATA ANALYSIS METHODS

According to Saunders *et al.* (2016:316), data analysis provides reasoning in understanding the collected data. The results were analysed using the software program, SPSS version 27.

The current study utilised a mixed-method approach, and the data analysis comprised of descriptive, inferential and content analysis (Saunders *et al.*, 2016:316). As per Saunders *et al.* (2016:316), the study used descriptive statistics and inferential statistics to analyse the semi-structured questions, while the one closed-ended question was analysed through content analysis (Saunders *et al.*, 2016:316). Bar graphs and frequency tables were calculated using IBM SPSS via crosstab analysis. This provided an overview of the participants' perceptions regarding improving demand management in the South African public sector.

Firstly, the study's results were presented using frequency tables (count and %) and descriptive statistics (means and standard deviations) for all categorical variables. Secondly, factor analysis was used for data reduction. Thirdly, Cronbach's alpha, with a cut-off point of 0.7, was used to test reliability. Fourthly, a test for association or differences between any demographic variables was performed through Pearson's chi-squared test, interpreted at a 0.05 error rate. The research findings related to the data analysis are presented in Chapter 6 of the thesis.

5.10.1 Descriptive statistics

Saunders *et al.* (2016:437) state that “descriptive statistics explain the information, and scores are allocated to describe specific behaviour”. In terms of the current study, SPSS was used to analyse the collected data, and tables and charts were used in the presentation of the findings.

- **Mean.** “The mean (M) is perceived as the sum of all the scores divided by the number of scores across the distribution and the intended mean is used to compute the score averages obtained in the various dimensions of the instruments” (Cohen, *et al.*, 2013:507).
- **Standard deviations.** “A standard deviation is a measure of the dispersal, or range of scores, calculated as the square root of the variance” (Cohen *et al.*, 2013:507). Tredoux and Durrheim (2013:507) emphasised that “the standard deviation (SD) and minimum and maximum values describe the spread of the results around the mean”. According to (Cohen *et al.*, 2013:507), a low SD means that the scores are clustered, while a high SD means that the scores are spread out.
- **Skewness and kurtosis.** **Skewness** refers to “a measure of symmetry or lack of symmetry” (Cohen *et al.*, 2013:504). If most of the scores are in the lower ranges, the distribution is regarded as positively uneven (Cohen *et al.*, 2013:504). However, if the scores are mostly in the upper ranges of the variable, it is regarded as negatively skewed (Hair *et al.*, 2014:34). **Kurtosis** refers to “whether the data is peaked or flat if compared to a normal distribution”. “Skewness and kurtosis values range between -1 and +1, and the normal range is recommended for parametric tests” (Cohen *et al.*, 2013:504; Hair *et al.*, 2014:34).

5.10.2 Inferential analysis

According to Quinlan (2011:399), inferential statistics assists researchers to reach assumptions that extend further than the data by allowing for significant differences between different groups to be tested. The Fisher’s Exact test was used in the analysis of this data. The Fisher’s Exact test is a statistical test used in the study of contingency tables. In practice, Fisher’s Exact tests are employed when sample sizes are small; however, they are valid for all sample sizes (Saunders *et al.*, 2016:237).

5.10.3 Content analysis

According to Graham (2012) the term ‘content analysis’ encompasses a group of research approaches that include the utilisation of descriptive analyses and strict, systematic word-based analyses. Graham (2012) also maintained that the answers to

semi-structured interview questions should be analysed and aligned to relevant literature review and research objectives of the study.

The current study used Atlas.ti (software program) in the analysis of the one open-ended question in the questionnaire (qualitative) (Graham, 2012). According to Friese (2012), Atlas.ti is a data management program that is often used in qualitative studies as it enables researchers to work with large amounts of data. Atlas.ti makes the analysis more accessible to the researcher and allows the study to perform complex data management that includes manual coding and analysis (Friese, 2012). On receipt of the responses the researcher created and grouped the responses into measures.

5.11 VALIDITY AND RELIABILITY OF THE STUDY

According to Fendler (2016), reliability is when the same result is obtained for the same research study but conducted by different researchers, whilst validity describes research that measures what it is supposed to measure. According to Creswell and Creswell (2018:153), quantitative research validity shows that a researcher can draw significant and helpful inferences from scores on specific instruments

5.11.1 Validity

As applied in a research study, appropriateness and accuracy are called validity (Fendler, 2016). When considering both internal and external validity, two questions can be asked, namely:

1. Did the study provide the answers for which it was undertaken?
2. Were appropriate methods and procedures utilised in providing the answers?

According to Bless *et al.* (2016), internal validity is only achieved when the study demonstrates a causal relationship between two variables. Internal validity is achieved when the research instrument can measure what it intends to measure. According to Leedy and Ormrod (2015:91), external validity refers to whether the research findings can be generalised to other settings. This research study can be applied to the South African public sector because demand management practices must be implemented in all public sector entities. All demand management practices must comply with SCM policies and regulations. Implementing the demand management framework developed in this research study will need verification through future research studies.

5.11.2 Reliability

The reliability of the data is a critical part of the validity (Quinlan, Babin, Carr, Griffin & Zikmund, 2015:21). According to Saunders *et al.* (2016:237), when a research instrument is consistent, predictable and accurate, it is reliable, which means the more significant the consistency of the research instrument, the greater its reliability. When a test measures the same thing repeatedly, and the outcome remains the same, it is said that reliability has been reached (Creswell & Creswell, 2018:250).

Hyman and Sierra (2015) maintain that the researcher will use the same procedure to obtain the results to maintain reliability. According to Saunders *et al.* (2016:237), reliability can be increased by avoiding leading questions. "The consistency of the research results across various items was measured using Cronbach's alpha, which measures how consistently participants respond to one set of items" (Saunders *et al.*, 2016:237). Cronbach's alpha only requires one sample of data to estimate the internal consistency reliability.

Cronbach's alpha was used to test for internal consistency. Cronbach's alpha coefficient is one of the most popular indicators of internal consistency (Bryman & Bell, 2015). Internal consistency ensures that the same outcome is produced whenever the same test is conducted more than once. The alpha coefficient can range from 0 to 1, with values of 0.60 to 0.70 deemed the lower limit of acceptability (Bryman & Bell, 2015).

According to Pallant (2011), values less than 0.3 indicate that items measure something different from the scale as a whole, and in removing such things, the total alpha value can be improved. Since this study was both exploratory and descriptive, follow-up studies will be necessary to determine the reliability of the results.

5.12 ETHICAL CONSIDERATIONS

Ethical considerations are essential to ensure that no harm is done to any individual during the data-collection process (Sobocan, Bertotti & Strom-Gottfried, 2018). The participants participating in the research study must be advised of the purpose of the research study, methods to be used, the intended use of the study, and what their participation in the research study entails (Zikmund *et al.*, 2013:70). Ethical clearance was firstly obtained from UNISA's College of Economic and Management Sciences

Research Ethics Review Committee with reference number 2020_CRERC_021 (FA) before the data-collection process. (Ethical Clearance Certificate is attached as Appendix A.)

During the data-collection process, the following essential ethical considerations were followed as suggested by Fendler (2016):

- The researcher undertook to focus on the research questions and did not interfere in any manner that would jeopardise the integrity of data and the study as a whole.
- The researcher acknowledged that participation was voluntary and informed consent from participants was a prerequisite.
- There were no unpleasant or damaging effects on the individual, the team and the workplace.
- The researcher communicated the aim, objectives, nature and future use of the findings to participants before commencement of data-collection activities.

The respondents did not experience any physical or emotional harm in completing the questionnaire, which took approximately 20 minutes. The questionnaire was distributed electronically. Participation in the research was voluntary and the participants were informed that they could withdraw from the study at any time. Participants were provided with an information sheet containing complete and accurate information relating to the research study to obtain informed consent from them.

If a participant received the link to the survey and decided not to participate in the survey, the participant had the option of clicking the 'NO' option, and access to the study was immediately terminated. The participant then exited the Ms Forms website.

All the electronic data was stored on the researcher's computer, and only the researcher, supervisor, and statistician had access to the information. The researcher requested the statistician to sign a confidentiality clause. The data relating to the research study was treated with the strictest confidentiality.

The data on the researcher's computer will be secured using a password. All electronic information on the password-protected computer will be permanently deleted from the researcher's computer hard drive. The researcher will inquire from the GDoH's Information Communication Technology (ICT) section on the method to permanently

delete all information relating to the research study from the researcher's computer hard drive. Upon completing the project, the thesis will be made available online, and articles relating to the research study will be published in accredited journals. Participants will be provided with the URL link to access the thesis and the journal articles. A summary of the survey will be provided to all participants.

5.13 CONCLUSION

The chapter presented the research methodology and opened the window into the research practices of the research study. The data was collected via an online questionnaire. The population and sample were presented, data-collection instruments and procedures for data collection were described in detail, followed by a discussion of validity, reliability and ethical considerations.

Chapter 6 discusses the empirical results and findings of implementing demand management practices, compliance to supply chain prescripts, and aligning demand planning to strategic objectives and budgeting in the South African public healthcare sector. The data is discussed in terms of descriptive and inferential statistical interpretation.

CHAPTER 6:

DATA ANALYSIS AND INTERPRETATION OF RESULTS

6.1 INTRODUCTION

Chapter 5 discussed the research methodology and design, including the data-collection method, the sampling design, and data analysis methods employed in the research. The study set out to develop a framework to improve demand management practices in the public sector in South Africa. It involved the collection of data through an online survey strategy. A final return rate of 207 responses was realised, representing 88.08% of the population. Chapter 6 will present the interpretation of results and data analysis.

6.2 DEMOGRAPHIC PROFILES OF THE RESPONDENTS

This section presents an analysis of the responses to the questions regarding the respondents' demographic profiles. Section A of the questionnaire consisted of four (4) statements relating to the respondent's demographic profile. Respondents were requested to indicate the total number of years working in SCM in the South African public sector, the number of years working in SCM in the GDoH, their age in years and their level of seniority.

6.2.1 Category of hospital in GDoH

This section presents the results related to the category of hospital in which respondents are employed. Respondents were requested to indicate the category of hospital in which they were employed. This study sought to establish the various categories of hospitals in GDoH in which respondents were employed.

Table 6.1 and Figure 6.1 present the responses of participants relating to the various categories of hospitals in the GDoH.

Table 6.1: Category of hospital in GDoH

Category	Frequency	Percentage	Valid percentage	Cumulative percentage
Central	20	9.7	9.7	9.7
District	58	28.0	28.0	37.7
Regional	36	17.4	17.4	55.1
Specialised	79	38.2	38.2	93.2
Tertiary	14	6.8	6.8	100
Total	207	100	100	

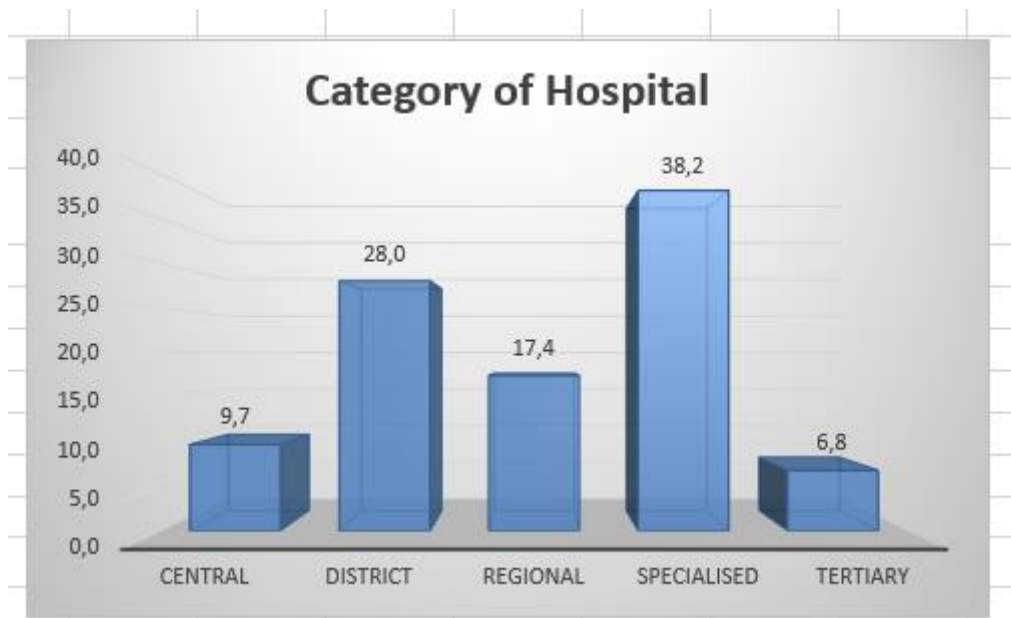


Figure 6.1: Category of hospital in GDoH

Table 6.1 and Figure 6.1 above indicate distribution of the various categories of hospitals in which respondents are employed. The category of hospital in which respondents are mostly employed is specialised hospitals making up 38.2% of the total responses, district hospitals with 28.0%, regional hospitals with 17.4%, central hospitals with 9.7%, and lastly, tertiary hospitals with 6.8%. It can be concluded that there are more specialised hospitals than district and regional hospitals than tertiary and central hospitals in GDoH due to the level of care offered.

6.2.2 Distribution of respondents' experience in SCM in the South African public sector

The section presents the number of years that respondents have worked in SCM in the South African public sector. The respondents were asked to state how many years they had worked in SCM in the South African public sector. The categories of years of experience in SCM in the public sector were: less than 5 years, 6-10 years, and more than 11 years. The research sought to establish the number of years respondents have worked in SCM in the South African public sector.

Table 6.2 and Figure 6.2 below present responses relating to experience in SCM in the public sector.

Table 6.2: Distribution of respondents' experience in SCM in the South African public sector

Number of years	Frequency	Percentage	Valid percentage	Cumulative percentage
<=5	73	35.3	35.3	35.3
6-10	77	37.2	37.2	72.5
11+	57	27.5	27.5	100
Total	207	100	100	



Figure 6.2: Distribution of respondents' experience in SCM in the South African public sector

Table 6.2 and Figure 6.2 above indicate the number of years that respondents have worked in SCM in the public sector. Respondents with the most number of years in

SCM in the public sector were in the category 6 to 10 years who made up 37.2% of the total, followed by the category less than or equal to 5 years with 35.3%, and lastly the category with more than 11 years with 27.5%.

The frequency was concentrated between 6 to 10 years of experience (37.2%). It can be concluded that there are seasoned demand management practitioners within GDoH, thus they understand demand management and can comply with SCM policies and regulations. Practice has shown that more than 5 years' experience in a particular industry is sufficient to acquire knowledge of relevant policies and regulations.

6.2.3 Distribution of respondents' experience in SCM in the GDoH

This section presents the number of years respondents have worked in SCM in GDoH. The respondents were asked to state how many years they had worked in SCM in GDoH, according to the following categories: less than 5 years, 6-10 years, and more than 11 years. The study sought to establish the number of years respondents worked in SCM in the GDoH.

Table 6.3 and Figure 6.3 below present the number of years worked in SCM in the GDoH.

Table 6.3: Distribution of respondents' experience in SCM in the GDoH

Number of years	Frequency	Percent	Valid Percent	Cumulative percent
<=5	70	33.8	33.8	33.8
6-10	89	43.0	43.0	76.8
11+	48	23.2	23.2	100
Total	207	100	100	

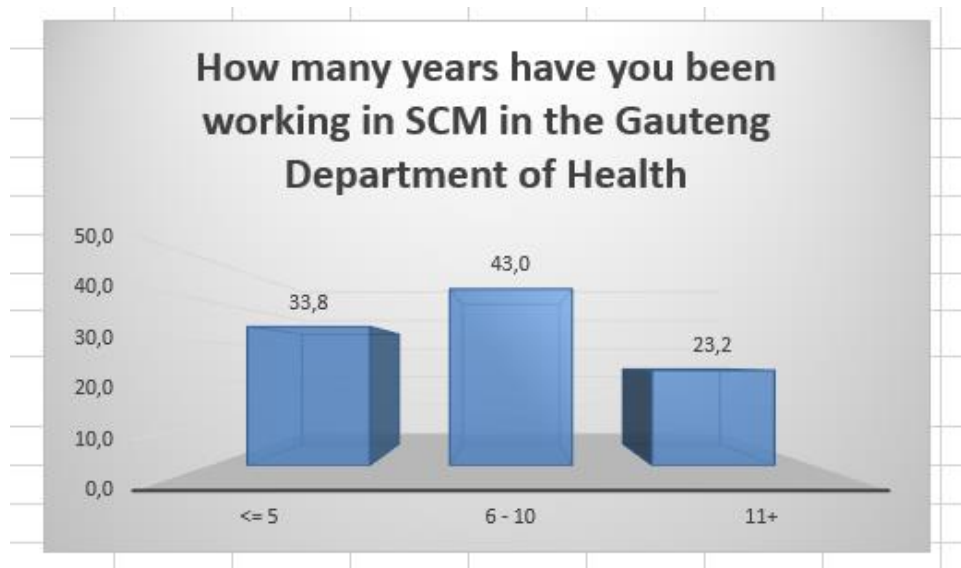


Figure 6.3: Distribution of respondents' experience in SCM in the GDoH

Table 6.3 and Figure 6.3 above indicate the number of years respondents have worked in SCM in the GDoH. The respondents with the greatest number of years in SCM in the GDoH were in the category 6 to 10 years who made up 43.0% of the total, followed by the category less than or equal to 5 years with 33.8%, and lastly, the category with more than 11 years of service in the GDoH at 23.2%.

The frequency is between 6 to 10 years of experience (43.0%). It can be concluded that there are seasoned demand management practitioners within GDoH, thus they can understand demand management and can comply with SCM policies and regulations. Practice has shown that more than 5 years' experience in a particular industry is sufficient to acquire knowledge and understanding of the organisations policies and regulations.

6.2.4 Distribution of respondents' age in years

This section presents the respondents' age in years. The respondents were asked to state their age in years, according to the following categories: under 36 years of age, 37-45 years, 46-51 years, and over 52 years of age. The study sought to establish the age of respondents. Table 6.4 and Figure 6.4 present the age of respondents in years.

Table 6.4: Distribution of respondents' age in years

Age	Frequency	Percent	Valid percent	Cumulative percent
<=36	52	25.1	25.1	25.1
37-45	64	30.9	30.9	56.0
46-51	49	23.7	23.7	79.7
52+	42	20.3	20.3	100
Total	207	100	100	

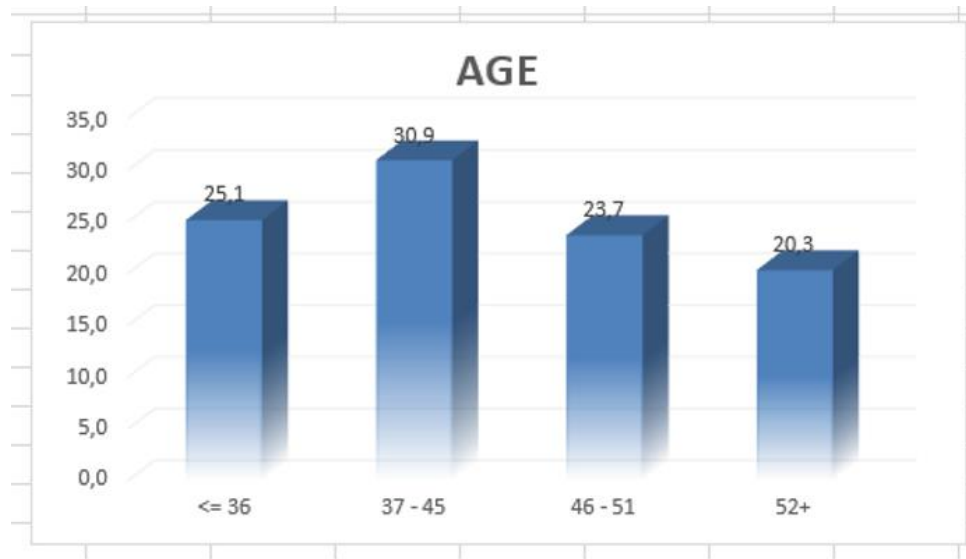


Figure 6.4: Distribution of respondents' age in years

As seen in Table 6.4 and Figure 6.4, the results reveal that the majority (30.9%) of respondents are in the age category of 37-45, 25.1% were under 36, while 23.7% were between the ages of 46-51, and 20.3% were older than 52 years of age. None of the respondents were above the age of 65. This is understandable given that the retirement age in the public sector is 65 years of age. Only 25.1% of respondents were below or equal to 36 years of age. This is understandable as the respondents were demand management practitioners on or above level 7, who have worked themselves up through the various levels within the department.

6.2.5 Distribution of respondents' level of seniority

This section presents the results related to the respondent's level of seniority. The respondents were asked to state their level of seniority, with options ranging from level 7 to level 13. The study sought to establish the seniority level of respondents.

Table 6.5 and Figure 6.5 present the distribution of the respondents' levels of seniority.

Table 6.5: Distribution of respondents' levels of seniority

Level	Frequency	Percent	Valid percent	Cumulative percent
7	63	30.4	30.4	30.4
8	63	30.4	30.4	60.9
9	33	15.9	15.9	76.8
10	21	10.1	10.1	87.0
11	13	6.3	6.3	93.2
12	10	4.8	4.8	98.1
13	4	1.9	1.9	100
Total	207	100	100	

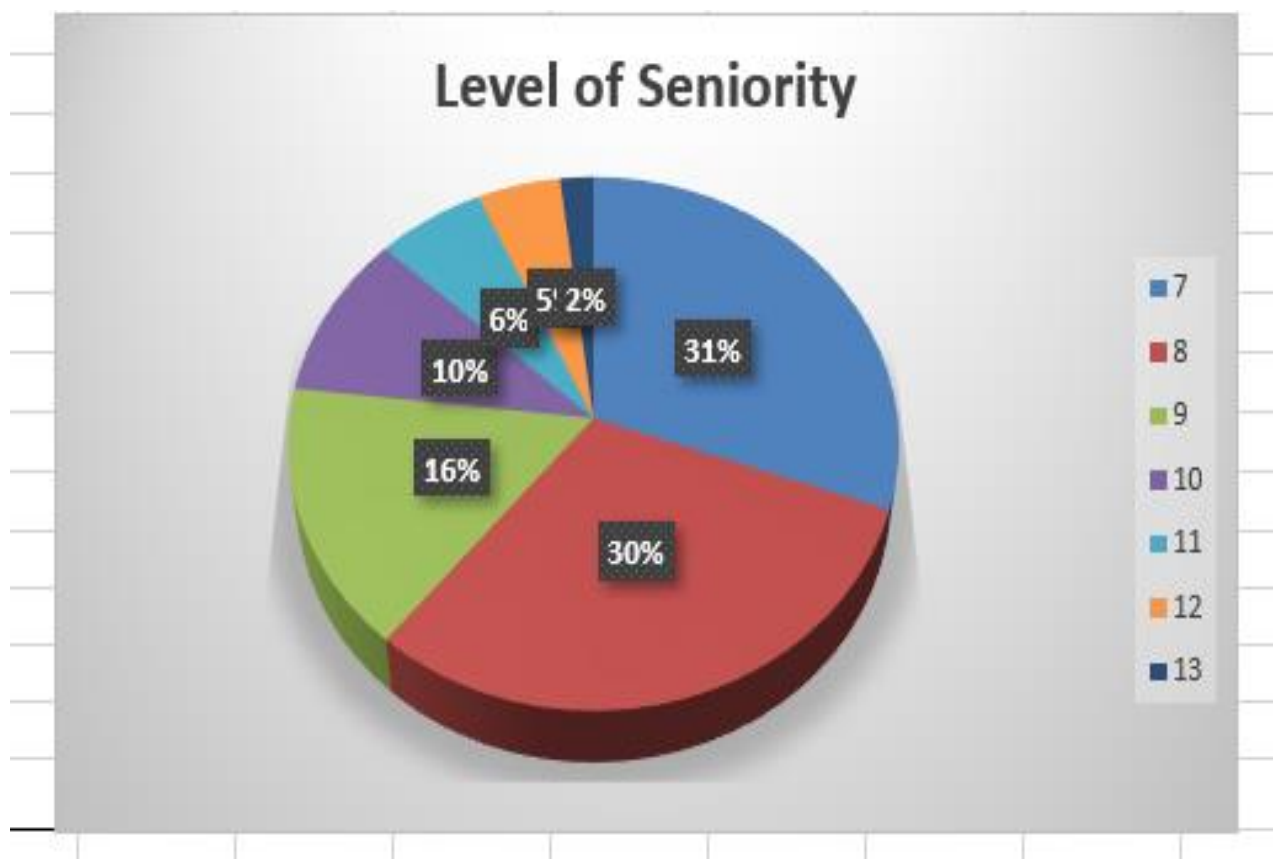


Figure 6.5: Distribution of respondents' level of seniority

The results presented in Table 6.5 and Figure 6.5 reveal that 31% of the respondents were on level 7, 30% were on level 8, 16% on level 9, 10% on level 10, 6% on level

11, 5% on level 12, and 2% on level 13. Therefore, the results show that a large number of the respondents were on non-managerial levels, which is below level 9. This is to be expected, as managerial levels (level 9 upwards) are comparatively fewer and mainly provide strategic leadership, whereas non-managerial levels (level 8 and below) provide operational oversight over demand management processes in a hospital. However, current proposals under the National Health Insurance (NHI) could see a change in all that.

6.3 DEMAND MANAGEMENT PRACTICES IN THE SOUTH AFRICAN PUBLIC SECTOR

The section provides an analysis of the responses for the questions related to demand management practices in the South African public sector. The research study identified that demand management practices in the South African public sector comprise of the following three dimensions: demand management considerations, development of specifications and TOR, and key role players in the demand management process.

Section B of the questionnaire consisted of (23) statements which present the responses relating to demand management practices in the South African public sector. The questions raised to the respondents aimed to establish the extent to which demand management practices have been implemented in the public sector. The respondents had to indicate their level of agreement to the statements in the questionnaire using a 5-point Likert response format, as follows: 1=Strongly disagree, 2=Disagree, 3=Neither agree or disagree, 4=Agree, and 5=Strongly agree. The analysis of the responses used the following abbreviations: SD for strongly disagree, DA for disagree, DN for neither agree nor disagree, A for agree, and SA for strongly agree.

The mean scores were interpreted as follows: 0–1.50 means that respondents strongly disagree, 1.50–2.50 means they disagreed, 2.50–3.50 means they were not sure, 3.50–4.50 means that they agreed, while above 4.50 means they strongly agreed.

6.3.1 Demand management considerations

The respondents were asked to respond to the seven statements related to the extent of demand management considerations in the South African public sector, by rating

the seven statements using a 5-point Likert scale. The questions raised to the respondents aimed to establish the extent of demand management considerations in the South African public sector.

Table 6.6 below indicates the perception of respondents regarding demand management considerations.

Table 6.6: Demand management considerations

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
We consult with our end-users to understand their specific requirements.	4.48	5.00	0.723	-1.636	3.062
We implement effective sourcing strategies.	3.96	4.00	1.210	-0.954	-0.346
We analyse supplier cost structures	3.81	4.00	1.265	-0.889	-0.394
We hold suppliers accountable for poor performance.	3.73	4.00	1.381	-0.676	-1.003
We analyse Bid Adjudication System (BAS) reports weekly.	3.41	4.00	1.296	-0.385	-1.048
We analyse Systems Applications and Products in Data Processing (SAP) reports daily.	3.41	3.00	1.219	-0.364	-0.737
We identify suppliers for sub-contracting opportunities.	3.30	3.00	1.417	-0.242	-1.275

The responses were ranked according to the highest mean score. In terms of the perceptions of the respondents regarding demand management considerations, Table 6.6 indicates that the highest number of respondents (M=4.48, SD=0.723) agreed that end-users are consulted to understand their specific requirements. This was followed by effective sourcing strategies are implemented (M=3.96, SD=1.210), thirdly, respondents (M=3.81, SD=1.265) indicated that suppliers cost structures are analysed, fourthly, respondents (M=3.73, SD=1.381) indicated that suppliers were held accountable for underperforming, fifthly, the respondents (M=3.41 SD= 1.296) indicated that basic accounting system (BAS) reports are analysed weekly, and (M=3.41, SD=1.219) indicated that Systems Applications and Products in Data Processing (SAP) reports are analysed daily. The lowest ranked responses indicated that suppliers are identified for sub-contracting (M=3.30, SD=1.417).

The results for demand management considerations obtained a mean score which ranged from (4.48 to 3.30). The high mean score indicates that the majority of hospitals in GDoH have implemented demand management considerations. The findings are in line with the guidelines of National Treasury (2017:52) which indicate that demand management practitioners must implement demand management considerations by assisting end-users to: embark on a needs analysis, expenditure analysis, commodity analysis, market and industry analysis.

The results showed that the skewness values for demand management considerations ranged from -1.636 to -0.242, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -1.275 and 3.062, thereby “falling outside the -1 and +1 normality range recommended for these coefficients”, as specified by Tredoux and Durrheim (2013:181).

6.3.2 Development of specifications and terms of reference

The respondents were asked to respond on the extent of the development of specifications and TOR in accordance with the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principles, by rating the eight statements using a 5-point Likert scale.

Table 6.7 below provides the perception of the respondents regarding the development of specifications and TOR.

Table 6.7: Development of specifications and terms of reference

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Bid Specification Committee (BSC) is appointed by the Head of Department (HOD).	4.17	4.00	0.993	-1.277	1.144
Bid Specification Committee (BSC) include acceptable standards in specifications.	4.16	4.00	0.931	-1.100	0.779
Bid Specification Committee (BSC) drafts specifications in an unbiased manner.	4.14	4.00	1.036	-1.105	0.359
Irregular expenditure is reported to the Loss Control unit.	4.11	4.00	1.074	-1.234	0.863
Bid Specification Committee (BSC) compiles terms of reference according to the Specific,	4.07	4.00	1.024	-0.969	0.048

Measurable, Achievable, Realistic, and Timely (SMART) principles.					
Bid Specification Committee (BSC) compiles specifications according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principle.	4.06	4.00	1.055	-0.918	-0.187
Fruitless and wasteful expenditure is reported to the Loss Control unit.	3.99	4.00	1.115	-1.021	0.195
Bid Specification Committee (BSC) attend meetings on a regular basis	3.93	4.00	1.101	-0.824	-0.321

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to the development of specifications and TOR, Table 6.7 indicates that the highest number of responses (M=4.17, SD=0.993) agreed that the BSC is appointed by the Head of Department (HOD). The appointment of the BSC members by the HOD is welcomed as this supports the notion of experts being involved in the compiling of specifications.

Second highest (M=4.16, SD=0.931) indicates BSC includes acceptable standards in specifications. Third highest (M=4.14, SD=1.036) indicates BSC drafts specifications in an unbiased manner. This outcome suggests that the South African public sector is moving in the right direction in ensuring fairness in the SCM process. Fourth highest (M=4.11, SD=1.074) indicates cases of irregular expenditure is reported to the Loss Control unit. Fifth highest (M=4.07, SD=1.024) indicates the BSC compiles TOR according to the SMART principle.

Sixth highest (M=4.06, SD=1.055) indicates the BSC compiles specifications according to the SMART principle. Seventh highest (M=3.99, SD=1.115) indicates fruitless and wasteful expenditure is reported to the Loss Control unit. The least ranked response regarding BSC attending meetings on a regular basis at (M=3.93, SD=1.101).

The results for compilation of specifications and TOR obtained a mean score ranging from (4.17 and 3.93). The high score indicates that most of the hospitals in GDoH compiled specifications and TOR according to the SMART principle. The findings are in line with the guidelines of National Treasury (2016:1), which indicate that specifications should be crafted in an unbiased manner which does not favour specific suppliers.

The skewness values for the compilation of specifications and TOR ranged from -1.277 to -0.824, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -0.321 and 1.144, therefore, “falling outside the -1, and above the +1 normality range recommended for these coefficients”, as explained by Tredoux and Durrheim (2013:181).

6.3.3 Key role players in the demand management process

Respondents were asked to respond on the key role players in the demand management process in the South African public sector, by rating the eight statements using a 5-point Likert scale.

Table 6.8 presents the perception of respondents regarding key role players in the demand management process.

Table 6.8: Key role players in the demand management process

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
The Chief Financial Officer (CFO) is appointed as the chairperson of Bid Adjudication Committee (BAC).	4.54	5.00	0.652	-1.304	1.416
We utilise the demand plan for procurement of goods.	4.39	5.00	0.822	-1.789	4.254
The Head of Department (HOD) approves contracts above R1million.	4.38	5.00	0.803	-1.425	1.816
Cost Centre Managers approve all procurement requests.	4.25	4.00	0.849	-1.120	0.806
Bid Evaluation Committee (BEC) evaluate bids according to pre-determined evaluation criteria.	4.21	4.00	0.802	-0.859	0.314
Bid Adjudication Committee (BAC) is conversant with Supply Chain Management (SCM) prescripts.	4.15	4.00	0.906	-0.944	0.148
We ensure that only goods listed on demand plans are procured.	4.09	4.00	1.111	-1.180	0.531
Bid Specification Committee (BSC) compiles evaluation criteria.	3.94	4.00	0.912	-0.505	-0.569

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to key role players in the demand management process, Table 6.8 indicates that the highest number of responses (M=4.54, SD=0.652) agreed that the CFO is appointed as the chairperson of BAC.

Second highest (M=4.39, SD=0.822) indicates that the demand plan is utilised for the procurement of goods. Third highest (M= 4.38, SD=0.803) indicates that the HOD approves contracts above R1million. Fourth highest (M=4.25, SD=0.849) indicates that cost centre managers approve all procurement requests. Fifth highest (M=4.21, SD=0.802) indicates that BEC evaluates bids according to pre-determined evaluation criteria.

Sixth highest (M=4.15, SD=0.906) indicates that BAC is conversant with SCM prescripts. Seventh highest scoring response (M=4.09, SD=1.111) indicates that only goods listed on the demand plan are procured. The least ranked responses were regarding BSC that compiles evaluation criteria at (M=3.94, SD=0.912).

The results for key role players participating in demand management processes obtained a mean score ranging from (4.54 to 3.94). The high score is an indication that the majority of the hospitals revealed that key role players do participate in the demand management process in the hospitals. The findings are in line with that of De Villiers et al. (2017:285) who indicated that it is vital that key role players participate in the demand management process.

The skewness values for key role players in the demand management process ranged from -1.789 to -0.505, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -0.569 and 4.254, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients”, as stated by Tredoux and Durrheim (2013:181).

6.3.4 Key demand management practices

The next section required respondents to rate ten statements related to the demand management practices according to the one which has the biggest impact on demand management processes. Table 6.9 and Figure 6.6 represent the perception of the respondents regarding key demand management practices.

Table 6.9: Key demand management practices

Demand management practice	Mean	Median	Std. Dev.
Analysis of needs is conducted.	25.55	15.00	22.33
Analysis of expenditure patterns.	12.15	10.00	10.74
Development of a business case for procurement.	9.02	10.00	5.80
Developing Specific, Measurable, Achievable, Realistic, and Timely (SMART) specifications.	8.81	8.00	12.49
Development of a sound annual procurement plan.	8.04	10.00	5.40
Developing strategies to approach the market.	7.88	10.00	4.98
Ensuring availability of funding.	7.72	8.00	6.94
Identifying the institution's goals and objectives.	7.11	8.00	5.08
Understanding of supplier's performance drivers.	7.00	8.00	3.63
Determining a Total Cost of Ownership (TCO).	6.71	8.00	3.64

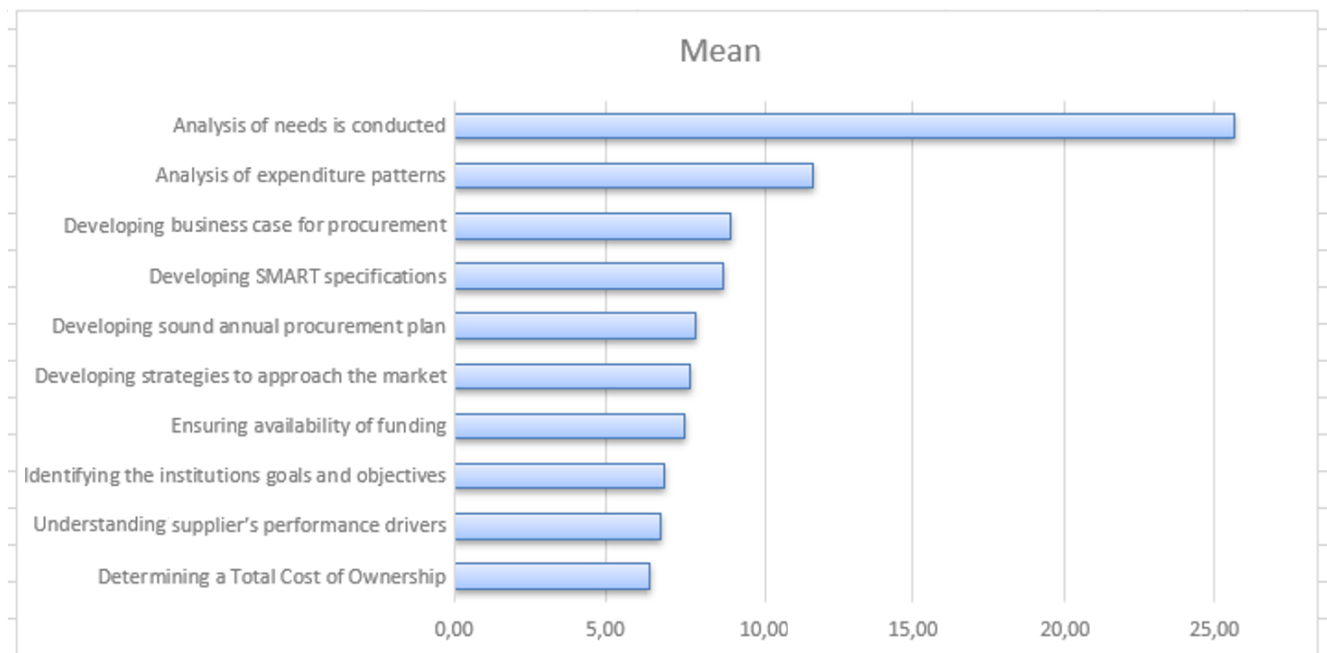


Figure 6.6: Key demand management practices

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to key demand management practices, Table 6.9 and Figure 6.6 indicates that the highest number of responses (M=25.55) agreed that conducting an analysis of needs is the key demand management practice, followed by an analysis of expenditure patterns (M=12.15).

6.3.5 Measures to be employed to improve the demand management process

The next section required respondents to indicate measures that can be employed to improve the demand management processes. This was an open-ended question that required the respondents to write in an answer in the space provided.

Table 6.10 summarises the perception of the respondents regarding measures to improve demand management processes.

Table 6.10: Summary of measures to be employed to improve the demand management process

Train end-users and demand management practitioners in demand management processes.
Better understand of the alignment between demand planning, strategic objectives and budget.
Consider technology to improve accuracy of demand forecasts.
Better utilisation of cross-functional teams.
Monitor procurement against demand plan on a regular basis.
End-users to be more involved in the demand management process.
Better communication between all key role players.
Develop market price listing.
Strengthen Supply Chain Management (SCM) structure.
Capacitate demand management by employing experienced and qualified demand management practitioners.

Table 6.10 above identifies 10 measures that could be employed to improve demand management practices, as suggested by the respondents to the study.

6.3.6 Summary of results for demand management practices in the South African public sector

The results for demand management practices were discussed under Sections 6.3.1 to 6.3.5. Table 6.11 below presents the responses regarding the three dimensions of demand management practices in the South African public sector.

Table 6.11: Demand management practices in the South African public sector

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Key role players in the demand management process	4.54	5.00	0.652	-1.304	1.416
Demand management considerations	4.48	5.00	0.723	-1.636	3.062
Development of specifications and terms of reference	4.17	4.00	0.993	-1.277	1.144

Table 6.11 indicates that the highest mean score was for key role players in the demand management process (M=4.54, SD=0.652), second highest was demand management considerations (M=4.48, SD=0.723), whilst development of specifications and TOR scored the lowest mean score (M=4.17, SD=0.993).

The results for demand management practices obtained a mean score ranging from (4.54 to 4.17). The high score is an indication that the majority of the hospitals have implemented demand management. The findings concur with National Treasury (2017:26), which indicated that analysis of various aspects of demand management activities is part of the research that should be done by demand management to support advised actions and ensure a proper support of service delivery throughout the South African public sector.

The key role players in the demand management process include the HOD, CFO, Cost Centre Managers and the three Bid Committees, namely, the BSC, BEC and BAC. Each key role player plays a critical role in the demand management process. The HOD is responsible for appointing the CFO as the chairperson of the BAC, and approving tenders as recommended by the BAC. The CFO, as chairperson of BAC, is responsible for adjudicating recommendations by the BEC. The BSC is responsible for compiling unbiased specifications. Cost Centre Managers are responsible for managing particular programmes within a public sector entity. The finding indicates that the key role players play an active role in the demand management process within the majority of GDoH institutions.

Demand Management considerations are critical in ensuring demand management practitioners consult with end-users in understanding their specific requirements. This ensures that demand management implements effective sourcing strategies. During

the demand management process it is critical that suppliers' cost structures are analysed and suppliers must be identified for sub-contracting opportunities. The findings indicate that demand management considerations are implemented within the majority of GDoH institutions.

It is critical that demand management practitioners ensure that unbiased specifications and TOR are compiled. This ensures that SCM processes are conducted in a fair, open and transparent manner in accordance with the Constitution. All prospective bidders must be provided with an equal opportunity to respond to tenders advertised on Government's eTender portal. The findings indicate that unbiased specifications and TOR are compiled by the majority of GDoH institutions.

The skewness values for demand management practices ranged from -1.636 to -1.277, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between 1.144 and 3.062, thereby "falling outside the -1, and above the +1 normality range recommended for these coefficients" as explained by Tredoux and Durrheim (2013:18).

6.4 COMPLIANCE OF DEMAND MANAGEMENT PRACTICES WITH SCM POLICIES AND REGULATIONS

The respondents were asked to measure their agreement to statements related to the level of compliance to SCM policies and regulations in the South African public sector, by rating the statements against a 5-point Likert scale consisting of: 1=Strongly disagree, 2=Disagree, 3=Neither agree or disagree, 4=Agree, and 5=Strongly agree.

The literature review revealed that more than 80 pieces of legislations govern SCM in South Africa. The study focused on three pieces of legislation, namely, the Constitution, the PFMA and the PPPFA.

Section C of the questionnaire consisted of 11 statements relating to level of compliance with SCM regulations and policies.

6.4.1 The Constitution

The respondents were asked to respond to five statements related to the level of compliance to the Constitution, by rating the five statements using a 5-point Likert scale.

Table 6.12 below shows the results of the respondents' perception regarding compliance to the Constitution.

Table 6.12: Compliance to Constitutional requirements on demand management processes

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
We advertise tenders on the National Treasury eTender portal.	4.23	4.00	0.789	-0.487	-1.047
We provide procurement opportunities to previously disadvantaged individuals.	4.15	4.00	0.882	-0.897	0.739
We request bids from suitably qualified suppliers.	4.05	4.00	0.944	-0.726	0.064
We conduct price negotiations with prospective suppliers.	3.99	4.00	0.900	-0.616	0.010
Our procurement is conducted in a fair manner.	3.97	4.00	0.900	-0.297	-1.001

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to compliance to the Constitution, Table 6.12 indicates that the highest response (M=4.23, SD=0.789) agreed tenders are advertised on the eTender portal.

Second highest (M=4.15, SD=0.882) indicates previously disadvantaged individuals are provided with procurement opportunities. Third highest (M=4.05, SD=0.944) indicates bids are received from suitably qualified suppliers. Fourth highest (M=3.99, SD=0.900) indicates price negotiations are conducted with prospective suppliers. The least ranked response was regarding procurement is conducted in a fair manner at (M=3.97, SD=0.900).

The results for compliance to the Constitution obtained a mean score ranging from (4.23 to 3.97). The high mean score is an indication that the majority of the hospitals revealed that demand management processes are performed according to the provisions of the Constitution. The findings are in line with that of Khadija and Kibert (2015:128) who indicated that "when an organ of state procures goods, works and services it must be done in accordance with a system which is fair, equitable, transparent, competitive and cost effective".

The skewness values for compliance to the Constitution ranged from -0.897 to -0.297, thereby falling within the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -1.047 and 0.739, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients” as specified by Tredoux and Durrheim (2013:181).

6.4.2 Public Finance Management Act (PFMA)

Respondents were asked to respond on the integration of the PFMA. The questions focused on the relevant sections of the PFMA which related to demand management. The questions related to the PFMA comprised of three statements.

Table 6.13 below presents the perception of the respondents regarding the integration of the PFMA.

Table 6.13: Integration of the PFMA

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
We ensure standard bid documents (SBD) forms are completed by prospective bidders.	4.27	4.00	0.802	-0.746	-0.077
The Supply Chain Management (SCM) unit reports to the Chief Financial Officer (CFO).	4.25	4.00	0.740	-0.512	-0.766
Bid Specification Committee (BSC) ensure the bid evaluation criteria is clearly stipulated in bid documents.	4.15	4.00	0.773	-0.274	-1.276

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to integration of the PFMA, Table 6.13 indicates that the highest ranked response (M=4.27, SD=0.802) agreed that Standard Bidding Document (SBD) forms are completed by prospective bidders. Second highest (M=4.25, SD=0.740) indicates that the SCM unit reports to the CFO. The least ranked responses were regarding evaluation criteria is clearly stated in bid documents by the BSC at (M=4.15, SD=0.773).

The results for compliance to the PFMA obtained a mean score ranging from (4.27 to 4.15). The high mean score is an indication that the majority of the hospitals revealed that demand management practices are performed in accordance with the provisions of the PFMA. The findings are in line with that of Shafritz *et al.* (2015:474) who

indicated that the PFMA requires accounting officers/authorities to place more emphasis on management principles and less emphasis on following a set of rules to achieve results.

The skewness values for compliance to the PFMA ranged from -0.746 to -0.274, falling within the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -1.276 and -0.077, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.4.3 Preferential Procurement Policy Framework Act (PPPFA)

The respondents were asked to respond on the integration of PPPFA. The section on the PPPFA comprised of three statements.

Table 6.14 below shows the results of the analysis of the perception of the respondents regarding the integration of the PPPFA.

Table 6.14: Integration of PPPFA

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
80/20 point system is used for transactions between R30 000 – R50 million.	4.15	4.00	0.930	-0.997	0.830
Sub-contracting is considered a pre-requisite for transactions above R30 million.	4.14	4.00	0.944	-1.028	0.522
90/10 point system is used for transactions above R50 million.	4.02	4.00	0.887	-0.502	-0.236

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to integration of the PPPFA, Table 6.14 indicates that the highest ranked response (M=4.15, SD=0.930) agreed the 80/20 price point system is used below R50 million. Second highest (M=4.14, SD=0.944) indicates sub-contracting is considered a pre-requisite above R30 million. The least ranked responses were regarding the 90/10 price point system is used above R50 million at (M=4.02, SD=0.887).

The results for compliance to the PPPFA obtained a mean score ranging from (4.15 to 4.02). The high mean score is an indication that the majority of the hospitals

revealed that demand management practices are performed in accordance with the provisions of the PPPFA. The findings are in line with Ambe (2016) who indicated that the PPPFA outlines the preference point system for evaluating tenders.

The skewness values for the integration of the PPPFA ranged from -1.028 to -0.502, thereby falling outside the -1 and +1 normality range recommended for these coefficients” (Cohen *et al.*, 2013). The kurtosis values ranged between -0.236 and 0.830, thereby “falling within the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.4.4 Summary of results for demand management practices compliance with SCM policies and regulations

Table 6.15 below presents the perception of the respondents regarding compliance to SCM policies and regulations.

Table 6.15: Summary of compliance to SCM policies and regulations

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Public Finance Management Act (PFMA)	4.27	4.00	0.802	-0.746	-0.077
The Constitution	4.23	4.00	0.789	-0.487	-1.047
Preferential Procurement Policy Framework Act (PPPFA)	4.15	4.00	0.930	-1.028	0.522

Table 6.15 indicates that the highest mean score was PFMA (M=4.27, SD=0.802), second was the Constitution (M=4.23, SD=0.789), whilst PPPFA (M=4.15, SD=0.930) had the lowest mean score.

The results for compliance to SCM policies and regulations obtained a mean score ranging from (4.27 to 4.15). The high mean score is an indication that the majority of the hospitals revealed that demand management practices comply with SCM prescripts. The findings concur with the study of Mrope, Namusonge, & Iravo (2017:43) who indicated that compliance to SCM prescripts is critical for the achievement of the objectives of the SCM framework.

It is critical that public sector entities ensure that demand management practices comply with SCM policies and regulations. This will prevent the public sector from incurring irregular expenditure and fruitless and wasteful expenditure, and will result

in the public sector entity receiving a clean audit report from the AGSA. Furthermore, it will result in a reduction in fraudulent and corrupt activities within the demand management activities.

The skewness value for compliance to SCM policies and regulations ranged between -1.028 and -0.487, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis value ranged between -1.047 and 0.522, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.5 ALIGNMENT BETWEEN DEMAND PLANNING, STRATEGIC OBJECTIVES AND BUDGETING

Respondents were asked to rate their agreement with the statements related to the level of alignment between demand planning, strategic objectives and budgeting. The subsections of alignment between demand planning, strategic objectives and budgeting consisted of 14 elements.

6.5.1 Demand planning

The respondents were asked to respond to the statements related to the extent of implementation of demand planning, and to rate their agreement to the five statements against a 5-point Likert scale. The questions raised to the respondents sought to establish the extent of implementation of demand planning.

Table 6.16 below presents the perception of the respondents regarding the extent of demand planning.

Table 6.16: Demand planning

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Demand plans indicate the full description of goods required.	4.39	5.00	0.798	-1.575	3.076
Procurement plans are compiled for requirements above R500 000.	4.27	5.00	0.981	-1.520	1.975
Demand plans are aligned with the institution's strategic objectives.	4.15	4.00	0.854	-0.576	-0.694
Demand plans include all requirements for the financial year.	3.92	4.00	1.267	-0.923	-0.467
Demand plans are approved in line with budget allocations.	3.67	4.00	1.165	-0.617	-0.406

The responses were ranked according to the highest mean score. In terms of the perception of the respondents relating to the extent of demand planning, Table 6.16 indicates that the highest mean score was for the statement 'demand plans include the full description of goods required' (M=4.39, SD=0.798).

Second highest (M=4.27, SD=0.981) indicates that procurement plans are compiled for requirements above R500 000. Third highest (4.15 to 0.854) indicates that demand plans are aligned with the institution's strategic objectives. Fourth highest (M=3.92, SD=1.267) which indicates that demand plans include all requirements for the financial year. The least ranked responses was regarding demand plans are approved in line with budget allocations at (M=3.67, SD=1.165).

The results for implementation of demand planning obtained a mean score ranging from (4.39 to 3.67). The high mean score is an indication that the majority of hospitals revealed the effective implementation of demand planning in the South African public sector. The findings are in line with that of Özlen and Hadžiahmetović (2013:126) who indicated that for the successful implementation of demand planning, good relationships with end-users are needed.

The skewness value for extent of demand planning ranged between -1.575 and -0.576, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis value ranged between -0.694 and 3.076, thereby "falling outside the -1, and above the +1 normality range recommended for these coefficients" (Tredoux & Durrheim, 2013:181).

6.5.2 Alignment to strategic objectives

The respondents were asked to respond on the extent of alignment to strategic objectives in the South African public sector, by measuring their agreement with five statements using a 5-point Likert scale.

Table 6.17 below presents the perception of the respondents regarding the extent of alignment to strategic objectives.

Table 6.17: Strategic objectives

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
The head of Supply Chain Management (SCM) is involved in the strategic planning process.	4.37	5.00	0.801	-1.449	2.598
The annual performance plan is approved by the Head of Department (HOD).	4.29	4.00	0.766	-0.558	-1.092
The strategic objectives focus on the achievement of specific outcomes.	4.16	4.00	0.781	-0.349	-1.094
The resources required for the fulfilment of obligations are clearly identified.	4.12	4.00	0.870	-0.594	-0.604
The strategic objectives are reviewed on an annual basis.	4.08	4.00	0.817	-0.207	-1.331

The responses were ranked according to the highest mean score achieved. In terms of the perception of the respondents relating to the extent of alignment to strategic objectives, Table 6.17 indicates that the highest mean score agreed that the head of SCM is involved in the strategic planning process (M=4.37, SD=0.801).

Second highest (M=4.29, SD=0.766) indicates the annual performance plan is approved by the HOD. Third highest (M=4.16, SD= 0.781) indicates the strategic objectives focus on the achievement of specific outcomes. Fourth highest (M=4.12, SD=0.870) indicates the resources required for the fulfilment of obligations are clearly identified.

The least ranked responses were regarding the statement 'strategic objectives are reviewed on an annual basis' at (M=4.08, SD=0.817).

The results for the alignment of demand planning to strategic objectives obtained a mean score ranging from (4.37 to 4.08). The high mean score is an indication that the majority of the hospitals revealed that demand planning is aligned to strategic objectives. This is a vast improvement in terms of strategic objectives in comparison to the results of research conducted by Accenture (2010).

The skewness value for extent of alignment between demand planning and strategic objectives ranged between - 1.449 and -0.207, thereby falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis value ranged between -1.331 and 2.598, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.5.3 Alignment to budgeting

The respondents were asked to respond to the statements related to the extent of alignment between demand planning and budget by rating the four statements using a 5-point Likert scale.

Table 6.18 below shows the perception of the respondents regarding alignment to budget.

Table 6.18: Budgeting

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Demand plans are approved in line with budget allocations.	4.18	4.00	0.831	-0.704	-0.026
End-users present detailed budget bids during budget bilateral.	4.11	4.00	0.904	-0.898	0.654
Demand management practitioners attend budget bilateral meetings.	4.06	4.00	0.896	-0.646	-0.214
Demand plans are compiled during budget bilateral.	4.06	4.00	0.966	-1.008	0.717

The responses were ranked according to the highest mean score achieved. In terms of the perception of the respondents relating to the extent of alignment to budget, Table 6.18 indicates that the highest mean score agreed that demand plans are approved in line with budget allocations (M=4.18, SD=0.831).

Second highest (M=4.11, SD=0.904) indicates end-users present detailed budget bids during budget bilateral meetings. The least ranked score (M=4.06, SD= 0.896) indicates demand management practitioners attend budget bilateral and (M=4.06, SD=0.966) demand plans are compiled during budget bilateral.

The results for the alignment of demand planning to budgeting obtained a mean score ranging from (4.18 to 4.06). The high mean score is an indication that the majority of the hospitals revealed that demand planning is aligned to budget. The results are in line with (Naidoo, 2019) who indicated that in order to ensure that priorities and key government objectives are budgeted and attained, the budget plans must be linked to government institutions mandate and strategic plans.

The skewness values for alignment between demand planning and budgeting ranged from -1.008 to – 0.646, falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -0.214 and 0.717, thereby “falling within the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.5.4 Summary of results of alignment between demand planning, strategic objectives and budgeting

The results of the analysis of all the responses to the alignment between demand planning, strategic objectives and budgeting statements were arranged from the lowest to the highest mean score.

Table 6.19 below shows the perception of the respondents regarding the alignment between demand planning, strategic objectives and budgeting.

Table 6.19: Summary of alignment between demand planning, strategic objectives and budgeting

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Demand planning	4.39	5.00	0.798	-1.575	3.076
Strategic objectives	4.37	5.00	0.801	-1.449	2.598
Budgeting	4.18	4.00	0.831	-0.704	-0.026

Table 6.19 indicates the statistical results for alignment between demand planning, strategic objectives and budgeting. The mean scores were ranked from highest to lowest to determine the extent of alignment between demand planning, strategic

objectives and budgeting. The results reveal that demand planning was the highest aligned (M=4.39, SD=0.798), followed by strategic objectives (M= 4.37, SD=0.801) and budgeting (M=4.18, SD=0.831).

The results for alignment between demand planning, strategic objectives and budgeting obtained a mean score ranging from (4.39 to 4.18). The high mean score is an indication that the majority of hospitals revealed that demand planning is aligned with strategic objectives and budget. The results are in line with the findings of Naidoo (2019) who indicated that in order to ensure that priorities and key government objectives are budgeted and attained, the budget plans must be linked to the government institution's mandate and strategic plans.

It is critical that public sector entities ensure the alignment between demand planning, strategic objectives and budget. Demand management practitioners must ensure that the resources required to achieve the objectives contained in the strategic objectives are listed in demand plans, and that budget is adequately provided. This will ensure that the resources, as required in the strategic plan, will be delivered at the right time, at the right cost in the right quantity and quality and in the right place.

The skewness values for alignment between demand planning, strategic objectives and budgeting ranged from -1.575 to - 0.704, falling outside the -1 and +1 normality range recommended for these coefficients (Cohen *et al.*, 2013). The kurtosis values ranged between -0.026 and 3.076, thereby "falling outside the -1, and above the +1 normality range recommended for these coefficients" (Tredoux & Durrheim, 2013:181).

6.6 MECHANISMS NECESSARY FOR THE EFFICIENT IMPLEMENTATION OF DEMAND MANAGEMENT

The section provides the responses to the questions relating to the mechanisms necessary for the implementation of demand management. Section E of the questionnaire consisted of five statements which present the responses relating to mechanisms necessary for the efficient implementation of demand management. The respondents had to indicate their agreement with the statements against a 5-point Likert scale.

Table 6.20 below shows the perception of the respondents regarding the mechanisms necessary for the effective implementation of demand management.

Table 6.20: Mechanisms necessary for effective implementation of demand management

Practice	Mean	Median	Std. Dev.	Skewness	Kurtosis
Our institution has an approved organisational structure.	4.09	4.00	0.956	-1.049	1.009
Demand management practitioners understand their roles and responsibilities.	4.03	4.00	0.916	-0.757	0.337
Demand management practitioners possess relevant skills.	4.03	4.00	0.932	-0.759	0.239
Demand management practitioners attend training courses.	4.03	4.00	0.939	-0.732	0.134
Our institution has sufficient capacity to implement demand management.	3.71	4.00	1.145	-0.754	-0.085

The responses were ranked according to the highest mean score achieved. In terms of the perception of the respondents relating to mechanisms necessary for effective implementation of demand management, Table 6.20 indicates that institutions have an approved organisational structure (M=4.09, SD=0.956), followed by Demand management practitioners understanding their roles and responsibilities (M=4.03, SD=0.916), Demand management practitioners possessing relevant skills (M=4.03, SD=0.932), and Demand management practitioners attending training courses (M=4.03, SD=0.939). The least ranked score indicated that institutions have sufficient capacity to implement demand management at (M=3.71, SD= 1.145).

The results related to the mechanisms necessary for the efficient implementation of demand management obtained a mean score ranging from (4.09 to 3.71). The high mean score is an indication that the majority of the mechanisms are necessary for the efficient implementation of demand management. The results are in line with the finding of Masete and Mafini (2018:3) study that indicated that the mechanisms necessary for the efficient implementation of demand management comprise a complete set of human skills, equipment, procedures, and rules and regulations that work in harmony to achieve a set of predetermined goals.

The skewness values for mechanisms necessary for the efficient implementation of demand management ranged from -1.049 and -0.732, falling outside the -1 and +1 normality range recommended for these coefficients” (Cohen *et al.*, 2013). The kurtosis values ranged between -0.085 and 1.009, thereby “falling outside the -1, and above the +1 normality range recommended for these coefficients” (Tredoux & Durrheim, 2013:181).

6.7 CHALLENGES IMPACTING THE IMPLEMENTATION OF DEMAND MANAGEMENT

Section F of the questionnaire contained six statements focusing on determining challenges impacting the implementation of demand management in the South African public sector. The respondents had to rate their level of agreement against a 5-point Likert scale. As shown in Table 6.21 below the following abbreviations were used: SD for strongly disagree, D for disagree, DN for neither agree nor disagree, A for agree and SA for strongly agree.

Table 6.21 shows (in percentages) the perception of the respondents regarding challenges with the implementation of demand management.

Table 6.21: Challenges with the implementation of demand management

Statements	SD	DA	DN	A	SA
Our organisational structure has not made provision for demand management.	3.9%	8.7%	20.3%	29%	38.2%
We experience challenges implementing demand management practices.	2.9%	5.3%	16.9%	34.8%	40.1%
We are allocated insufficient budget.	1.0%	3.4%	16.9%	37.7%	41.1%
We experience challenges in aligning demand plans to strategic objectives.	2.9%	2.9%	24.2%	34.3%	35.7%
We experience challenges in complying with Supply Chain Management (SCM) policies and regulations.	3.4%	7.7%	24.2%	34.8%	30.0%
We experience challenges in compiling specifications according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principle.	3.4%	9.2%	9.7%	38.2%	39.6%

Source: Research data (2018)

The responses were ranked according to the highest percentage. In terms of the perception of the respondents relating to challenges with the implementation of demand management, Table 6.21 indicates that more than half (67.2%) of the respondents to some level agreed with the statement “Our organisation structure has not made provision for demand management”, whilst 12.6% felt that this was still a challenge.

The results in Table 6.21 further indicate that most of the respondents to some level (74.9%) agreed with the statement “We experience challenges implementing demand management practices”, whilst 8.2% perceived this not to be a challenge.

In addition, 78.8% agreed with the statement “We are allocated insufficient budget”, whilst 4.4% disagreed with the statement.

Moreover, the results in Table 6.21 further show that most of the respondents (70%) agreed with the statement “We experience challenges in aligning demand plans to strategic objectives”, whilst 5.8% of the respondents disagreed with the statement.

Majority of the respondents (64.8%) agreed with the statement “We experience challenges in complying with SCM policies and regulations”, whilst 11.1% disagreed to the statement.

Most of the respondents, 77.8% agreed with the statement “We experience challenges in compiling specifications according to the SMART principle”, whilst 12.6% indicated that this is not a challenge.

This confirms that a number of public sector entities still experience challenges in implementing demand management practices. The study revealed six challenges that are prevalent in demand management in the South African public sector, indicating that the organisational structure has not made provision for demand management, demand management practices have not been implemented, there is insufficient allocation of budget, demand plans are not aligned to strategic objectives, demand management practices do not comply with SCM prescripts, and specifications are not compiled according to the SMART principle.

This confirms the findings of Ambe and Badenhorst-Weiss (2012a:252) that public sector entities experience challenges with linking demand plans with strategic objectives, and public sector entities do not comply with the prescripts of SCM.

6.8 EXPLORATORY FACTOR ANALYSIS

This section validates the research instrument and presents the results for each of the five factor (demand management practices, compliance of demand management practices, alignment between demand planning, mechanisms necessary, and challenges impacting implementation) analyses, as well as the reliability tests performed in the study.

6.8.1 Demand management practices

Before exploring the factor analysis results for demand management practices, the assumption of sample adequacy and correlation were tested with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity, as reflected in Table 6.22.

Table 6.22: Sample adequacy and correlation tests

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.846
Bartlett's Test of Sphericity	Approx. Chi-Square	2893.429
	df	190
	Sig.	0.000

To test the theoretical constructs that were hypothesised, three factors, namely, development of specifications and TOR, demand management considerations, and key role players in the demand management process were extracted. The factorability of the 23 demand management practices items was examined, and items with loadings <0.4 were suppressed. As a result, three items with communalities <0.3 were excluded. The final model, therefore, consisted of 20 items.

Table 6.22 indicates that the KMO measure of sampling adequacy was .846, above the commonly recommended value of .6. The results in Table 6.22 further reveal that the Bartlett's test of sphericity was significant ($\chi^2(190) = 2893.429, p < .05$). Finally, the communalities (h^2) (the total amount of variance a variable shares with all factors) were all above .3 (see Table 6.23), further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable with all 20 items, and the factors extracted were named, as presented in Table 6.23.

Table 6.23: Communalities between the three factors

Variables	Naming of factors	Factors extracted			h ²
		1	2	3	
B2.2 Bid Specification Committee (BSC) compiles terms of reference according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principle	Development of specifications and terms of reference	0.91			0.727
B2.1 Bid Specification Committee (BSC) compiles specifications according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principle		0.887			0.709
B2.3 Bid Specification Committee (BSC) drafts specifications in an unbiased manner		0.746			0.661
B3.7 Bid Evaluation Committee (BEC) evaluate bids according to pre-determined evaluation criteria		0.688			0.578
B2.6 Bid Specification Committee (BSC) includes acceptable standards in specifications		0.633			0.588
B2.5 Bid Specification Committee (BSC) attends meetings on a regular basis		0.587			0.849
B3.6 Bid Specification Committee (BSC) compiles evaluation criteria		0.451			0.861
B3.4 We utilise the demand plan for procurement of goods		0.429			0.679
B1.2 We analyse Basic Accounting System (BAS) reports weekly		Demand management considerations		0.834	
B1.3 We analyse Systems Applications and Products in Data Processing (SAP) reports daily			0.758		0.718
B1.5 We identify suppliers for sub-contracting opportunities			0.562		0.813

Variables	Naming of factors	Factors extracted			h ²
		1	2	3	
B1.4 We implement effective sourcing strategies			0.486		0.751
B1.6 We analyse supplier cost structures			0.45		0.760
B3.8 Bid Adjudication Committee (BAC) is conversant with Supply Chain Management (SCM) prescripts	Key role players in the demand management process			0.716	0.484
B2.7 Fruitless and wasteful expenditure is reported to the Loss Control unit				0.671	0.557
B3.3 Cost Centre Managers approve all procurement requests				0.639	0.564
B2.8 Irregular expenditure is reported to the Loss Control unit				0.629	0.548
B3.2 The Chief Financial Officer (CFO) is appointed as the chairperson of Bid Adjudication Committee (BAC)				0.597	0.476
B2.4 Bid Specification Committee (BSC) are appointed by the Head of Department (HOD)				0.549	0.655
B3.1 The Head of Department (HOD) approves contracts above R1million				0.496	0.655
Extraction Method: Principal Axis Factoring.					
Rotation Method: Oblimin with Kaiser Normalization.					
a. Rotation converged in 8 iterations.					

Table 6.23 indicates that the communalities (h^2), namely, development of specifications and TOR, demand management considerations and key role players in the demand management process were all above .3, confirming that each item shared some common variance with the other items.

Reliability analysis for demand management practices:

Table 6.24 shows the results of the Cronbach's alpha for the three factors, namely, development of specifications and TOR, demand management considerations, and key role players in the demand management process.

Table 6.24: Reliability statistics

Constructs	Cronbach's alpha	N of Items
Development of specifications and terms of reference	0.905	8
Demand management considerations	0.854	5
Key role players in the demand management process	0.849	7

Table 6.24 indicates that the three factors have Cronbach's alpha values >0.70 , which is the acceptable level, indicating relatively high levels of internal consistency.

6.8.2 Compliance of demand management practices with SCM policies and regulations

Before exploring the factor analysis results, the assumption of sample adequacy and correlation were tested. Table 6.25 presents the results of the sample adequacy and correlation tests.

Table 6.25: Sample adequacy and correlation tests

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.481
Bartlett's Test of Sphericity	Approx. Chi-Square	1093.719
	df	55
	Sig.	.000

Table 6.25 indicates that the test of assumptions of factor analysis was not met for this section as the KMO is less than .060. To improve the results, items with communalities <0.3 were excluded, however, this did not improve the results. The factorability of the

section was not achieved, and for that reason, the items will not be combined to calculate the summated score for compliance with demand management practices, and the items will rather be treated separately.

6.8.3 Alignment between demand planning, strategic objectives and budget

Before exploring the factor analysis results, the assumption of sample adequacy and correlation were first tested.

The factorability of the 14 items related to the alignment between demand planning, strategic objectives and budget was examined, and three factors, namely, demand planning, alignment to strategic objectives and alignment to budget were extracted.

Table 6.26: Sample adequacy and correlation tests

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.638
Bartlett's Test of Sphericity	Approx. Chi-Square	944.956
	df	45
	Sig.	0.000

Table 6.26 indicates that the KMO measure of sampling adequacy was .638, above the commonly recommended value of .6, and Bartlett's test of sphericity was significant ($\chi^2(45) = 944.956, p < .05$). Finally, the communalities (h^2) were all above .3 (see Table 6.27), further confirming that each item shared some common variance with other items.

Given these overall indicators, factor analysis was deemed to be suitable with all remaining 10 items and the factors extracted were named, as presented in Table 6.27.

Table 6.27: Communalities between demand planning, budget and strategic objectives

	Naming of factors	1	2	3	h ²
D1.3 Demand plans indicate the full description of goods required		0.821			0.586
D2.3 The head of Supply Chain Management (SCM) is involved in the strategic planning process		0.805			0.386
D1.1 Demand plans include all requirements for the financial year	Demand planning	0.722			0.796
D1.5 Procurement plans are compiled for requirements above R500 000		0.641			0.839
D1.2 Demand plans are approved in line with budget allocations		0.524			0.483
D3.3 Demand plans are compiled during budget bilateral	Budget		0.775		0.834
D3.1 Demand management practitioners attend budget bilateral			0.707		0.818
D3.2 End users present detailed budget bids during budget bilateral			0.603		0.515
D2.2 The resources required for the fulfilment of obligations are clearly identified	Strategic objectives			0.857	0.438
D1.4 Demand plans are aligned with the institution's strategic objectives				0.848	0.631

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Table 6.27 indicates that the communalities (h²) were all above .3, confirming that each item shared some common variance with other items. This implies the alignment between demand planning, strategic objectives and budget in the majority of hospitals in GDoH. This will ensure that the resources identified in the strategic plan will be delivered at the right time, right place in the right quantity and quality and at the right cost.

Reliability analysis - alignment between demand planning, strategic objectives and budgeting:

Table 6.28 shows the results of the Cronbach's alpha for the three factors, namely, demand planning, budget and strategic objectives.

Table 6.28: Reliability analysis of demand planning, strategic objectives and budgeting

	Cronbach's alpha	N of Items
Demand planning	0.746	5
Budget	0.649	3
Strategic objectives	0.930	2

Table 6.28 indicates that two of the factors have Cronbach's alpha values >0.70, and one factor has Cronbach's alpha >0.60 <.70 which is acceptable, indicating relatively high levels of internal consistency.

6.8.4 Mechanisms necessary for the efficient implementation of demand management

Before exploring the factor analysis results, the assumption of sample adequacy and correlation were first tested.

The factorability of the mechanisms necessary for the efficient implementation of demand management was examined. Table 6.29 presents the results of the sample adequacy and correlation tests.

Table 6.29: Sample adequacy and correlation tests

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.799
Bartlett's Test of Sphericity	Approx. Chi-Square	197.655

	df	10
	Sig.	0.000

Table 6.29 indicates that the KMO measure of sampling adequacy was .799, above the commonly recommended value of .6, and the Bartlett's test of sphericity was significant ($\chi^2(45) = 197.655, p < .05$). Finally, the communalities (h^2) were all above .3 (see Table 6.30), further confirming that each item shared some common variance with other items.

Given these overall indicators, factor analysis was deemed to be suitable with all 5 items, and the factors extracted were named.

Table 6.30: Communalities between the mechanisms necessary for the efficient implementation of demand management

	Factor	1	h^2
1.1 Our institution has an approved organisational structure	Mechanisms necessary for the efficient implementation of demand management	0.670	0.449
1.2 Our institution has sufficient capacity to implement demand management		0.609	0.371
1.3 Demand management practitioners understand their roles and responsibilities		0.704	0.495
1.4 Demand management practitioners possess relevant skills		0.748	0.560
1.5 Demand management practitioners attend training courses		0.769	0.592
Extraction Method: Principal Component Analysis.			
a. 1 components extracted.			

Table 6.30 indicates that the communalities (h^2) were all above .3, confirming that each item shared some common variance with other items. This implies that all the mechanisms are necessary for the efficient implementation of demand management in the public sector in South Africa. This will ensure that demand management is effectively and efficiently implemented within the public sector.

Reliability analysis for mechanisms necessary for the efficient implementation of demand management:

Table 6.31 shows the results of the Cronbach's alpha for the mechanisms necessary for the implementation of demand management.

Table 6.31: Results of the Cronbach's alpha for the mechanisms necessary for the implementation of demand management

	Cronbach's alpha	N of Items
Mechanisms necessary for the efficient implementation of demand management	0.734	5

Table 6.31 indicates that the factor has a Cronbach's alpha value >0.70, which is acceptable, indicating a relatively high level of internal consistency.

6.8.5 Challenges impacting the implementation of demand management

Before exploring the factor analysis results, the assumption of sample adequacy and correlation were first tested.

The factorability of the challenges impacting the implementation of demand management was examined. Table 6.32 presents the results of the sample adequacy and correlation tests.

Table 6.32: Results of the sample adequacy and correlation tests for challenges impacting the implementation of demand management

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.820
Bartlett's Test of Sphericity	Approx. Chi-Square	307.145
	df	15
	Sig.	0.000

Table 6.32 indicates that the KMO measure of sampling adequacy was .820, above the commonly recommended value of .6, and the Bartlett's test of sphericity was significant ($\chi^2(45) = 307.145, p < .05$). Finally, the communalities (h^2) were all above .3 (see Table 6.33), further confirming that each item shared some common variance with other items.

Given these overall indicators, factor analysis was deemed to be suitable with all six items, and the factors extracted were named.

Table 6.33: Communalities between challenges impacting the implementation of demand management

	Naming of factors	1	h2
F1.1 Our organisation structure has not made provision for demand management	Challenges impacting the implementation of demand management	0.659	0.435
F1.2 We experience challenges implementing demand management practices		0.740	0.547
F1.3 We are allocated insufficient budget		0.570	0.325
F1.4 We experience challenges in aligning demand plans to strategic objectives		0.735	0.540
F1.5 We experience challenges in complying with Supply Chain Management (SCM) policies and regulations		0.746	0.557
F1.6 We experience challenges in compiling specifications according to the Specific, Measurable, Achievable, Realistic and Timely, (SMART) principle		0.728	0.529
Extraction Method: Principal Component Analysis			

Table 6.33 indicates that the communalities (h2) were all above .3, confirming that each item shared some common variance with other items. This implies that there is communality between the challenges impacting the implementation of demand management in the public sector in South Africa. The GDoH will continue to experience challenges in the implementation of demand management within all hospitals if the identified challenges are not resolved.

Reliability analysis for challenges impacting the implementation of demand management:

Table 6.34 shows the results of the Cronbach’s alpha for the challenges impacting the implementation of demand management.

Table 6.34: Results of the Cronbach’s alpha for the challenges impacting the implementation of demand management

	Cronbach's alpha	N of Items
Challenges impacting the implementation of demand management	.789	6

Table 6.34 indicates that the factor has a Cronbach’s alpha value >0.70, which is acceptable, indicating a relatively high level of internal consistency.

6.9 DESCRIPTIVE STATISTICS

This section presents the results of the descriptive statistics related to the four constructs (demand management practices, alignment between demand planning, strategic objectives and budgeting, mechanisms necessary, and challenges impacting implementation) in the study.

6.9.1 Demand management practices

Table 6.35 shows the perception of the respondents regarding the three dimensions of demand management practices in the South African public sector.

Table 6.35: Perception of respondents regarding the three dimensions of demand management practices in the South African public sector

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Minimum
Development of specifications and terms of reference	4.114	4.375	.748	-.962	-.078	2.25
Demand management considerations	3.578	3.800	1.020	-.521	-.730	1.00
Key role players in the demand management process	4.226	4.429	.670	-.708	-.641	2.71

Table 6.35 indicates that the highest mean score was for key role players in the demand management process (M=4.226, SD=0.670), followed by development of specifications and TOR (M=4.114, SD=0.748), whilst demand management considerations scored the lowest mean score (M=3.578, SD=1.020). This implies that the majority of hospitals in GDoH have implemented demand management practices. Key role players play an active role in the demand management process, thus ensuring that critical goods and services are received on time, at the right place, at the right quantity and quality and at the right cost.

Table 6.36: Key role players in the demand management process

Statistics	
	Maximum
Development of specifications and terms of reference	5.00
Demand management considerations	5.00
Key role players in the demand management process	5.00

Table 6.36 indicates a maximum mean score of 5.00 for demand management practices in the South African public sector. The highest mean score for demand management practices was (M=4.226, SD=0.670), and the lowest mean score (M=3.578, SD=1.020). This implies that the majority of hospitals in GDoH have efficiently and effectively implemented demand management practices, thus ensuring the correct quantity and quality of goods are timeously received.

6.9.2 Alignment between demand planning, strategic objectives and budget

Table 6.37 presents the perception of respondents regarding the alignment between demand planning, strategic objectives and budgeting.

Table 6.37: Perception of respondents regarding the alignment between demand planning, strategic objectives and budgeting

Statistics						
	Mean	Median	Std. Dev.	Skewness	Kurtosis	Minimum
Demand planning	4.124	4.400	.718	-.913	.392	1.60
Budget	4.077	4.000	.707	-.952	.989	1.67
Strategic objectives	4.135	4.000	.834	-.544	-.707	2.00

Table 6.37 indicates that the highest mean score was for alignment with strategic objectives (M=4.135, SD=0.834), followed by alignment with demand planning, (M=4.124, SD=0.718), whilst alignment with budget scored the lowest mean score (M=4.077, SD=0.707).

Table 6.38: Alignment between demand planning, strategic objectives and budgeting

Statistics	
	Maximum
Demand planning	5.00
Budget	5.00
Strategic objectives	5.00

Table 6.38 indicates a maximum mean score of 5.00 for alignment between demand planning, strategic objectives and budget. The highest mean score for alignment between demand planning, strategic objectives and budgeting was (M=4.135, SD=0.834), and the lowest mean score (M=4.077, SD=0.707). This implies that there is alignment between demand planning, strategic objectives and budget within the majority of hospitals in GDoH. This results in the resources as identified in the strategic plan being delivered timeously.

6.9.3 Mechanisms necessary for the efficient implementation of demand management

Table 6.39 shows the perception of the respondents regarding mechanisms necessary for the efficient implementation of demand management.

Table 6.39: Perception of respondents regarding mechanisms necessary for the efficient implementation of demand management

Mean	Median	Std. Dev.	Skewness	Kurtosis	Minimum	Maximum
3.980	4.000	.683	-1.711	4.568	1.00	5.00

Table 6.39 indicates that the mean score for mechanisms necessary for the efficient implementation of demand management is (M=3.980, SD=.683).

6.9.4 Challenges impacting the implementation of Demand Management

Table 6.40 shows the perception of the respondents regarding challenges impacting the implementation of demand management.

Table 6.40: Perception of respondents regarding challenges impacting the implementation of demand management

Mean	Median	Std. Dev.	Skewness	Kurtosis	Minimum	Maximum
3.977	4.167	.719	-1.412	2.569	1.00	5.00

Table 6.40 indicates that the mean score for challenges impacting the implementation of demand management is (M=3.977, SD=.719). This implies that certain hospitals in GDoH are still experiencing challenges in implementing demand management, resulting in the resources identified in the strategic plan not being delivered on time, at the right place, at the right cost and in the right quantity and quality.

6.10 INFERENCE STATISTICS

This section presents the analyses of the results to determine whether there is a statistically significant difference between: (i) demand management practices in different hospitals in GDoH, (ii) compliance of demand management practices with the Constitution, (iii) compliance of demand management practices with the PFMA and PPPFA, (iv) differences in alignment between demand planning, strategic objectives and budget, and (v) mechanisms necessary for the efficient implementation of demand management and challenges impacting the implementation of demand management.

The parametric test ANOVA and a non-parametric test, such as Kruskal-Wallis, were performed to test for the difference. The parametric test was applied where the data was found to be normally distributed and the non-parametric test was performed where the data was found to not be normally distributed.

6.10.1 Differences in the perception on demand management practices in terms of categories of the hospitals

The null hypothesis is stated as follows:

Null hypothesis: There is no significant difference between the categories of the hospitals in GDoH with regard to demand management practices.

Alternative hypothesis: There is a significant difference between the categories of the hospitals in GDoH with regard to demand management practices.

The null hypothesis will be rejected if the p-value is < 0.05 .

Table 6.41 shows differences in the perception regarding demand management practices in terms of the categories of hospital.

Table 6.41: Differences in the perception of demand management practices in terms of categories of hospital

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		Min	Max	Tests of Homogeneity of Variances	ANOVA	
					Lower Bound	Upper Bound				F	P
Development of specifications and terms of reference	Central	20	4.03	0.791	3.65	4.40	2.25	5.00	0.735	0.515	0.725
	District	58	4.21	0.715	4.02	4.40	2.38	5.00			
	Regional	36	4.05	0.784	3.78	4.31	2.50	5.00			
	Specialised	79	4.08	0.754	3.91	4.24	2.25	5.00			
	Tertiary	14	4.23	0.743	3.80	4.66	2.25	5.00			
	Total	207	4.11	0.748	4.01	4.22	2.25	5.00			
Demand management considerations	Central	20	3.36	1.189	2.80	3.92	1.00	5.00	0.388	0.530	0.714
	District	58	3.54	1.090	3.26	3.83	1.00	5.00			
	Regional	36	3.49	0.975	3.16	3.82	1.80	5.00			
	Specialised	79	3.67	0.943	3.46	3.88	1.00	5.00			
	Tertiary	14	3.73	1.077	3.11	4.35	2.00	5.00			
	Total	207	3.58	1.020	3.44	3.72	1.00	5.00			
Key role players in the demand management process	Central	20	3.92	0.758	3.57	4.28	2.71	5.00	0.454	2.072	0.086
	District	58	4.31	0.679	4.13	4.49	2.71	5.00			
	Regional	36	4.34	0.589	4.14	4.54	2.71	5.00			
	Specialised	79	4.16	0.667	4.01	4.31	2.71	5.00			
	Tertiary	14	4.42	0.610	4.07	4.77	3.14	5.00			
	Total	207	4.23	0.670	4.13	4.32	2.71	5.00			

The test of assumption of equality, Levene's test was performed, and from Table 6.41 above it is evident that the variances are equal across the hospitals: $p > 0.05$. The study also failed to reject the null hypothesis that there is no difference between the mean scores of the hospitals, as the ANOVA's p-values are all > 0.05 .

The results in Table 6.41 indicate that there is no statistical difference in demand management practices in the various hospitals in GDoH. This implies that the respondents similarly rated the statements.

6.10.2 Differences in the compliance of demand management practices with the Constitution between the categories of hospital

The null hypothesis is stated as follows:

Null hypothesis: There is no significant difference between the categories of the hospitals in GDoH with regard to the compliance of demand management practices with SCM policies.

Alternative hypothesis: There is a significant difference between the categories of the hospitals in GDoH with regard to compliance of demand management practices with SCM policies.

Table 6.42 shows the differences in the compliance of demand management practices with the Constitution between the categories of hospitals.

Table 6.42: Test for differences in the compliance of demand management practices with the Constitution between the categories of hospital

	Hospital	N	Mean Rank	Kruskal-Wallis H	df	p-value
Bid Specification Committee (BSC) compiles specifications according to the Specific, Measurable, Achievable, Realistic, and Timely (SMART) principle	Central	20	104.18	4.434	4	0.350
	District	58	111.78			
	Regional	36	96.69			
	Specialised	79	97.99			
	Tertiary	14	124.21			
	Total	207				
Bid Specification Committee (BSC) compiles terms of reference according to the Specific, Measurable, Achievable,	Central	20	100.25	2.726	4	0.605
	District	58	110.05			
	Regional	36	95.68			
	Specialised	79	101.60			

	Hospital	N	Mean Rank	Kruskal-Wallis H	df	p-value
Realistic, and Timely (SMART) principle	Tertiary	14	119.21			
	Total	207				
Bid Specification Committee (BSC) drafts specifications in an unbiased manner	Central	20	86.95	4.850	4	0.303
	District	58	103.71			
	Regional	36	109.81			
	Specialised	79	101.77			
	Tertiary	14	127.21			
	Total	207				
Bid Specification Committee (BSC) are appointed by the Head of Department (HOD)	Central	20	86.40	9.019	4	0.061
	District	58	109.36			
	Regional	36	114.85			
	Specialised	79	95.03			
	Tertiary	14	129.64			
	Total	207				
Bid Specification Committee (BSC) attend meetings on a regular basis	Central	20	96.15	0.751	4	0.945
	District	58	106.97			
	Regional	36	104.63			
	Specialised	79	102.48			
	Tertiary	14	109.89			
	Total	207				
Bid Specification Committee (BSC) include acceptable standards in specifications	Central	20	94.23	2.932	4	0.569
	District	58	113.71			
	Regional	36	102.96			
	Specialised	79	99.49			
	Tertiary	14	105.89			
	Total	207				
Fruitless and wasteful expenditure is reported to the Loss Control unit	Central	20	86.85	2.472	4	0.650
	District	58	109.28			
	Regional	36	105.85			
	Specialised	79	104.39			
	Tertiary	14	99.71			
	Total	207				

	Hospital	N	Mean Rank	Kruskal-Wallis H	df	p-value
Irregular expenditure is reported to the Loss Control unit	Central	20	80.20	4.570	4	0.334
	District	58	105.03			
	Regional	36	108.35			
	Specialised	79	105.16			
	Tertiary	14	116.04			
	Total	207				

The test of assumption of equality, the Levene's test was performed, and from Table 6.42 above it is evident that the variances are equal across the categories of hospital: $p > 0.05$. The study also failed to reject the null hypothesis that there is no difference between the mean scores of the hospitals, as the ANOVA's p-values are all > 0.05 .

The results in Table 6.42 indicate that there is no statistical difference in terms of compliance to demand management practices with the Constitution between the various categories of hospitals. This implies that the respondents similarly rated the statements.

6.10.3 Differences in the compliance of demand management practices with the PFMA and PPPFA between the categories of hospitals

The null hypothesis is stated as follows:

Null hypothesis: There is no significant difference between the categories of the hospitals in GDoH with regard to compliance of demand management practices with SCM policies and regulations.

Alternative hypothesis: There is a significant difference between the categories of the hospitals in GDoH with regard to compliance of demand management practices with SCM policies and regulations.

Table 6.43 shows the differences in the compliance of demand management practices with the PFMA and PPPFA between the various hospitals in GDoH.

Table 6.43: Test for differences in compliance of demand management practices with the PFMA and PPPFA between the categories of the hospital

Hospital	Category	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Our procurement is conducted in a fair manner	Central	20	99.48	3.212	4	0.523
	District	58	111.06			
	Regional	36	104.03			
	Specialised	79	103.94			
	Tertiary	14	81.50			
	Total	207				
We provide procurement opportunities to previously disadvantaged individuals	Central	20	80.90	6.582	4	0.160
	District	58	112.73			
	Regional	36	94.33			
	Specialised	79	105.75			
	Tertiary	14	115.82			
	Total	207				
We advertise tenders on the National Treasury eTender portal	Central	20	94.80	3.291	4	0.510
	District	58	97.16			
	Regional	36	108.08			
	Specialised	79	106.22			
	Tertiary	14	122.50			
	Total	207				
We request bids from suitably qualified suppliers	Central	20	87.23	7.776	4	0.100
	District	58	109.46			
	Regional	36	90.01			
	Specialised	79	113.41			
	Tertiary	14	88.21			
	Total	207				
We conduct price negotiations with prospective suppliers	Central	20	88.63	2.716	4	0.606
	District	58	107.52			
	Regional	36	98.29			
	Specialised	79	105.90			
	Tertiary	14	115.36			
	Total	207				
The Supply chain Management (SCM) unit reports to the Chief Financial Officer (CFO)	Central	20	97.40	2.046	4	0.727
	District	58	108.84			
	Regional	36	102.61			

Hospital	Category	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
	Specialised	79	100.23			
	Tertiary	14	118.21			
	Total	207				
We ensure standard bid document (SBD) forms are completed by prospective bidders	Central	20	93.75	4.323	4	0.364
	District	58	95.38			
	Regional	36	106.50			
	Specialised	79	108.43			
	Tertiary	14	122.93			
	Total	207				
Bid Specification Committee (BSC) ensure the bid evaluation criteria is clearly stipulated in bid documents	Central	20	92.00	2.289	4	0.683
	District	58	106.94			
	Regional	36	96.42			
	Specialised	79	106.74			
	Tertiary	14	113.00			
	Total	207				
80/20 point system is used for transactions between R30 000 – R50 million	Central	20	85.43	5.419	4	0.247
	District	58	103.79			
	Regional	36	96.21			
	Specialised	79	113.58			
	Tertiary	14	97.36			
	Total	207				
90/10 point system is used for transactions above R50 million	Central	20	88.85	2.111	4	0.715
	District	58	108.16			
	Regional	36	103.39			
	Specialised	79	106.34			
	Tertiary	14	96.79			
	Total	207				
Sub-contracting is considered a pre-requisite for transactions above R30 million	Central	20	98.13	4.592	4	0.332
	District	58	110.94			
	Regional	36	112.14			
	Specialised	79	94.74			
	Tertiary	14	114.96			
	Total	207				

The test of assumption of equality, the Levene's test was performed, and from Table 6.43 above it is evident that the variances are equal across the hospital: $p > 0.05$. The study also failed to reject the null hypothesis that there is no difference between the mean scores of the hospitals, as the ANOVA's p-values are all > 0.05 .

The results in Table 6.43 indicate that there is no statistical difference in compliance with the PFMA and PPPFA between the various hospitals in GDoH. This implies that the respondents similarly rated the statements.

6.10.4 Differences in alignment between demand planning, strategic objectives and budget

The null hypothesis is stated as follows:

Null hypothesis: There is no significant difference between the categories of the hospitals in GDoH with regard to alignment between demand planning, strategic objectives and budget.

Alternative hypothesis: There is a significant difference between the categories of the hospitals in GDoH with regard to alignment between demand planning, strategic objectives and budget.

Table 6.44 shows the differences in alignment between demand planning, strategic objectives and budget

Table 6.44: Test for differences in alignment between demand planning, strategic objectives and budget

		N	Mean	Std. deviation	95% confidence interval for mean		Min	Max	Tests of homogeneity of variances	ANOVA	
					Lower Bound	Upper Bound				F	P
Demand Planning	Central	20	3.950	0.778	3.586	4.314	2.00	5.00	0.958	0.527	0.716
	District	58	4.076	0.704	3.891	4.261	2.20	5.00			
	Regional	36	4.206	0.641	3.989	4.422	2.80	5.00			
	Specialised	79	4.157	0.758	3.987	4.327	1.60	5.00			
	Tertiary	14	4.171	0.692	3.772	4.571	2.80	5.00			
	Total	207	4.124	0.718	4.025	4.222	1.60	5.00			
Budget	Central	20	3.633	0.936	3.195	4.071	1.67	5.00	0.194	2.346	0.056
	District	58	4.098	0.664	3.923	4.272	2.33	5.00			
	Regional	36	4.083	0.692	3.849	4.317	2.00	5.00			
	Specialised	79	4.160	0.622	4.021	4.300	2.00	5.00			
	Tertiary	14	4.143	0.864	3.644	4.642	2.00	5.00			
	Total	207	4.077	0.707	3.980	4.174	1.67	5.00			
Strategic objectives	Central	20	3.975	0.924	3.542	4.408	2.00	5.00	0.989	1.398	0.236
	District	58	3.957	0.834	3.738	4.176	2.00	5.00			
	Regional	36	4.208	0.787	3.942	4.475	3.00	5.00			
	Specialised	79	4.259	0.812	4.078	4.441	2.00	5.00			
	Tertiary	14	4.214	0.893	3.699	4.730	2.00	5.00			
	Total	207	4.135	0.834	4.021	4.250	2.00	5.00			

The test of assumption of equality, the Levene's test was performed, and from Table 6.44 above it is evident that the variances are equal across the hospital: $p > 0.05$. The study also failed to reject the null hypothesis that there is no difference between the mean scores of the hospitals, as the ANOVA's p-values are all > 0.05 .

The results in Table 6.44 indicate that there is no statistical difference in the alignment between demand planning, strategic objectives and budget between the hospitals. This implies that the respondents similarly rated the statements.

6.10.5 Differences in the mechanisms necessary for the efficient implementation of demand management and challenges impacting the implementation of demand management

The null hypothesis is stated as follows:

Null hypothesis: There is no significant difference between the categories of the hospitals in GDoH with regard to the mechanisms necessary for the efficient implementation of demand management, challenges impacting the implementation of demand management.

Alternative hypothesis: There is a significant difference between the categories of the hospitals in GDoH with regard to the mechanisms necessary for the efficient implementation of demand management, challenges impacting the implementation of demand management.

Table 6.45 shows the differences in the mechanisms necessary for the efficient implementation of demand management, and challenges impacting the implementation of demand management.

Table 6.45: Differences between mechanisms necessary for the efficient implementation of demand management and challenges impacting the implementation of demand management

Hospital		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Mechanisms necessary for the efficient implementation of demand management	Central	20	92.33	1.821	4	0.769
	District	58	105.60			
	Regional	36	107.58			
	Specialised	79	106.55			
	Tertiary	14	90.43			
	Total	207				
Challenges impacting the implementation of demand management	Central	20	78.30	7.583	4	0.108
	District	58	96.78			
	Regional	36	119.88			
	Specialised	79	107.18			
	Tertiary	14	111.86			
	Total	207				

The test of assumption of equality, the Levene's test was performed, and from Table 6.45 above it is evident that the variances are equal across the hospital: $p > 0.05$. The study also failed to reject the null hypothesis that there is no difference between the mean scores of the hospitals, as the ANOVA's p-values are all > 0.05 .

The results in Table 6.45 indicate that there is no statistical difference between the mechanisms necessary for the efficient implementation of demand management and challenges impacting the implementation of demand management between the hospitals. This implies that the respondents similarly rated the statements.

6.11 CONCLUSION

The chapter discussed the findings of the empirical study into the implementation of demand management practices, compliance to SCM policies and regulations and alignment between demand planning, strategic objectives and budgeting in the South African public sector. The measurement items were found to be reliable, valid, and therefore, acceptable. The findings of the research study indicate that the conceptualised model provides a good match for the specified sample data.

The next chapter revisits the study objectives, draws conclusions and makes recommendations for the public sector demand planning and further research studies.

CHAPTER 7:

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Chapter 7 starts by revisiting the research questions and objectives and indicates how they were achieved. Thereafter, recommendations are presented that are applicable to demand management practitioners and researchers. A summary of the main ideas of the conceptual framework and the outcome of the empirical results are presented. The chapter concludes by identifying areas for further research on demand management in the South African public sector.

7.2 REVISIT RESEARCH QUESTIONS AND OBJECTIVES

This section revisits the research questions and objectives. This study's primary purpose was to develop a demand management framework to improve demand management processes in the South African public sector. The main research question is: *What framework is best suited to improve demand management processes in the South African public sector?* To answer the main research question, the following secondary research questions were posed to senior demand management practitioners on post level 7, and above, from hospitals within the GDoH:

1. Which demand management practices are implemented in the South African public sector?
2. To what extent are demand management practices compliant with SCM policies and regulations?
3. To what extent is demand planning aligned with the public sector's strategic objectives and budget?
4. What mechanisms are necessary for the efficient implementation of demand management?
5. What challenges are experienced in the implementation of demand management?
6. What are the differences in demand management practices amongst hospitals in the GDoH?

7.3 RESEARCH OBJECTIVES

The main research objective of the study was to develop a demand management framework to improve demand management processes in the South African public sector. To achieve the main objective, the following secondary research objectives need to be achieved:

1. To identify which demand management practices are implemented in the South African Public Sector.
2. To assess the extent of compliance of demand management practices with SCM policies and regulations.
3. To assess the extent of alignment between demand planning, public sector strategic objectives and budget.
4. To determine what mechanisms are necessary for the efficient implementation of demand management.
5. To assess the challenges impacting the implementation of demand management.
6. To determine the differences in demand management practices amongst hospitals in the GDoH.

The following hypothesis was developed to answer Research objective 6:

Null hypothesis HO: There is no significant difference in demand management practices amongst hospitals in GDoH.

Positive hypothesis H1: There is a significant difference in demand management practices amongst hospitals in GDoH.

7.4 DISCUSSION OF THE RESEARCH FINDINGS

The section discusses the research findings as described in Chapter 6, based on the results. To answer the main research question, the secondary questions were responded to first.

7.4.1 Secondary research question 1

- Which demand management practices are implemented in the South African public sector?

To answer Research question 1, various literature sources were reviewed to achieve an understanding of the various demand management practices. The literature typically examined three key areas: demand considerations, specifications and TOR, and key role players. The literature review further identified six (6) demand management practices: needs analysis, expenditure analysis, commodity analysis, market analysis, industry analysis, and supplier analysis. The implementation of demand management practices in the South African public sector was tested using a questionnaire. Twenty-three (23) statements regarding demand management practices were raised to determine the extent of the implementation of demand management practices. The demand management practice with the highest score was key role players, followed by demand considerations, and specifications and TOR, with scores ranging between (4.54 and 4.17). The section below provides a brief discussion of the findings.

- **Key role players** was the highest implemented demand management practice in the South African public sector. The high score of demand management validates the vital role of key stakeholders in the demand management process. The results reveal that key role players play a critical role in the demand management process. The findings are in line with that of De Villiers *et al.* (2017:285), who indicated that it is vital that key role players participate in the demand management process. It is believed that the participation of key role players in the demand management processes will ensure a reduction in fruitless and wasteful expenditure, and further ensure that the correct goods, works and services are timeously procured.
- **Demand management considerations** was the second-highest implemented demand management practice. The high score validates the implementation of demand management considerations. The results reveal that most hospitals conduct a needs analysis, expenditure analysis, commodity analysis, market analysis, industry analysis and supplier analysis. The results align with the guidelines of National Treasury (2017:52), which indicate that demand management practitioners must implement demand management considerations by assisting end-users in embarking on a needs analysis, expenditure analysis, commodity analysis, market and industry analysis. It is believed that the efficient implementation of demand management considerations will yield cost savings and enhance efficiency within demand management.

- **Specifications and terms of reference** was the third-highest implemented demand management practice. According to the SMART principle, the high score validates the compilation of specifications and TOR. The results reveal that many hospitals compile unbiased specifications and TOR according to the SMART principle. The results align with the guidelines of National Treasury (2016:1), which indicate that specifications should be crafted in an unbiased manner that does not favour any specific bidder. It is believed that the compilation of specifications and TOR according to the SMART principle will ensure that the correct item is delivered at the right place in the right quantity and the right price.

7.4.2 Secondary research question 2

- To what extent are demand management practices compliant with SCM policies and regulations?

To answer Research question 2, various literature sources were reviewed to achieve an understanding of the various SCM prescripts. The literature review revealed that demand management practices must comply with SCM prescripts. This study analysed the compliance of demand management practices to three pieces of legislation, namely, the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996), the Public Finance Management Act, 1999 (Act 29 of 1999) and the Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000). The compliance of demand management practices to SCM prescripts was tested through the use of a questionnaire. Eleven (11) statements regarding the compliance of demand management practices were raised to determine their compliance with the SCM regulatory framework. The highest compliance of demand management practices to SCM policies and regulations was related to the PFMA, followed by the Constitution and PPPFA, with scores ranging between (4.27 and 4.15). The section below provides a discussion on the findings.

- The **PFMA** was the SCM prescript that showed the highest compliance from demand management practices. The high score validates compliance with the provisions of the PFMA. The results of the study reveal that a large majority of respondents indicated that their demand management practices comply with the requirements of the PFMA. The findings are in line with those of Shafritz *et al.* (2015:474), who suggested that the PFMA requires accounting officers/authorities

to place more emphasis on management principles and less emphasis on following a set of rules to achieve results. It is believed that compliance with the provisions of the PFMA will reduce the number of negative Auditor General of South Africa findings, and will further eliminate fraud and corrupt practices within the South African public sector.

- **The Constitution** was the SCM policy and regulation that showed the second highest compliance from demand management practices. The high score validates compliance with the provisions of the Constitution. The results reveal that a large majority of respondents indicated that their demand management practices comply with the requirements of the Constitution. The findings are in line with the results that Khadija and Kibert (2015:128) study obtained, and which suggested that "when an organ of state procures goods, works and services, it must be done by a fair, equitable system transparent, competitive and cost-effective". It is believed that compliance with the provisions of the Constitution will support HDIs and eliminate previous discriminatory practices.
- The **PPPFA** was found to be the SCM regulatory framework that showed the third-highest compliance from demand management practices. The high score validates compliance with the requirements of the PPPFA. The results reveal that a large majority of respondents indicated that their demand management practices comply with the provisions of the PPPFA. The findings align with those of Ambe (2016) who suggested that the PPPFA outlines the preference point system for evaluating tenders. It is believed that compliance with the provisions of the PPPFA will provide opportunities for previously disadvantaged individuals to participate in the procurement process.

7.4.3 Secondary research question 3

- To assess the extent of alignment between demand planning, public sector strategic objectives and budgeting.

To answer Research question 3, various literature sources were reviewed to identify the alignment between demand planning, strategic objectives, and budgeting. The literature review showed that there should be alignment between demand planning, strategic objectives and budget (Rexhausen *et al.*, 2012:269). Public sector entities must compile annual demand plans that are aligned to the strategic plan (Eyaa & Ntayi,

2010:83). The purpose is to align demand plans in line with the public entity's strategic objectives and priorities. The strategic objectives must inform the demand plans of the institution (Burt *et al.*, 2010:21). An empirical study followed the literature review. The alignment between demand planning, strategic objectives and budget was tested using a questionnaire that contained 14 statements regarding the alignment between demand planning, strategic objectives and budgeting. The highest scoring statement was demand planning, followed by strategic objectives and budget, with scores ranging between (4.39 and 4.18). The section below provides a brief discussion of the findings.

- **Demand planning** was found to be the highest-scoring statement. The high score validates the compilation of demand and procurement plans. The results reveal that most respondents indicated that they compile demand and procurement plans. The findings align with the guidelines of National Treasury (2011) and the findings of Willy and Njery (2014:62) that suggested that every public sector entity should compile demand and procurement plans. Ideally, every programme manager should compile a demand and procurement plan for that specific commodity.
- **Strategic objectives** were found to be the second-highest scoring statement. The high score validates the alignment between demand planning and strategic objectives. The results reveal that most respondents indicated an alignment between their demand plans and strategic objectives. The findings align with the study by Ambe *et al.* (2012a:251) that suggested that the demand management function primarily links the demand plan to the strategic plan and strategic objectives of a public sector institution.
- **Budgeting** was found to be the third-highest scoring statement. The high score validates the alignment between demand planning and budgeting. The results reveal that most respondents indicated an alignment between their demand plans and budget. The findings are in line with that of Setino's (2018) study that stated that there should be a link between detailed budgets for procurement operations provided by the budget programme structures within each public sector entity; thereby ensuring that service delivery mandates are reflected in the programmes and sub-programmes of every public sector institution.

7.4.4 Secondary research question 4

- What mechanisms are necessary for the efficient implementation of demand management?

To answer Research question 4, various literature sources were reviewed to achieve an understanding of the multiple mechanisms necessary for the efficient implementation of demand management. The literature review stated that SCM officials and professionals play a significant role in implementing demand management (Masete & Mafini, 2018:3). An empirical study followed the literature review. The mechanisms necessary for the efficient implementation of demand management were tested using a questionnaire. Five (5) statements measured the respondents' perceptions regarding the tools essential for the efficient implementation of demand management. The empirical results showed a positive indication of the mechanisms necessary for the efficient implementation of demand management at a mean score ranging from (4.09 to 3.71). The section below provides a discussion of the findings.

The highest-scoring element was related to institutions having an approved organisational structure, followed by demand management practitioners understanding their roles and responsibilities; demand management practitioners possessing the relevant skills, demand management practitioners attending training courses, and institutions having sufficient capacity to implement demand management, with scores ranging between 4.09 and 3.71. The high mean score is an indication that the majority of the mechanisms are necessary for efficient implementation of demand management. The results align with those of Masete and Mafini (2018:3), who indicated that the means required for the efficient implementation of demand management comprise a complete set of human skills, equipment, procedures, rules and regulations, which work in harmony to achieve a set of predetermined goals.

7.4.5 Secondary research question 5

- What challenges are experienced in the implementation of demand management?

To answer Research question 5, various literature sources were reviewed to identify the challenges experienced in the implementation of demand management. The

literature study in Chapter 3 (Section 3.8), established that the South African public sector experiences numerous challenges regarding the implementation of demand management practices. Such challenges include inadequate SCM organisational structure, lack of demand management practices, overspending on budget, poor alignment of demand planning to strategic planning, non-compliance to SCM policies and regulations, and poor compilation of specifications and TOR. The challenges impacting the implementation of demand management were tested using a questionnaire. Six (6) statements regarding the challenges affecting the implementation of demand management were raised to identify the various challenges impacting the implementation of demand management in practice.

The results indicated significant challenges in the following areas: organisational structure, demand management practices, budget, the alignment between demand planning and strategic objectives, SCM policies and regulations and specifications.

In conclusion, based on the results, there are significant challenges in implementing demand management in the South African public sector. The findings are in line with the findings of authors such as Migiro *et al.* (2008), Ambe *et al.* (2012), Nzau *et al.* (2014), Ambe (2016), Odero *et al.* (2017), Omanji *et al.* (2018), and Ezeanyim *et al.* (2020) who identified numerous challenges in the implementation of demand management in the South African public sector.

7.4.6 Secondary research question 6

- To determine the differences in demand management practices between the various categories of hospitals in Gauteng.

This research question sought to establish differences in the demand management practices between hospitals in GDoH. There are nine provincial health departments in the South African public sector, of which the GDoH is the largest provincial health department in the country. As per Government Gazette, Number 35101 of 2 March 2012 number R.185, public sector hospitals are categorised as district hospitals, regional hospitals, specialised hospitals, tertiary hospitals and central hospitals (Gauteng Provincial Government, 2020/21:7). There are three tertiary hospitals, 13 district hospitals, four central hospitals, eight regional hospitals, and 19 specialised hospitals. Therefore, demand management will be practised differently, based on the

skill levels of the demand management practitioners, and their competencies and capabilities within the respective hospitals.

The following hypothesis was formulated:

Null hypothesis

HO: there is no significant difference between the different hospitals regarding demand management practices.

Alternative hypothesis

H1: there is a significant difference between the different hospitals regarding demand management practices.

According to the findings there were no major differences between hospitals in GDoH regarding demand management practices.

7.4.7 Main research question

The main research question was: *What framework is best suited to improve demand management processes in the South African public sector?*

It can be concluded that the six demand management practices, namely, needs analysis, expenditure analysis, commodity analysis, market analysis, industry analysis and supplier analysis, must be fully implemented. Specifications including TOR must be compiled according to the SMART principle in an unbiased manner. Demand management practices must be performed according to the SCM prescripts set out in the Constitution, and the PFMA and PPPFA. Demand management must ensure an alignment between demand planning, strategic objectives and budgeting

The results presented in Chapter 6 (Sections 6.3 to 6.7) indicated that most respondents agreed and strongly agreed with effective demand management practices. Several respondents indicated they still experience challenges with the implementation of demand management.

7.5 SUMMARY AND RECOMMENDATIONS

This section outlines the research study and conclusions to the research objectives.

7.5.1 Summary of the research study

The study's primary objective was to develop a framework to improve demand management processes in the South African public sector.

Chapter 1: Provided the introduction and background, problem statement; research objectives; research design and methodology; reasons for and contribution of the study; and the outline of the study. This chapter defined the title of the research study.

Chapter 2: Provided an in-depth theoretical background to demand management based on available literature. In this chapter, the researcher analysed the available literature to understand what is meant by demand management.

Chapter 3: Provided a detailed discussion of demand management in the public sector. In this chapter, the researcher analysed the available literature to understand demand management in the South African public sector.

Chapter 4: This chapter indicated the instruments necessary to develop a framework to improve demand management processes in the South African public sector.

Chapter 5: Provided the background to the research objectives. It presented the research design; research instruments, sampling procedures; data collection and data analysis. It discussed the research validity and reliability, ethical considerations and trustworthiness of the study.

Chapter 6: The data collected from the questionnaires was provided and analysed. The chapter also provided the analysis and interpretation of the findings. The findings were discussed against the background of the research problem, the aim of the study, research objectives and research questions.

Chapter 7: This chapter focused on linking the results with the research objectives. The research questions were revisited, and the findings were discussed. The chapter concluded with a summary and the conclusions drawn from the findings to inform the framework for improving demand management in the GDoH. The chapter ended with a discussion of the limitations of the research study and provided scope for further research.

7.5.2 Conclusions relating to the research objectives

Before answering the primary research objective, the secondary objectives were addressed.

7.5.2.1 Secondary research objective 1

To identify which demand management practices are implemented in the South African public sector.

The study's findings indicated that the majority of hospitals have implemented demand management practices. It is concluded that most hospitals conduct a (i) needs analysis, (ii) expenditure analysis, (iii) commodity analysis, (iv) market analysis, (v) industry analysis (vi) supplier analysis (vii) compile specifications and TOR according to the SMART principle, and (viii) vital key role players do participate in the demand management process.

Research objective 1 can be confirmed as follows: there is adequate implementation of demand management practices in the public sector.

7.5.2.2 Secondary research objective 2

The second research objective was: To assess the extent of compliance of demand management practices with SCM policies and regulations.

The study's findings show that most respondents indicated that demand management practices comply with SCM policies and regulations. It is concluded that most hospitals complied with (i) the Constitution, (ii) the PFMA and (iii) PPPFA.

Research objective 2 can be confirmed as follows: demand management practices comply with SCM policies and regulations.

7.5.2.3 Secondary research objective 3

To assess the extent of alignment between demand planning, public sector strategic objectives and budgeting.

The study's findings indicate that the majority of respondents indicated that there is alignment between demand planning, strategic objectives and budgeting.

Research objective 3 can be confirmed as follows: there is alignment between demand planning, strategic objectives and budgeting.

7.5.2.4 Secondary research objective 4

To determine what mechanisms are necessary for the efficient implementation of demand management.

The study's findings indicate that the majority of respondents indicated there are mechanisms necessary for the efficient implementation of demand management.

Research objective 4 was confirmed as follows: there are the necessary mechanisms available for the efficient implementation of demand management.

7.5.2.5 Secondary research objective 5

To assess the challenges impacting the implementation of demand management.

The findings established that demand management is being implemented in the public sector, however, six challenges are impacting the successful implementation of demand management in the South African public sector, which indicate that (1) the organisational structure has not made provision for demand management in all institutions, (2) demand management practices have not been successfully implemented in all institutions, (3) there is insufficient allocation of budget in all institutions, (4) demand plans are not aligned to strategic objectives in all institutions, (5) demand management practices do not comply with SCM prescripts in all institutions, and (6) specifications and TOR are not compiled according to the SMART principle in all institutions.

Research objective 5 was confirmed as follows: demand management has been implemented in the public sector, however, there are significant challenges in the successful implementation of demand management in the South African public sector.

7.5.2.6 Secondary research objective 6

To determine the differences in demand management practices amongst hospitals in GDoH.

The study's findings indicate that there are no major differences between the various hospitals regarding demand management practices.

Research objective 6 can be confirmed as follows: there are no significant differences between the different hospitals regarding demand management practices.

7.5.3 Recommendations

This section presents the recommendations of the study. The recommendations were based on the gap in the research findings, namely, that public sector entities have failed to successfully implement demand management, which is the first element in South Africa's SCM business model. That notwithstanding, none of the studies that have been conducted in the South African public sector have recommended that a demand management framework be developed to improve demand management processes.

7.5.3.1 Implementation of demand management practices

The South African public sector should conduct a total needs assessment before the SCM process begins. Resources required to fulfil objectives contained in strategic plans must be fully analysed and assessed.

Demand management practitioners in the South African public sector must ensure that the following demand management practices are implemented: an analysis of current and future needs is conducted, requirements are linked to the budget, requirements must form part of the strategic plan, a study of past expenditure is conducted, industry analysis is conducted, and a commodity analysis is conducted. These demand management practices, when implemented, will increase demand management performance by ensuring on-time delivery which further ensures that the South African public sector receives the correct goods, works or services, at the right time, at the right place and the correct cost.

The current and future needs of the department should be fully understood and identified by demand management practitioners. Demand management practitioners must ensure that the need supports the department's costs and quality objectives, and the resources required to fulfil the department's objectives must be identified and analysed. Demand management practitioners must conduct a needs assessment in terms of the current situation (as-is assessment) and a needs analysis of what the situation wants to achieve. A thorough assessment of what is required, and how to plan and budget for the need, should be undertaken by demand management practitioners and the relevant end-users.

Demand management practitioners must conduct a commodity analysis to see what is available to satisfy the identified need. The department must identify personnel with

the necessary knowledge, competence and experience to carry out the commodity analysis. The department must also analyse the market and industry per commodity and its related competitive dynamics, whilst establishing the various types of suppliers that may be utilised. Industry analysis should be carried out as part of the planning stage before the department determines a strategy to approach the market. Demand management practitioners must analyse past expenditure patterns as this will assist them in the understanding of past, current and likely future requirements.

7.5.3.2 Compliance with SCM policies and regulations

Demand management practitioners must perform demand management practices in accordance with SCM prescripts, as these prescripts provide an excellent foundation for development of a demand management system to ensure alignment to Governments mandates. This will ensure that when regular and continuous assessments of the South African public sector are conducted concerning compliance to SCM prescripts, the South African public sector will not receive adverse reports of poor compliance with the relevant policies and regulations. Failure to procure goods and services in line with the SCM regulatory framework will also result in irregular expenditure and negative audit findings for the South African public sector.

7.5.3.3 Alignment of demand planning with strategic objectives and budgeting

Demand management practitioners must ensure that demand planning is aligned to the department's budget. This will ensure that the department can deliver on its mandate. Demand management practitioners must ensure that demand plans are linked to the institution's mandate and budget to ensure that the priorities and key objectives of the department are budgeted for and can be attained.

Once the department or institution has done the needs analysis, as part of the strategic planning, their requirements should be prioritised regarding the envisaged funds that are expected to be received through the financial budgetary system. The same prioritisation should be done generally after the budget allocations at the beginning of the financial year.

Demand planning must be aligned to the department's service delivery strategy. Therefore, it is essential for demand planning to be aligned with the department's strategy and objectives to reinforce service delivery. This alignment has a significant impact on demand management practices.

The different stakeholders participating in the strategic planning processes of the department must ensure that the products needed are budgeted for and approved by authorities in the strategic planning session. Strategic planning participation is then followed by procurement planning.

Demand management practitioners must develop an annual demand management strategy that articulates how demand management will ensure that the organisational strategy and objectives are achieved. The procurement plan should be funded. The demand management strategy should be reviewed regularly. The demand management strategy should include methods of achieving continuous improvement in value for money.

7.5.3.4 Recommendations for the efficient implementation of demand management

The department's capacity to implement demand management comprises a complete set of human skills, equipment, procedures, and rules and regulations, which work in harmony to achieve a set of predetermined goals. The generic model for capacity building for public sector organisations must determine the capacity. Demand management practitioners and professionals play significant roles in the design and management of supply and demand. Demand management practitioners need to know about demand management functions and processes, such as demand planning.

Demand management practitioners in the South African public sector require relevant demand management skills and knowledge to manage demand management effectively. Therefore, training programmes are necessary to equip demand management practitioners with the relevant skills and knowledge to achieve demand management objectives. Employing qualified demand management practitioners, and the introduction of incentive schemes should be implemented. Institutions of higher learning should equip practitioners with relevant skills and knowledge by developing a syllabus that ensures sustainable demand management in the public sector.

Hospitals in GDoH experience challenges in the efficient implementation of demand management. Figure 7.1 presents a recommended demand management framework that the South African public sector could consider for implementing efficient demand management.

Figure 7.1 illustrates the revised demand management framework for the study.

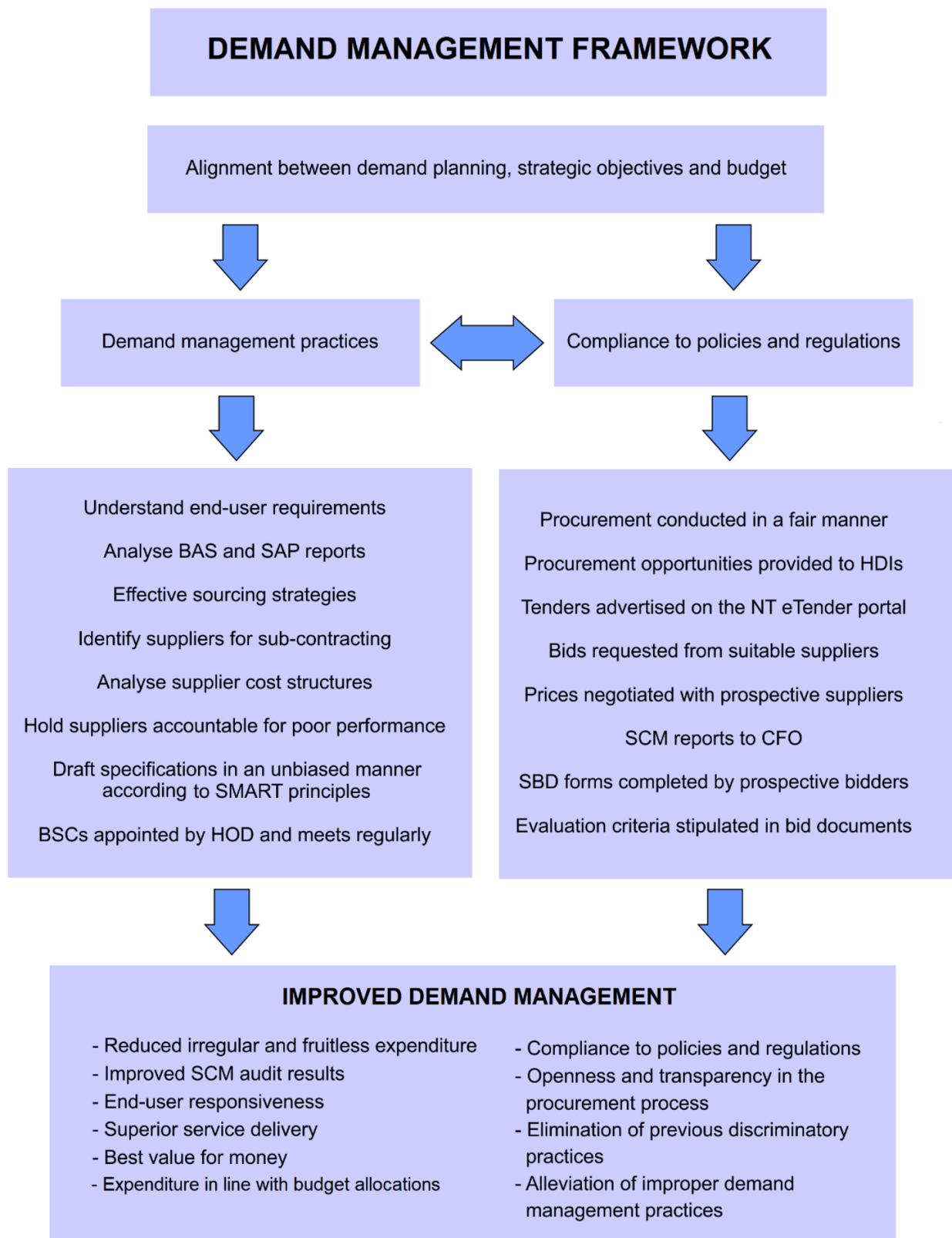


Figure 7.1: Demand management framework for the study.

Source: Researcher's own compilation

Based on the study's findings, the three critical areas of strategic importance are the implementation of demand management practices, compliance of demand management practices with SCM prescripts, and the alignment between demand planning, strategic objectives and budgeting.

7.6 RESEARCH CONTRIBUTION

The literature review provided in-depth information regarding demand management in both the private and public sectors. The literature review revealed that demand management practices, compliance to relevant prescripts, and aligning demand planning to strategic objectives and budget in the South African public sector were critical areas in demand planning in the public sector. Whilst the research constructs, namely, demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget had been extensively researched in the private sector, there is a lack of research on demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget in the South African public sector. This is the first research study to compile a framework to improve demand management in the South African public sector. The research, contributed to theory development for further research, and has created the theoretical groundwork for further research in South Africa.

The research contributed to new literature regarding demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget in the South African public sector. The research study could be a valuable source of reference material for further academic research. The findings of the research provided an understanding of how demand management practices, compliance to SCM policies and regulations, and the alignment of demand planning to strategic objectives and budget can improve demand management and service delivery in the public sector in South Africa. The literature review highlighted the importance of improvements to demand control in compiling a demand management framework in the South African public sector.

As one of the functional strategies of SCM, demand management practices must be performed in accordance with SCM prescripts. The research identified that the public sector has not successfully implemented the elements of demand management to improve SCM performance in the South African public sector.

The findings of the research provided a new understanding of how demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget can assist in improving demand management performance in the South African public sector. The literature review highlighted the importance of the three constructs: demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget, in improving demand management performance.

The research approach was original, as it included all the constructs to develop a demand management framework for the South African public sector. Therefore, demand management practitioners should be in an improved position of fully understanding demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget to assist the public sector in providing enhanced service delivery. It is recommended that the demand management framework, be implemented in the South African public sector.

The research study contributed to the body of knowledge regarding the role of demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget in the South African public sector. This study provides a valuable framework for demand management practitioners in the public sector, and it will enable them to assess their performance.

7.7 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

The study was limited to hospitals in the Gauteng Department of Health, and it would have been preferred if samples from a more extensive variety of departments within the Gauteng province were considered. Respondents comprised of senior demand management practitioners on post level 7, and above, from hospitals in the Gauteng Department of Health. Since the hospitals were under the GDoH, it was expected that a number of responses would be similar. The researcher was conscious of these expectations and prevented generalisations. A total sampling method, a purposive sampling technique that involves examining the entire population, was used to obtain 235 respondents. The sample was not large enough, and therefore, the research could not be generalised.

Future studies should utilise other research methodologies, which could provide a better understanding of demand management practices, compliance to SCM prescripts, and aligning demand planning to strategic objectives and budget.

Future research be conducted in another setting, for example, in other departments in the South African public sector. The findings of the research study identified a need to conduct further research in compiling frameworks to improve other elements of Governments SCM business model. It is recommended that future research should address limitations inherent in this research.

7.8 CHAPTER SUMMARY

The chapter provided a summary of the findings, conclusions and limitations including recommendations for further research. Demand management was presented concerning the literature study and empirical analysis. The main research aim of the study was achieved, namely, to compile a demand management framework in the South African public sector and for future research based on the findings of this study.

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**APPENDIX A:
ETHICAL CLEARANCE CERTIFICATE**



**COLLEGE OF ECONOMIC AND MANAGEMENT SCIENCE RESEARCH ETHICS
REVIEW COMMITTEE**

12 October 2020

Dear Mr David Harold Selby

**Decision: Ethics Approval from
2020 to 2025**

NHREC Registration # : (if applicable)
ERC Reference # : 2020_CRERC_020 (FA)
Name : Mr David Harold Selby
Student/Staff No#: 37818376

Researcher(s): Mr David Harold Selby, david.selby@gauteng.gov.za, 0828501370
Department of Applied Management
College of Economic and Management Sciences
University of South Africa

"A framework to improve Demand Management in the Public Healthcare Sector"

Qualification: Postgraduate

Thank you for the application for research ethics clearance by the Unisa College of Economic and Management Sciences Research Ethics Review Committee for the above-mentioned research. Ethics approval is granted for 5 years **(12 October 2020 until 11 October 2025)**.

*The **low risk application** was **reviewed** by the College of Economic and Management Sciences Research Ethics Review Committee on **October 2020** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the
- 3.



University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

College of Economic and Management Sciences Research Ethics Review Committee.

4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date (**11 October 2025**). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.
9. Permission is to be obtained from the university from which the participants are to be drawn (the Unisa Senate Research, Innovation and Higher Degrees Committee) to ensure that the relevant authorities are aware of the scope of the research, and all conditions and procedures regarding access to staff/students for research purposes that may be required by the institution must be met.
10. If further counselling is required in some cases, the participants will be referred to appropriate support services.

Note:

The reference number 2020_CRERC_021 (FA) should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Yours sincerely,



Prof AT Mutezo
Chairperson, CRERC
E-mail: muteza@unisa.ac.za
Tel: 012 429 4595



**Prof RT Mpfu, Deputy
Executive Dean (on behalf of)**

Prof MT Mogale
Executive Dean: CEMS
E-mail: mogalmt@unisa.ac.za
Tel: 012 429 4805



UREC 05-04-17 - Decision template (V2) - Approve

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APPENDIX B: REQUEST PERMISSION TO CONDUCT RESEARCH



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Enquiries: **Mr. D. Selby**
Tel: **011- 241 5674**

REQUEST PERMISSION TO CONDUCT RESEARCH AT GAUTENG DEPARTMENT OF HEALTH

"A framework to improve Demand Management in the public healthcare sector"

To: Dr Bridgette Ikalafeng

Policy, Planning & Research

082 461 9354; bridget.ikalafeng@gauteng.gov.za

Dear Dr B. Ikalafeng

Your permission is hereby requested to allow **David Selby**, a Doctor of Commerce student from the Department of Business Management at the University of South Africa (UNISA), to conduct academic research in your organisation.

Your company has been selected to participate because the study examines Demand Management at district, regional, tertiary and central hospitals and all research to be conducted in a Gauteng Department of Health (GDoH) institution that involves GDoH staff, requires approval.

The purpose of the study is to develop a framework with which the Gauteng public healthcare sector can utilize to improve Demand Management. The study is expected to improve Demand Management to ultimately enhance compliance to the SCM Framework and SCM norms and standards. The study will entail interviewing Supply Chain Management managers regarding application and experience of Demand Management. GDoH's participation in this study is very important, however, GDoH may choose not to participate or withdraw from the study at any time without any negative consequences.

The results of the study will be used for academic purposes and may be published in an academic journal. We will provide you with a summary of our findings on request. Please contact my supervisor, Prof I.M.Ambe (ambeim@unisa.ac.za) if you have any questions or comments regarding the study. Please sign below to indicate your willingness to participate in the study.

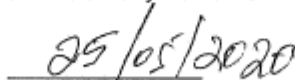
Your sincerely

David Selby

21/05/2020

I, Dr Bridgette Ikalafeng, herewith give permission for the study to be conducted in GDoH facilities.


Signature


Date

APPENDIX C: APPROVAL LETTERS



CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL
OFFICE OF THE CEO
Enquiries: Dr. MM LESIA
Tel : (011) 933- 9145/0269/0181
Fax2email: 086 422 7274
Email: Nkele.Lesia@gauteng.gov.za

15 July 2020

Dear Mr David Selby

RE: Application for permission to conduct research at Chris Hani Baragwanath Academic Hospital

This serves as confirmation that your letter dated 29th June 2020 regarding the following doctoral research which was received by the Office of the CEO at Chris Hani Baragwanath Academic Hospital.

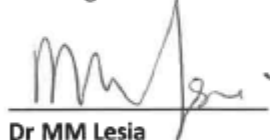
Research Topic: **"Developing framework to improve Demand Management in the public health sector"**

Approval is granted for you to conduct the research in the hospital once the following requirements have been met and the Office of the CEO is provided with the copies thereof.

- Approved research protocol from the school
- Approved Ethical Clearance
- Approved questionnaire and consent form

Best wishes with the study

Kind regards



Dr MM Lesia

CEO: Chris Hani Baragwanath Academic Hospital

Date: 16/07/20



GAUTENG PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL (CMJAH)

Office of the Director: SCM

Enquiries: Ms. Christina Nkhabelana

Tel: (011) 488-3716

Email: Christina.Nkhabelana@gauteng.gov.za

Physical Address: Room 252A, 17 Jubilee, Parktown 2193 Postal Address: Private Bag x39, Johannesburg 2000

06 October 2020

Dear Mr. David Selby

STUDY TITTLE: Developing a framework to improve Demand Management in the public healthcare sector

Permission to conduct the above mentioned study at Charlotte Maxeke Johannesburg Academic Hospital is approved. The study entails interviewing Supply Chain Practitioners regarding application and experience of Demand Management.

Supported/~~Not Supported~~

Mr. Solly Mokoena
Director: Supply Chain Management

Date: 2020/11/09

Approved/~~Not Approved~~

Ms. G. Bogoshi
Chief Executive Officer: CMJAH

Date: 09.11.2020



Office of the Director Clinical Services

Enquiries : Dr. C Holm

Tel : (012) 529 3691

Fax : (012) 560 0099

Email:Christene.Holm @gauteng.gov.za

keitumetse.mongale@gauteng.gov.za

To Mr D Selby
Department of Health
Johannesburg

Date :17 July 2020

PERMISSION TO CONDUCT RESEARCH

The Dr. George Mukhari Academic Hospital hereby grants you permission to conduct research on "A framework to improve demand management in the public healthcare sector" at Dr George Mukhari Academic Hospital

This permission is granted subject to the following conditions:

- That you obtain Ethical Clearance from the Human Research Ethics Committee of the relevant University
- That the Hospital incurs no cost in the course of your research
- That access to the staff and patients at the Dr George Mukhari Hospital will not interrupt the daily provision of services.
- That prior to conducting the research you will liaise with the supervisors of the relevant sections to introduce yourself (with this letter) and to make arrangements with them in a manner that is convenient to the sections.
- Formal written feedback on research outcomes must be given to the Director: Clinical Services
- Permission for publication of research must be obtained from the Chief Executive Officer

Yours sincerely

DR. C. HOLM
DIRECTOR CLINICAL SERVICES

DATE: 17/7/20



GAUTENG PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

STEVE BIKO ACADEMIC HOSPITAL

Enquiries: Dr M.P Mathebula
Tel: 012 354 2222
Email: mathabo.mathebula@gauteng.gov.za

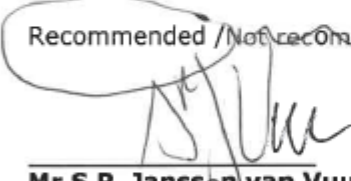
Attention: Mr. David Selby
Director: Supply Chain Management
Gauteng Health: Head Office

CC: Dr. J Mangwane
Clinical Manager

**RE: Permission to conduct research at Steve Biko Academic Hospital:
Doctorate in Business Management**

Permission is hereby granted that Mr. David Selby with ID: 6009105057082, student number: 37818376 can conduct research at Steve Biko Academic Hospital: Supply Chain Management as indicated above.

~~Recommended / Not recommended / Recommended as amended~~


Mr S.P. Jansen van Vuuren
Director: Supply Chain Management
Steve Biko Academic Hospital

Date 2020/07/16

~~Approved / Not approved / Approved as amended~~


Dr. M.P. Mathebula
Chief Executive Officer
Steve Biko Academic Hospital

Date 16/07/2020

APPENDIX D: QUESTIONNAIRE



PhD RESPONDENT INFORMATION SHEET

Date information sheet provided:

11 November 2021

PhD Research Title: **DEVELOPING A DEMAND MANAGEMENT FRAMEWORK IN THE PUBLIC SECTOR:
THE CASE OF THE GAUTENG DEPARTMENT OF HEALTH**

Dear Respondent

You are herewith invited to participate in an academic research study conducted by **David Selby**, a Doctor of Philosophy student at the University of South Africa (UNISA). The purpose of this study is to develop a framework to improve demand management processes within the public sector. All your answers will be treated as confidential, and you will not be identified in any of the research reports emanating from this research. Your participation in this study will be appreciated but you may also withdraw your participation any time should you choose to do so, as participation is purely voluntary.

Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 15-20 minutes of your time. The results of the study will be used for academic purposes only and may be published in an Academic journal. We will provide you with a summary of our findings on request.

Please contact my supervisor Prof IM Ambe (ambeim@unisa.ac.za) if you have any questions or comments regarding the study.

Yours sincerely

A handwritten signature in black ink, appearing to be "D Selby", is written over a light grey horizontal line.

David

11/11/2021

I agree to partake in this research:

 YES NO

DEMAND MANAGEMENT QUESTIONNAIRE

DEVELOPING A DEMAND MANAGEMENT FRAMEWORK IN THE PUBLIC SECTOR. THE CASE OF THE GAUTENG DEPARTMENT OF HEALTH

INTRODUCTION

The primary objective of this research study is to develop a framework to improve demand management processes in the South African public sector. Express your opinion freely and with honesty as all responses will be treated confidentially and will remain anonymous. Your co-operation and assistance in completing this research study conducted by Mr David Selby (cellphone 0828501370: david.selby@gauteng.gov.za) is greatly appreciated.

Name of institution:

SECTION A: DEMOGRAPHIC INFORMATION

Kindly answer all the questions by ticking or writing as per your opinion and based on the facts.

1. **How many years have you been working in public sector SCM?**

2. **How many years have you been working in SCM in the Gauteng Department of Health?**

3. **What is your age in years? One option only**

4. **Indicate you level of seniority. One option only**

SECTION B: DEMAND MANAGEMENT PRACTICES IN THE SOUTH AFRICAN PUBLIC SECTOR

B1: Demand Management Considerations

Questions 1 to 7 relate to demand management considerations

Kindly indicate the extent to which you agree with the following statements regarding the extent of demand management considerations where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
B1.1	We consult with our end users to understand their specific requirements	1	2	3	4	5
B1.2	We analyse BAS reports weekly	1	2	3	4	5
B1.3	We analyse SAP reports daily	1	2	3	4	5
B1.4	We implement effective sourcing strategies	1	2	3	4	5
B1.5	We identify suppliers for sub-contracting opportunities	1	2	3	4	5
B1.6	We analyse supplier cost structures	1	2	3	4	5
B1.7	We hold suppliers accountable for poor performance	1	2	3	4	5

B2: Development of Specifications and Terms of Reference

Questions 1 to 8 relate to the development of specifications and terms of reference

Kindly indicate the extent to which you agree with the following statements regarding the extent of developing specifications and terms of reference where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
B2.1	BSC compiles specifications according to the SMART principle	1	2	3	4	5
B2.2	BSC compiles terms of reference according to the SMART principle	1	2	3	4	5
B2.3	BSC drafts specifications in an unbiased manner	1	2	3	4	5
B2.4	BSC are appointed by the HOD	1	2	3	4	5
B2.5	BSC attend meetings on a regular basis	1	2	3	4	5
B2.6	BSC include acceptable standards in specifications	1	2	3	4	5
B2.7	Fruitless & wasteful expenditure is reported to the Loss Control unit	1	2	3	4	5
B2.8	Irregular expenditure is reported to the Loss Control unit	1	2	3	4	5

B3: Key Role Players in the Demand Management Process

Questions 1 to 8 relate to key role players in the demand management process

Kindly indicate the extent to which you agree with the following statements regarding the key role players in the demand management process where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
		1	2	3	4	5
B3.1	The HOD approves contracts above R1million	1	2	3	4	5
B3.2	The CFO is appointed as the chairperson of BAC	1	2	3	4	5
B3.3	Cost Centre Managers approve all procurement requests	1	2	3	4	5
B3.4	We utilize the demand plan for procurement of goods	1	2	3	4	5
B3.5	We ensure that only goods listed on demand plans are procured	1	2	3	4	5
B3.6	BSC compiles evaluation criteria	1	2	3	4	5
B3.7	BEC evaluates bids according to pre-determined evaluation criteria	1	2	3	4	5
B3.8	BAC is conversant with SCM prescripts	1	2	3	4	5

B4: Impact of Demand Management Processes

Rate the following demand management practices according to the one which has a bigger impact on demand management processes in your institution (less impact to most impact) out of 100. Please enter the rating in the column provided.

Rating	Demand Management Practices
	Analysis of needs is conducted
	Analysis of expenditure patterns
	Development of a business case for procurement
	Developing strategies to approach the market
	Understanding of supplier's performance drivers
	Development of a sound annual procurement plan
	Determining a Total Cost of Ownership
	Ensuring availability of funding
	Identifying the institutions goals and objectives
	Developing SMART specifications

B5: Measures to Improve the Demand Management Process

Indicate measures that your institution can employ to improve the demand management process.

SECTION C: COMPLIANCE OF DEMAND MANAGEMENT PRACTICES WITH SCM POLICIES AND REGULATIONS

Questions 1 to 11 relates to compliance of demand management practices with SCM policies and regulations.

Kindly indicate the extent to which you agree with the following statement regarding the level of compliance to Governments supply chain legislations and policies where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
THE CONSTITUTION						
C1.1	Our procurement is conducted in a fair manner	1	2	3	4	5
C1.2	We provide procurement opportunities to previously disadvantaged individuals	1	2	3	4	5
C1.3	We advertise tenders on the National Treasury eTender portal	1	2	3	4	5
C1.4	We request bids from suitably qualified suppliers	1	2	3	4	5
C1.5	We conduct price negotiations with prospective suppliers	1	2	3	4	5
PFMA						
C1.6	The SCM unit reports to the CFO	1	2	3	4	5
C1.7	We ensure SBD forms are completed by prospective bidders	1	2	3	4	5
C1.8	BSC ensure the bid evaluation criteria is clearly stipulated in bid documents	1	2	3	4	5
PPPFA						
C1.9	80/20 point system is used for transactions between R30 000 – R50 million	1	2	3	4	5
C1.10	90/10 point system is used for transactions above R50 million	1	2	3	4	5
C1.11	Sub-contracting is considered a pre-requisite for transactions above R30 million	1	2	3	4	5

SECTION D: ALIGNMENT BETWEEN DEMAND PLANNING, STRATEGIC OBJECTIVES AND BUDGET

D1: DEMAND PLANNING

Questions 1 to 5 relates to the extent of demand planning.

Kindly indicate the extent to which you agree with the following statement regarding the extent of demand planning where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
D1.1	Demand plans include all requirements for the financial year	1	2	3	4	5
D1.2	Demand plans are approved in line with budget allocations	1	2	3	4	5
D1.3	Demand plans indicate the full description of goods required	1	2	3	4	5
D1.4	Demand plans are aligned with the institution's strategic objectives	1	2	3	4	5
D1.5	Procurement plans are compiled for requirements above R500 000	1	2	3	4	5

D2: STRATEGIC OBJECTIVES

Questions 1 to 5 look at the alignment of demand planning to strategic objectives.

Kindly indicate the extent to which you agree with the following statement regarding the extent of alignment between demand planning and strategic objectives where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
D2.1	The strategic objectives focus on the achievement of specific outcomes	1	2	3	4	5
D2.2	The resources required for the fulfillment of obligations are clearly identified	1	2	3	4	5
D2.3	The head of SCM is involved in the strategic planning process	1	2	3	4	5
D2.4	The strategic objectives are reviewed on an annual basis	1	2	3	4	5
D2.5	The annual performance plan is approved by the HOD	1	2	3	4	5

D3: BUDGETING

Questions 1 to 4 look at the alignment of demand planning to budget.

Kindly indicate the extent to which you agree with the following statement regarding the extent of alignment between demand planning and budget where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
D3.1	Demand management practitioners attend budget bilateral	1	2	3	4	5
D3.2	End users present detailed budget bids during budget bilateral	1	2	3	4	5
D3.3	Demand plans are compiled during budget bilateral	1	2	3	4	5
D3.4	Demand plans are approved in line with budget allocations	1	2	3	4	5

SECTION E: MECHANISMS NECESSARY FOR THE EFFICIENT IMPLEMENTATION OF DEMAND MANAGEMENT

Questions 1 to 5 looks at mechanisms necessary for the efficient implementation of demand management.

Kindly indicate the extent to which you agree with the following statement regarding mechanisms necessary for the efficient implementation of demand management where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
		1	2	3	4	5
E1.1	Our institution has an approved organizational structure	1	2	3	4	5
E1.2	Our institution has sufficient capacity to implement demand management	1	2	3	4	5
E1.3	Demand management practitioners understand their roles and responsibilities	1	2	3	4	5
E1.4	Demand management practitioners possess relevant skills	1	2	3	4	5
E1.5	Demand management practitioners attend training courses	1	2	3	4	5

SECTION F: CHALLENGES IMPACTING THE IMPLEMENTATION OF DEMAND MANAGEMENT

Questions 1 to 6 look at the challenges impacting the implementation of demand management.

Kindly indicate the extent to which you agree with the following statement regarding the challenges impacting the implementation of demand management where **1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly agree**

No	Statement	Agreement				
		1	2	3	4	5
F1.1	Our organization structure has not made provision for demand management	1	2	3	4	5
F1.2	We experience challenges implementing demand management practices	1	2	3	4	5
F1.3	We are allocated insufficient budget	1	2	3	4	5
F1.4	We experience challenges in aligning demand plans to strategic objectives	1	2	3	4	5
F1.5	We experience challenges in complying with SCM policies and regulations	1	2	3	4	5
F1.6	We experience challenges in compiling specifications according to the SMART principle	1	2	3	4	5

END OF SURVEY

THANK YOU FOR PARTICIPATING

**APPENDIX E:
INFERENCE STATISTICS**

Table E1: Inferential statistics: Level of seniority

Constructs	Level of Seniority	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of Homogeneity of Variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Development of specifications and terms of reference	7	63	4.16	0.699	0.088	3.98	4.33	2.38	5.00	0.794	0.808	0.565
	8	63	4.15	0.773	0.097	3.96	4.35	2.25	5.00			
	9	33	4.24	0.707	0.123	3.99	4.49	2.38	5.00			
	10	21	3.92	0.750	0.164	3.58	4.26	2.50	4.88			
	11	13	3.95	0.924	0.256	3.39	4.51	2.25	5.00			
	12	10	3.95	0.830	0.262	3.36	4.54	2.25	5.00			
	13	4	3.72	0.695	0.348	2.61	4.82	2.75	4.38			
	Total	207	4.11	0.748	0.052	4.01	4.22	2.25	5.00			
Demand management considerations	7	63	3.56	0.956	0.120	3.32	3.80	1.00	5.00	0.396	0.630	0.706
	8	63	3.62	1.093	0.138	3.34	3.89	1.00	5.00			
	9	33	3.75	1.110	0.193	3.36	4.15	1.20	5.00			
	10	21	3.56	0.999	0.218	3.11	4.02	2.00	5.00			
	11	13	3.38	0.846	0.235	2.87	3.90	2.00	4.60			
	12	10	3.42	0.819	0.259	2.83	4.01	2.00	4.60			
	13	4	2.85	1.380	0.690	0.65	5.05	1.40	4.60			
	Total	207	3.58	1.020	0.071	3.44	3.72	1.00	5.00			
Key role players in the demand management process	7	63	4.28	0.688	0.087	4.11	4.45	2.71	5.00	0.861	0.367	0.899
	8	63	4.24	0.708	0.089	4.06	4.42	2.71	5.00			
	9	33	4.26	0.619	0.108	4.04	4.48	3.00	5.00			
	10	21	4.16	0.611	0.133	3.88	4.43	2.86	5.00			
	11	13	4.15	0.643	0.178	3.77	4.54	3.14	5.00			

Constructs	Level of Seniority	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of Homogeneity of Variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
	12	10	4.00	0.700	0.221	3.50	4.50	2.86	5.00			
	13	4	4.07	0.829	0.414	2.75	5.39	3.00	4.86			
	Total	207	4.23	0.670	0.047	4.13	4.32	2.71	5.00			

Kruskal-Wallis Test

Table E2: Inferential statistics: Ranks

Items	Level of seniority	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Our procurement is conducted in a fair manner	7	63	108.12	3.082	6	0.798
	8	63	103.83			
	9	33	109.89			
	10	21	88.93			
	11	13	96.73			
	12	10	93.75			
	13	4	121.63			
	Total	207				
We provide procurement opportunities to previously disadvantaged individuals	7	63	111.01	6.263	6	0.394
	8	63	106.71			
	9	33	99.38			
	10	21	107.48			
	11	13	97.38			
	12	10	75.20			
	13	4	64.38			
	Total	207				
We advertise tenders on the National Treasury eTender portal	7	63	109.76	9.464	6	0.149
	8	63	103.29			
	9	33	120.76			
	10	21	90.50			
	11	13	83.15			
	12	10	87.35			
	13	4	66.38			
	Total	207				
We request bids from suitably qualified suppliers	7	63	113.29	9.142	6	0.166
	8	63	102.81			
	9	33	115.94			
	10	21	90.33			
	11	13	77.27			
	12	10	89.00			
	13	4	74.13			
	Total	207				
We conduct price negotiations with prospective suppliers	7	63	95.59	8.495	6	0.204
	8	63	112.90			

Items	Level of seniority	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
	9	33	112.38			
	10	21	91.40			
	11	13	123.73			
	12	10	78.25			
	13	4	93.50			
	Total	207				
The SCM unit reports to the CFO	7	63	103.55	3.571	6	0.734
	8	63	101.98			
	9	33	110.26			
	10	21	101.83			
	11	13	117.19			
	12	10	79.70			
	13	4	120.50			
	Total	207				
We ensure SBD forms are completed by prospective bidders	7	63	109.48			
	8	63	102.50			
	9	33	120.14			
	10	21	89.52			
	11	13	84.42			
	12	10	87.10			
	13	4	90.00			
	Total	207				
BSC ensure the bid evaluation criteria is clearly stipulated in bid documents	7	63	96.87			
	8	63	108.97			
	9	33	112.11			
	10	21	95.60			
	11	13	114.92			
	12	10	91.20			
	13	4	111.88			
	Total	207				
80/20 point system is used for transactions between R30 000 – R50 million	7	63	113.02			
	8	63	100.46			
	9	33	113.56			
	10	21	90.00			
	11	13	88.65			
Total	207					

Items	Level of seniority	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
	12	10	109.00			
	13	4	49.75			
	Total	207				
90/10 point system is used for transactions above R50 million	7	63	107.90	3.364	6	0.762
	8	63	102.48			
	9	33	109.41			
	10	21	97.74			
	11	13	100.35			
	12	10	106.50			
	13	4	60.25			
	Total	207				
Sub-contracting is considered a pre-requisite for transactions above R30 million	7	63	106.74	5.338	6	0.501
	8	63	113.08			
	9	33	89.35			
	10	21	99.60			
	11	13	107.35			
	12	10	90.85			
	13	4	83.88			
	Total	207				

Table E3: Inferential statistics

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of Homogeneity of Variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Demand planning	7	63	4.10	0.749	0.094	3.91	4.28	1.60	5.00	0.788	0.565	0.758
	8	63	4.22	0.682	0.086	4.04	4.39	2.60	5.00			
	9	33	4.13	0.694	0.121	3.89	4.38	2.20	5.00			
	10	21	4.13	0.624	0.136	3.85	4.42	3.00	5.00			
	11	13	4.08	0.768	0.213	3.61	4.54	2.20	5.00			
	12	10	3.88	0.948	0.300	3.20	4.56	2.00	5.00			
	13	4	3.75	0.915	0.457	2.29	5.21	2.40	4.40			
	Total	207	4.12	0.718	0.050	4.03	4.22	1.60	5.00			
Budget	7	63	4.14	0.712	0.090	3.96	4.32	2.00	5.00	0.007	0.840	0.550
	8	63	4.15	0.580	0.073	4.00	4.29	2.33	5.00			
	9	33	4.11	0.633	0.110	3.89	4.34	2.00	5.00			
	10	21	4.11	0.599	0.131	3.84	4.38	3.00	5.00			
	11	13	3.95	0.921	0.256	3.39	4.51	2.33	5.00			
	12	10	3.67	0.846	0.268	3.06	4.27	2.00	4.67			
	13	4	3.00	1.515	0.758	0.59	5.41	1.67	5.00			

	Total	207	4.08	0.707	0.049	3.98	4.17	1.67	5.00			
Strategic objectives	7	63	4.24	0.756	0.095	4.05	4.43	2.00	5.00	0.114	1.588	0.152
	8	63	4.11	0.790	0.100	3.91	4.31	2.00	5.00			
	9	33	4.33	0.787	0.137	4.05	4.61	3.00	5.00			
	10	21	4.10	0.930	0.203	3.67	4.52	3.00	5.00			
	11	13	3.77	0.927	0.257	3.21	4.33	2.00	5.00			
	12	10	3.80	1.059	0.335	3.04	4.56	2.00	5.00			
	13	4	3.50	1.291	0.645	1.45	5.55	2.00	5.00			
	Total	207	4.14	0.834	0.058	4.02	4.25	2.00	5.00			

Table E4: Inferential statistics

Indicate your level of seniority		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Mechanisms necessary for the efficient implementation of demand management	7	63	112.18	7.725	6.000	0.259
	8	63	106.48			
	9	33	104.35			
	10	21	108.24			
	11	13	75.50			
	12	10	77.85			
	13	4	69.00			
	Total	207				
Challenges impacting the implementation of demand management	7	63	110.63	3.877	6.000	0.693
	8	63	97.38			
	9	33	109.30			
	10	21	111.90			
	11	13	91.50			
	12	10	84.25			
	13	4	108.50			
	Total	207				

Table E5: Inferential statistics: Years of service in SCM

Constructs	Years working at SCM	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of homogeneity of variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Development of specifications and terms of reference	<= 5	70	4.12	0.807	0.096	3.93	4.31	2.25	5.00	0.203	0.551	0.577
	6 - 10	89	4.06	0.766	0.081	3.90	4.22	2.25	5.00			
	11+	48	4.20	0.618	0.089	4.02	4.38	2.63	5.00			
	Total	207	4.11	0.748	0.052	4.01	4.22	2.25	5.00			
Demand management considerations	<= 5	70	3.66	0.989	0.118	3.42	3.90	1.80	5.00	0.429	0.739	0.479
	6 - 10	89	3.48	1.082	0.115	3.25	3.71	1.00	5.00			
	11+	48	3.64	0.950	0.137	3.37	3.92	1.40	5.00			
	Total	207	3.58	1.020	0.071	3.44	3.72	1.00	5.00			
Key role players in the demand management process	<= 5	70	4.23	0.722	0.086	4.06	4.40	2.86	5.00	0.053	0.713	0.491
	6 - 10	89	4.17	0.678	0.072	4.03	4.32	2.71	5.00			
	11+	48	4.32	0.574	0.083	4.15	4.49	2.71	5.00			
	Total	207	4.23	0.670	0.047	4.13	4.32	2.71	5.00			

Table E6: Inferential statistics: Years of service in SCM in GDoH

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Our procurement is conducted in a fair manner	<= 5	70	93.86	3.660	2	0.160
	6 - 10	89	111.13			
	11+	48	105.55			
	Total	207				
We provide procurement opportunities to previously disadvantaged individuals	<= 5	70	96.42	3.163	2	0.206
	6 - 10	89	103.98			
	11+	48	115.09			
	Total	207				
We advertise tenders on the National Treasury eTender portal	<= 5	70	96.31	4.649	2	0.098
	6 - 10	89	102.26			
	11+	48	118.43			
	Total	207				
We request bids from suitably qualified suppliers	<= 5	70	87.67	9.237	2	0.010
	6 - 10	89	110.03			
	11+	48	116.64			
	Total	207				

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
We conduct price negotiations with prospective suppliers	<= 5	70	98.26	2.517	2	0.284
	6 - 10	89	102.68			
	11+	48	114.81			
	Total	207				
The SCM unit reports to the CFO	<= 5	70	98.94	3.513	2	0.173
	6 - 10	89	100.96			
	11+	48	117.01			
	Total	207				
We ensure SBD forms are completed by prospective bidders	<= 5	70	94.52	8.235	2	0.016
	6 - 10	89	100.99			
	11+	48	123.40			
	Total	207				
BSC ensure the bid evaluation criteria is clearly stipulated in bid documents	<= 5	70	91.66	14.030	2	0.001
	6 - 10	89	99.82			
	11+	48	129.74			
	Total	207				
	<= 5	70	87.61	13.116	2	0.001

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
80/20 point system is used for transactions between R30 000 – R50 million	6 - 10	89	105.31			
	11+	48	125.46			
	Total	207				
90/10 point system is used for transactions above R50 million	<= 5	70	99.07	0.811	2	0.667
	6 - 10	89	106.16			
	11+	48	107.18			
	Total	207				
Sub-contracting is considered a pre-requisite for transactions above R30 million	<= 5	70	110.41	1.910	2	0.385
	6 - 10	89	98.21			
	11+	48	105.39			
	Total	207				

Table E7: Inferential statistics

Constructs	Years working at SCM	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of homogeneity of variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Demand Planning	<= 5	70	4.10	0.773	0.092	3.92	4.28	2.00	5.00	0.098	2.905	0.057
	6 - 10	89	4.03	0.709	0.075	3.88	4.18	1.60	5.00			
	11+	48	4.33	0.618	0.089	4.15	4.51	2.40	5.00			
	Total	207	4.12	0.718	0.050	4.03	4.22	1.60	5.00			
Budget	<= 5	70	4.07	0.649	0.078	3.92	4.23	2.00	5.00	0.024	0.008	0.989
	6 - 10	89	4.07	0.643	0.068	3.94	4.21	1.67	5.00			
	11+	48	4.09	0.893	0.129	3.83	4.35	2.00	5.00			
	Total	207	4.08	0.707	0.049	3.98	4.17	1.67	5.00			
Strategic objectives	<= 5	70	4.05	0.889	0.106	3.84	4.26	2.00	5.00	0.132	2.018	0.136
	6 - 10	89	4.09	0.848	0.090	3.91	4.27	2.00	5.00			
	11+	48	4.34	0.693	0.100	4.14	4.55	2.00	5.00			
	Total	207	4.14	0.834	0.058	4.02	4.25	2.00	5.00			

Table E8: Inferential statistics

Constructs	Years working at SCM	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	Tests of Homogeneity of Variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Development of specifications and terms of reference	<= 5	70	4.12	0.807	0.096	3.93	4.31	2.25	5.00	0.203	0.551	0.577
	6 - 10	89	4.06	0.766	0.081	3.90	4.22	2.25	5.00			
	11+	48	4.20	0.618	0.089	4.02	4.38	2.63	5.00			
	Total	207	4.11	0.748	0.052	4.01	4.22	2.25	5.00			
Demand management considerations	<= 5	70	3.66	0.989	0.118	3.42	3.90	1.80	5.00	0.429	0.739	0.479
	6 - 10	89	3.48	1.082	0.115	3.25	3.71	1.00	5.00			
	11+	48	3.64	0.950	0.137	3.37	3.92	1.40	5.00			
	Total	207	3.58	1.020	0.071	3.44	3.72	1.00	5.00			
Key role players in the demand management process	<= 5	70	4.23	0.722	0.086	4.06	4.40	2.86	5.00	0.053	0.713	0.491
	6 - 10	89	4.17	0.678	0.072	4.03	4.32	2.71	5.00			
	11+	48	4.32	0.574	0.083	4.15	4.49	2.71	5.00			
	Total	207	4.23	0.670	0.047	4.13	4.32	2.71	5.00			

Table E9:

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Our procurement is conducted in a fair manner	<= 5	70	93.86	3.660	2	0.160
	6 - 10	89	111.13			
	11+	48	105.55			
	Total	207				
We provide procurement opportunities to previously disadvantaged individuals	<= 5	70	96.42	3.163	2	0.206
	6 - 10	89	103.98			
	11+	48	115.09			
	Total	207				
We advertise tenders on the National Treasury eTender portal	<= 5	70	96.31	4.649	2	0.098
	6 - 10	89	102.26			
	11+	48	118.43			
	Total	207				

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
We request bids from suitably qualified suppliers	<= 5	70	87.67	9.237	2	0.010
	6 - 10	89	110.03			
	11+	48	116.64			
	Total	207				
We conduct price negotiations with prospective suppliers	<= 5	70	98.26	2.517	2	0.284
	6 - 10	89	102.68			
	11+	48	114.81			
	Total	207				
The SCM unit reports to the CFO	<= 5	70	98.94	3.513	2	0.173
	6 - 10	89	100.96			
	11+	48	117.01			
	Total	207				
	<= 5	70	94.52	8.235	2	0.016

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
We ensure SBD forms are completed by prospective bidders	6 - 10	89	100.99			
	11+	48	123.40			
	Total	207				
BSC ensure the bid evaluation criteria is clearly stipulated in bid documents	<= 5	70	91.66	14.030	2	0.001
	6 - 10	89	99.82			
	11+	48	129.74			
	Total	207				
80/20 point system is used for transactions between R30 000 – R50 million	<= 5	70	87.61	13.116	2	0.001
	6 - 10	89	105.31			
	11+	48	125.46			
	Total	207				
	<= 5	70	99.07	0.811	2	0.667

How many years have you been working in SCM in the Gauteng Department of Health? (Binned)	Years working at SCM	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
90/10 point system is used for transactions above R50 million	6 - 10	89	106.16			
	11+	48	107.18			
	Total	207				
Sub-contracting is considered a pre-requisite for transactions above R30 million	<= 5	70	110.41	1.910	2	0.385
	6 - 10	89	98.21			
	11+	48	105.39			
	Total	207				

Table E10: Inferential statistics

Constructs	Years working at SCM	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Tests of Homogeneity of Variances	ANOVA	
						Lower Bound	Upper Bound				F	Sig.
Demand Planning	<= 5	70	4.10	0.773	0.092	3.92	4.28	2.00	5.00	0.098	2.905	0.057
	6 - 10	89	4.03	0.709	0.075	3.88	4.18	1.60	5.00			
	11+	48	4.33	0.618	0.089	4.15	4.51	2.40	5.00			
	Total	207	4.12	0.718	0.050	4.03	4.22	1.60	5.00			
Budget	<= 5	70	4.07	0.649	0.078	3.92	4.23	2.00	5.00	0.024	0.008	0.989
	6 - 10	89	4.07	0.643	0.068	3.94	4.21	1.67	5.00			
	11+	48	4.09	0.893	0.129	3.83	4.35	2.00	5.00			
	Total	207	4.08	0.707	0.049	3.98	4.17	1.67	5.00			
Strategic objectives	<= 5	70	4.05	0.889	0.106	3.84	4.26	2.00	5.00	0.132	2.018	0.136
	6 - 10	89	4.09	0.848	0.090	3.91	4.27	2.00	5.00			
	11+	48	4.34	0.693	0.100	4.14	4.55	2.00	5.00			
	Total	207	4.14	0.834	0.058	4.02	4.25	2.00	5.00			

APPENDIX F: DECLARATION OF PROFESSIONAL EDIT



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Independent Skills Development Facilitator

Dear Mr Selby

This letter is to record that I have completed a language edit of your thesis entitled, "Developing a demand management framework in the public sector: The case of Gauteng Department of Health".

The edit that I carried out included the following:

- Spelling
- Grammar
- Vocabulary
- Punctuation
- Pronoun matches
- Word usage
- Sentence structure
- Correct acronyms (matching your supplied list)
- Captions and labels for figures and tables
- Spot checking of 10 references

The edit that I carried out excluded the following:

- Content
- Correctness or truth of information (unless obvious)
- Correctness/spelling of specific technical terms and words (unless obvious)
- Correctness/spelling of unfamiliar names and proper nouns (unless obvious)
- Correctness of specific formulae or symbols, or illustrations.

Yours sincerely

Retha Burger

29 January 2022