UNIVERSITY OF KWAZULU-NATAL

Supply chain management challenges faced by public schools: An Umzinyathi district, KwaZulu-Natal case study

By

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A dissertation submitted in fulfilment of the requirements for the degree of Master of Commerce

School of Management, IT and Governance

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2021

DECLARATION

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ACKNOWLEDGEMENTS

The process of writing this dissertation has been very rewarding both academically and on a personal level. My sincere gratitude goes to all those who were always available when I needed them the most.

First and foremost, I want to thank God for never abandoning me during the writing process. Thank you to Professor Micheline Juliana Alberta Naude, my supervisor, for her rigorous, patient, and constructive criticism throughout the writing process; her time and suggestions were greatly appreciated.

Second, I'd like to express my gratitude to Dr. Caroline Goodier for her expert editing and Ms. Deborah Cunynghame for all of her administrative support.

Finally, I'd like to express my gratitude to my family, fiancé, and co-workers who have been supportive. I'd like to thank the KwaZulu-Natal Department of Education for helping to make the data collection process a success.

DEDICATION

I dedicate this dissertation to my family. Thank you very much for your support and encouragement.

ABSTRACT

The South African Schools Act No. 84 of 1996 states that all learners should be provided with a high quality of education and in so doing to lay a strong foundation for the development of learners' talents and capabilities. The act provides a clear framework so that everyone can understand the South African education system. However, the education system faces many challenges, particularly with regard to public schools. For example, there is a shortage of textbooks within the public schools, so that a considerable number of learners must share textbooks, which negatively impacts their learning. Against this background, the aim of the study was to identify the supply chain management challenges faced by public schools in the Umzinyathi district and to explore how these challenges could be managed and addressed.

The study is descriptive and exploratory, and a qualitative approach was used. Data was collected through semi-structured interviews with 20 stakeholders in the DoE. The stakeholders were selected by means of a non-probability sampling method. The collected data was analysed using thematic analysis.

The findings revealed that the main supply chain challenges centred around three themes, namely, procurement challenges, service delivery or logistics challenges, and demand challenges. These challenges negatively impact on learners' education. The study recommends that the public schools should be directly involved in the procurement processes to avoid any delays, shortages and over pricing, amongst other challenges. Furthermore, communication around supply chain challenges faced by public schools between DoE and school principals needs to be improved.

The contribution of this study is twofold. Firstly, it adds to the existing body of literature by identifying the challenges experienced in the country's public education and, secondly, the findings and recommendations could be useful in order to address the supply chain challenges faced by public school for stakeholders in the South African public education sector.

Key terms: South African Education System, Supply Chain Management Challenges, Department of Education, Public Schools, Stakeholders, Qualitative Approach, Thematic Analysis.

ABBREVIATIONS

CAPS	: National Curriculum and Assessment Policy Statement
CMC	: Circuit management centres
DBE	: Department of Basic Education
DoE	: Department of Education
KZN	: KwaZulu-Natal
KZNDoE	: KZN Department of Education
LTSM	: Learner teacher support material
MFMA	: Municipal Finance Management Act
NCS	: National Curriculum Statement
OAG	: Office of the Accountant-General
OBE	: Outcome Based Education
OCPO	: Office of the Chief Procurement Officer
PFMA	: Public Finance Management Act
PPPFA	: Preferential Procurement Policy Framework Act
SCM	: Supply chain management
SGB	: School governing body
SMT	: School management team
UKZN	: University of KwaZulu-Natal

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CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

According to the South African Schools Act No. 84 of 1996, all learners should receive a high-quality education that lays a strong basis for the development of learners' talents and potential. The act establishes a clear structure within which everyone can comprehend the South African educational system, which applies to learners in public schools in society at large (Great Schools Partnership, 2015: 6).

Supply chain management (SCM) is an important business activity globally. It is involved with essential business processes such as demand planning, procurement, operations and logistics management (Chopra & Meindl, 2013: 2). SCM involves the coordination of the flow of materials and operations both internally and externally from an organisation. This study was undertaken at the DoE in the Umzinyathi. The Umzinyathi district is one of eleven districts in the northern central region of KwaZulu-Natal (KZN). The district is situated between the N3 from Durban to Gauteng and the East Coast corridor (Christie & Monyokolo, 2017: 19).

It is estimated that 80% of the population in the Umzinyathi district in KZN live in rural areas (Lehohla, 2016: 19). Because of their remote locations, this group of individuals is geographically and culturally isolated (RSA Department of Cooperative Governance and Traditional Affairs, 2013: 10). The aim of this study was to provide insights of supply chain management challenges faced by South African education system.

The aim of the study was to find out the measures in place to overcome the supply chain management challenges that negatively impact the operation of public schools and public education system as the whole. The study background, research problem, and goal are all presented in this chapter. Furthermore, the objectives and critical questions guiding the study are outlined together with the statement of the problem.

1.2 BACKGROUND OF THE STUDY

The process of planning, integrating, and monitoring the movement of raw materials, of work in progress, and of finished products from point of origin to point of consumption is known as SCM (Bent, 2014: 3). This is a process of integrating all the

stakeholders in the movement of goods and services for an organisation in order to meet customer satisfaction (Felea & Albrastroiu, 2013: 81). SCM has an impact on a business or an organisation's competitiveness, as well as on how it works and how it procures supplies and disposes of them (Fawcett, Ellram & Ogden, 2014: 3)

SCM spans all sectors, including public schools. In public schools, it includes the process of acquiring the learner teacher support material required by the schools in order to provide the required quality of education or service to the stakeholders. Public schools can be regarded as the public education sector where citizens of the country receive public schooling provided by the South African government (Great Schools Partnership, 2015: 5). SCM challenges may be defined as challenges that affect the operation of public schools and DoE as a whole (Ambe & Badenhorst-Weiss, 2013a: 251). Some SCM challenges faced by the public education system in KZN, specifically in the Umzinyathi district, include the availability of classrooms, desks, chairs, books, adequately trained teachers, department support and management (Ater, 2013: 16). Other SCM challenges include the decisions involving the allocation of resources to various activities with an organisation (Mouton, Louw & Strydom, 2013: 36).

Most of the public schools in the Umzinyathi district are located in remote rural areas. The service of education and schooling is totally different from what is provided in the public schools located in towns and townships. Schools in towns are more advanced, in terms of the course curriculum and computer aided teaching whereas schools in townships are not able to involve learns in activities such as sports. Furthermore, rural schools face severe challenges that are unique to their environment. Poverty is rife and this has serious implications for the provision of quality education (Plessis & Mestry, 2019:3). The Umzinyathi district is divided into four subsections or circuit management centres, namely, Msinga, Ndumeni, Nquthu and Umvoti. The Umzinyathi district has 479 public schools and six independent schools.

Within this context, the aim of the study was to explore the SCM challenges that undermine the quality of education in KZN, specifically the Umzinyathi district, and provide recommendations on how these challenges could be managed.

1.3 STATEMENT OF THE PROBLEM

South Africa is a developing country, and the quality of the public education system is inadequate (Ambe & Badenhorst-Weiss, 2013a: 46). Recurring challenges include poor assessment outcomes and teacher training, insufficient departmental maintenance and guidance, a lack of physical resources, and the provision of teaching and learning materials, all of which contribute to poor results (Motuba, 2014: 25; Truter, 2015: 5). Mouton, Louw and Strydom (2013: 36) concur, highlighting the shortage of teachers, underqualified teachers and poor teacher performance among the difficulties facing the South African education system. These challenges lead to poor learner standards and academic results. A further challenge is a lack of classroom discipline, worsened by deficient resources and insufficient infrastructure (Barret, Treves, Shmis, Ambasz & Ustinova , 2019: 8).

While families in rural areas want to see their children succeed through a formal and effective school system, the majority of public schools are inadequate and incapable of providing learners with the skills they need to advance to the next grade. The majority of the public schools are in rural areas, and their usefulness lags behind that of their metropolitan counterparts (Truter, 2015: 6). Poor outcomes point directly to poor management in rural schools (Truter, 2015: 7).

Although a number of studies have been carried out on the concept and context of challenges faced by public schools, no studies were found that specifically deal with the supply chain challenges faced by public schools in KwaZulu-Natal, the Umzinyathi district, South Africa. The following studies have been carried out: on the SCM challenges faced in the South African public sector (Ambe & Badenhorst-Weiss, 2013a); on the constraints and challenges in the South African Education Sector (Nene, 2013: 33); and on teachers' experiences with overcrowded classrooms in a mainstream school (Muthusamy, 2015: 50). Accordingly, the following problem statement was formulated for this study:

"There is a lack of information about the supply chain challenges that public schools in KZN face which undermine the quality of education. These challenges need to be addressed in order to equip learners with necessary skills to progress to the next grade".

1.4 DEFINITION OF TERMS AND CONCEPTS

The following are definitions of key terms and concepts in this study.

Table 1.1: List of definitions of the key terms

Terms and concepts	Definitions
Supply Chain	A supply chain (SC) consists of all the parties involved directly or indirectly in delivering the inputs, outputs or outcomes in fulfilling a customer demand (Chopra & Meindl, 2013:15). In the public sector, supply chain mainly deals with the sourcing, the transportation, the storage and the receiving of goods as requested (Felea & Albastroiu, 2013: 75).
Quality	Quality is used to signify excellence of a product or service. It also means professionalism, reliability, consistency meeting societies' requirements. Quality is fitness for use or purpose (Rudragoudar, 2014: 37)
Supply Chain Management	In the context of this study supply chain management can be defined as the combination of all parties involved in delivering a combination of inputs, outputs or outcomes that will meet a specified service delivery in public sector or public schools (Felea & Albastroiu, 2013: 81).
Challenges	A challenge can be described as "something that hinders improvement or the accomplishment of something" (Ambe & Badenhorst-Weiss, 2013a). For example, in the context of this study, challenges could be described as "lack proper knowledge, skills and capacity, inadequate planning, accountability, fraud and corruption and unethical behaviours" (Ambe & Badenhorst-Weiss, 2013a).
Logistics	The delivery of goods and services from one location to another in order to meet customer requirements is referred to as logistics. Transportation, warehousing,

	and inventory management are all included (Lander, 2016: 40).
Procurement	Procurement is the process of acquiring goods and services for a business (Interagency Procurement Working Group, 2012: 2).
Public Education System	The public education system is the process of facilitating learning, or the acquisition of knowledge, skills, attitudes, beliefs, and habits through public schooling. Public education system methods include teaching, training, storytelling, discussion and directed research (Maarman, 2017: 20)
Stakeholders	A stakeholder can be defined as a person who has an interest or concern in the organisation at hand. In the context of this study, stakeholders comprise school governing bodies, school management teams, learners and parents (Mchunu, 2010: 16).

Source: Compiled by the researcher

1.5 RESEARCH QUESTIONS

From the problem statement, the following research questions were raised:

"What are the supply chain challenges that undermine the quality of education in KZN and how can these identified challenges be managed?"

In order to be able to respond to the primary research question, sub-questions are set up as follows:

1. What are the supply chain challenges experienced by stakeholders in the public education system in KZN that undermine the quality of education?
2. What methods or strategies could these stakeholders use to manage the identified SCM challenges?
3. What recommendations can be suggested to stakeholders in the public education system to better manage or overcome the identified supply chain challenges?

1.6 RESEARCH OBJECTIVES

In line with these research questions, the following research objectives can be identified:

- To determine the supply chain challenges experienced by stakeholders in the public education system in KZN that undermine the quality of education
- To examine the methods or strategies that stakeholders could use to manage the identified supply chain challenges.
- To recommend how stakeholders in the public education system can better manage or overcome their identified supply chain challenges.

1.7 CONCEPTUAL FRAMEWORK

Developing the conceptual framework and defining key theories is an important aspect of the research process (Adom & Hussein, 2018: 439). The framework in Figure 1.1 presents an overview of this study and deals with the supply chain challenges that undermine the education system in public schools in the Umzinyathi district of KZN. This framework illustrates the relationships between the stakeholders, SCM challenges, and strategies to overcome these challenges, and it will form the main focus of the study.

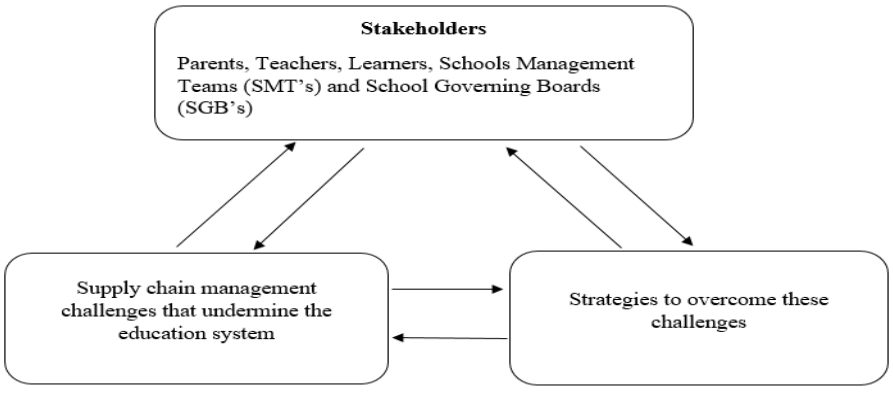


Figure 1.1: Conceptual Framework of the study

Source: Compiled by the researcher

1.8 SIGNIFICANCE OF THE STUDY

The South African educational system continues to produce poor results – from 2010 up until 2020, the pass rates ranged from 71% to 78% (Matric College, 2021). From these pass rates, it is evident that the Department of Basic Education (DBE) must focus on enhancing educational quality in order to get better outcomes (Spaull, 2013: 13). This study focuses on the supply chain challenges faced by public schools, which lead to the underperforming of learners within the classrooms (Truter, 2015: 15). Specifically, the study focuses on public schools located in the Umzinyathi district, a rural area.

The literature reveals that the majority of public schools in rural areas, such as the Umzinyathi district, provide substandard education because the teachers are unskilled or underqualified and lack the essential content expertise adequately to apply the curriculum (Great Schools Partnership, 2015: 8). The findings of this research are to outline and shed light on SCM challenges that undermine the quality of education faced by public schools in the Umzinyathi district. Suggestions are made as to how these challenges could be addressed.

1.9 JUSTIFICATION

The study was conducted in order to generalise its findings to other regions but to provide insight into the SCM challenges experienced by stakeholders in the public education system in the Umzinyathi district of KZN that undermine the quality of education. The main reason for conducting this study is based on preliminary research that was conducted by the researcher in order find that, when it comes to public schools in rural areas, the South African education system is falling short and that these schools face many challenges (Rudragoudar, 2014: 28). This aim of this study was to contribute to the literature by identifying these challenges. The findings and recommendations offered in this study are expected to be useful to the stakeholders in the public education sector.

1.10 RESEARCH METHODOLOGY

The purpose of section is to introduce the research design that underpins this study as well as the research methods and techniques (Campus Career Club, 2019). A brief overview of the research design, the research approach, data collection, interview guide and data analysis are provided in the next sections, together with an account of how validity and reliability of the data collecting in the study were achieved.

1.11 RESEARCH DESIGN

The research design can be viewed of as an overall approach that indicates how the researcher wants to carry out the study in order to find answers to the research questions (Mbhele, 2014: 68; Mvubu, 2015:9). It indicates the sort of data to be collected and analysed, as well as the methods to be utilised to collect and analyse the data (Van Wyk, 2013: 67). Wachauf-Tautermaen & Werchert (2015: 72) opine that there are three basic categories of research design available to researchers, each of which is appropriate for data collecting and analysis. The types of design include descriptive, explanatory, and exploratory designs.

Descriptive research is defined by Loeb, Morris, Dynarski, Reardon, McFarland & Reber (2017: 2) as a study that intends to define a type of subject or behaviour – it is used to find out what factors might be present. Saunders, Lewis and Thornhill (2016:175) define descriptive research as answering "*what, who, how, when and where*" questions to gain a description of events and of the population of the study or situations (Sekaran & Bougie, 2013: 22). In a descriptive design, quantitative and/or qualitative methods are appropriate (McCombes, 2019: 1).

The aim of *explanatory research* is to explain how variables cause and impact each other. The significance of the study design is that it attempts to investigate a topic in order to understand how and why a link exists between the variables (Saunders, et al., 2016: 176). It identifies the association between variables that relate to the research problem.

Exploratory research tries to provide insight into a phenomenon in order to generate new ideas and improve knowledge about the phenomenon (De Vos, Strydom, Fouche' & Delport, 2013: 13). According to Sekaran and Bougie (2013: 27), when only a few

facts are known but more knowledge about a phenomenon or an issue is needed, exploratory research is deemed appropriate.

In order to accomplish the study objectives, a descriptive and explanatory study was adopted because little is known about SCM challenges experienced by stakeholders in the public education system in the Umzinyathi district that undermine the quality of education.

1.12 RESEARCH ELEMENTS

1.12.1 Research methodology

A research approach is a set of steps used in research to reduce the data set from broad assumptions to specific data collection, analysis, and interpretation methods. Qualitative, quantitative, and mixed methods research design are the three approaches to research design (Castellan, 2013: 34; Creswell, 2013: 37). Quantitative research is utilised to assess objective numerical data. It uses collection techniques such as questionnaires. Qualitative research, on the other hand, deals with subjective data that is usually obtained through interviews and depends on understanding and discovering the thoughts, experiences and perspectives of participants. A mixed method of research combines qualitative and quantitative data obtained at the same time or sequentially (Saunders et al, 2016: 168).

In this study, a qualitative case study method was used as it assisted in understanding the beliefs, reasons, and opinions of stakeholders relative to the supply chain challenges faced by them in the public education system (Sharma, 2019: 5).

Interviews, transcripts of focus groups and copies of video recordings are all examples of qualitative data collecting (Sekaran & Bougie, 2013: 24). The qualitative method, in the form of conducting semi-structured interviews, was deemed appropriate as the method of gathering data in this study. Accordingly, interviews were conducted with DoE management and stakeholders in the Umzinyathi district.

1.12.2 Study site

The study site of the research refers to the location where data will be collected (Arikkok, 2017: 9). The status of public schools in the Umzinyathi district is different from those in towns. The Umzinyathi district is located in remote rural areas that lack

infrastructure. For this study, the research was conducted within the DoE in the Umzinyathi district offices. The Umzinyathi district is one of the districts located in the north of KZN with four circuit management centres namely, Msinga, Ndumeni, Nquthu and Umvoti. The district is located between the N3 corridor, which connects Durban and Gauteng, and the Coast corridor, which runs down the east coast.

1.12.3 Target population

The KwaZulu-Natal Department of Education (KZNDoE) refers to the basic education department that governs the schooling system in KZN. This department governs the education system from Grade R to Grade 12. The KZNDoE is responsible for approximately 6000 public educational institutions, which serve over 2.8 million learners. The department has non-school administrative offices in addition to teaching and learning spaces and associated facilities dedicated to school-based education service delivery. It is estimated that approximately 109 000 people work in these institutions, with over 80% of them being educators (KZNDoE Maintenance Strategy Signed 2016: 3).

The complete group of individuals, situations, or items of interest from which the researcher would like to generalise findings is referred to as the target population of the study (McLeod, 2019: 1; Sekaran & Bougie, 2013: 37). The target population in this study refers to all the individuals who are permanent members of staff and work in the DoE in the Umzinyathi district of KZN.

1.12.4 Sampling strategy

Sekaran and Bougie (2013: 16), define a sample a subset of the target population - a small number of selected subjects from the target population. Since this study is of a qualitative nature, a non-probability purposive sampling technique was used. As noted by Saunders, et al., (2016: 276), purposive sampling allows for the selection of participants who are considered to be relevant to the study. Purposive sampling is also identified as “judgement sampling – a sampling technique in which the researcher relies on his own judgement” (Sekaran & Bougie, 2013: 15).

1.12.5 Sample size

The sample size refers to the number of people who will be involved in the research. Sampling is the procedure of selecting the respondents or participants of the study.

Participants are those who take part in the investigation (McLeod, 2019: 1). The number of participants from the selected population is referred to as the sample size. The sample size is the smaller number of participants from the large population of the study (Muthusamy, 2015: 27).

The convenience non-probability sample for this study included 20 participants from the DoE in the Umzinyathi district. This comprised the circuit manager, supply chain, logistics and asset management officials, twelve school principals (from primary and secondary schools) and six other stakeholders from schools. Based on the population of the DoE in the Umzinyathi district, the researcher found that 20 participants would be suitable as the sample size of the study. There were 14 schools chosen for the study because the researcher engaged with the principals of these schools, and they agreed to assist with the study.

1.12.6 Data collection

The original data that the researcher acquires for a study is referred to as primary data. Primary data can be acquired directly from research interviews, surveys or questionnaires (Saunders, et al, 2016: 276). The data for this study was gathered through semi-structured interviews with individuals from the DoE.

1.12.7 Data collection tool

Data collection tools are used to collect data. Questionnaires, interview guidelines, and observations are examples of such tools. For the study to be conducted, it's vital to make sure the instrument you use is valid and reliable (Annum, 2016: 97; Taylor, Bogdan & DeVault, 2015: 9). The chosen instrument for this study was a semi-structured interview guide. Open-ended probing questions were included in the interview guide.

1.12.8 Data analysis

The data was analysed using thematic analysis. Thematic analysis is a process for detecting, analysing, and reporting patterns within data (Braun & Clark 2013a: 13). The study presents the research findings by themes that were generated through a manual process.

1.12.9 Data quality control

Data quality control refers to the determinations and techniques that the researcher puts in place to make sure that data that has been gathered is accurate and reliable (Jaya, Sidi, Ishak & Affendey, 2017: 2647). Guba's model of trustworthiness was used to ensure the accuracy of the current study. Guba's trustworthiness model examines the trustworthiness and reliability of the tools used to collect the data (Gunawan, 2015: 10). Guba's model is a strategy to ensure trustworthiness of qualitative research in terms of credibility, transferability, dependability and confirmability (Mvubu, 2016: 10). This is addressed in Section 4.11.

1.13 ETHICAL CONSIDERATION

Blumberg, Cooper and Schindler (2013: 15) define ethics as the moral philosophies, principles or measures that guide ethical decisions about our behaviour in association with others. Part of the approval process for a research study is that it needs to be approved by a research ethics committee. This involves stating how the data will be stored, whether the date will be kept after the research is completed, under what conditions and how long it will be kept so as to ensure confidentiality of the participants and their data (Lewis, Saunders and Thornhill, 2018: 57).

This study complied with the ethical clearance guidelines set out by the University of KwaZulu-Natal (UKZN). A formal application for ethical clearance was processed by the Humanities and Social Sciences and Research ethics committee at UKZN. The approval notification is included as Appendix A.

1.14 LIMITATIONS OF THE STUDY

A limitation of the study is that only twenty-six participants from the DoE in the Umzinyathi education sector participated in this study. A further limitation is that the researcher included only the Umzinyathi district DoE in this study. Therefore, the outcomes and conclusions cannot be generalised to the whole of KZN or South Africa.

1.15 CONCLUSION

This chapter provided an overview of the study as well as its background. The terms and concepts were defined, as well as the conceptual framework, problem statement, research questions, and objectives. The study selected the DoE because of its importance in the South African public education system. The role of DOE in the South Africa education system is to provide quality of education to young individuals. However, due to lack of resources and infrastructure, the provision of quality of education is lacking. The purpose of this study was to determine the supply chain challenges faced by stakeholders in the public education system in KZN. The research methodology was discussed in order to reach the study goals, including a summary of the research design, the importance of the study, ethical considerations, and study limitations.

The next chapter, (Chapter 2) presents an overview of the South African public education system. The aim of the chapters of the dissertation is outlined below:

1.16 CHAPTER OUTLINE

Chapter 1: Provides the introduction and background of the study.

Chapter 2: Presents an overview of the South African Education System.

Chapter 3: Presents supply chain management, the role of supply chain management in the public sector, the regulation framework and the supply chain management challenges faced by the public education system.

Chapter 4: Presents the research design and methods used to address the research objectives of this study.

Chapter 5: Presents the data findings and the discussion thereof.

Chapter 6: Revisits the research objectives and continues with recommendations and suggestions for further research.

CHAPTER 2: OVERVIEW OF THE SOUTH AFRICAN PUBLIC EDUCATION SYSTEM

2.1 INTRODUCTION

Education can be regarded as the most important aspect of national regeneration and progress. It refers to the facilitation of learning or the acquisition of knowledge, skills, values, beliefs, and habits. The public education system in South Africa refers to public schooling not private schools. The main focus of the public education system is to strengthen the existing schools, build new ones and appoint competent teachers in order to provide quality education (Maarman, 2017: 20).

This chapter presents an overview of the structure of the South African public education system through a review of relevant literature. Subsequently, the chapter provides insight into the supply chain and the supply chain challenges of the public education system.

2.2 AN OVERVIEW OF PUBLIC EDUCATION SYSTEM

Every child has the right to education, according to the South African Constitution, Act 108 of 1996, Section 29 of the Bill of Rights (Truter, 2015: 38). Education can help people get out of poverty (Howe & Covell, 2013: 49) and is essential for social progress. High quality education and training are essential in order to contribute to economic growth and development. Children benefit from education because it allows them to reach their full potential. However, in the South African public education system, the majority of children do not have access to high-quality education such as the education offered by private schools (Marishane, 2017: 2).

Education should focus on the entire development of the human personality as well as the promotion of human rights and fundamental freedoms (Marishane, 2017: 1). Every child is entitled to receive free education which is compulsory – at least in the elementary stages. Every child should get an education that will improve his or her general culture and enable him or her to develop his or her abilities, independent judgment, sense of moral and social responsibility, and, as a result, to become a useful member of society, on the basis of equal opportunity (Truter, 2015: 37).

Basic education is a flexible concept that must function to fulfil the learning needs of learners of all ages and experiences, whether they are children, youth, or adults. In order to put constitution educational values into practice, the former racially based education system was replaced by the South African Schools Act 84 of 1996. Since the advent of democracy of South Africa, the educational system has improved, with greater access to schools, higher learner-to-teacher ratios, democratically elected government bodies and better resource distribution (Maddock & Maroun, 2018: 195). Raising success levels and average student achievement is in the economy's best interest; implementing measures to improve skills and close the achievement gap is in the best interests of both the child and the economy (Truter, 2015: 36).

2.3 EDUCATION IN SOUTH AFRICA

In South Africa, education is regulated by two national departments: the DBE, which oversees primary and secondary schools, dealing with public schools and private schools, known as independent schools; and the Department of Higher Education and Training which oversees higher education in terms of tertiary education and vocational training (Mbiza, 2018: 1).

Education is crucial in every country. It has been commended, promoted, and valued in South Africa because many South African parents come from previously underprivileged circumstances and have never had access to a good education themselves (Prew, 2013: 17). Education is a long-term process that results in beneficial changes in human lives and behaviours. The acquisition of knowledge is accomplished through study or through the transmission of knowledge by means of instruction or other practical techniques (Mohamed, 2020: 1). Education affects an individual’s reasoning and ability to reach a specific objective in a natural and enduring way (Macha & Kadakia, 2017: 1).

2.4 CATEGORIES OF THE PUBLIC EDUCATION SYSTEM IN SOUTH AFRICA

In South Africa, the public education system is divided into three categories, namely, formal, informal and non-formal education, described in the following subsections.

2.4.1 Formal education

Formal education, often known as formal learning, is primarily conducted on the premises of a school, where students might gain fundamental, academic, or trade skills (Passion in Education, 2019: 1). Formal education starts in elementary school and continues through high school. Higher education, often known as post-secondary education, is usually obtained at a college or university and may result in the awarding of an academic degree (Maddock & Maroun, 2018: 204). Formal education is acquired through the learning system and may include learning in classrooms, school grades or certification, as well as structured teaching in many disciplines with a prescribed syllabus (Lewin & Charania, 2018: 1).

2.4.2 Informal education

The process of a parent teaching a child how to cook or swim is an example of informal education. “Informal education refers to learning that takes place outside of a traditional curriculum” (Jitpaisanwattana, Pathumcharoenwatten & Tantawathu, 2015: 945). An informal education can also be obtained by reading various books from the library or visiting educational websites. For example, informal education entails training a child basic numerical characters, as well as his or her mother tongue. Informal education is not provided by a formal educational institution like a school or college.

Informal education has an impact on the accumulation of human capital, which in turn has a significant impact on a country's growth and development (Jeffs & Ord, 2018: 108). Informal education is correlated to professional experience in the workplace and is considered to be a long term-investment.

2.4.3 Non-formal education

Adult basic education, adult literacy education and school equivalency preparation are examples of non-formal education (Dupuy, Bezu, Knudsen & Halvorsen, 2018: 4). Non-formal education is delivered purposefully, methodically and in a systematic manner (Roodt, 2018: 1). Fitness programmes and community-based adult education courses are examples of non-formal education.

2.5 LEVELS OF THE SOUTH AFRICAN PUBLIC EDUCATION SYSTEM

According to the South African Constitution's Bill of Rights, all South Africans have the right to a basic education, which includes adult basic education and progression to higher education (Brand South Africa, 2013a: 1). The education system in South Africa is divided into three levels, namely, elementary, secondary and tertiary (Santos & Miguel, 2020: 20). Each of these levels are explained below.

2.5.1 Elementary or primary education

The period of formal education following pre-school but before high school is known as elementary or primary school. It normally covers Grades R through 7, and students study fundamental abilities such as reading, writing and mathematics. Elementary school is a school of the first six or seven grades, where subjects are taught (Kasper, Uibu & Mikk, 2019: 514; Yoshida, 2020: 675). It influences people's lives even after they reach maturity by encouraging prudent decision-making. Children who receive this level of education gain a variety of skills, including sharing, taking turns, communicating, and numeracy skills (Darling-Hammond, Flook, Cook-Harvey, Barron, & Osher, 2019: 99). In addition, these children develop socially and emotionally faster than those who do not receive this education. The South African public education system states that primary education is compulsory and opens to everybody, it is free of charge and it promotes the growth of learners (Smith & Dawes, 2020: 764).

2.5.2 Secondary education

Secondary education is education delivered by high schools or college preparatory schools. Secondary education usually follows seven years of elementary or primary school and is followed in turn by higher education (Maddock & Maroun, 2018: 197). Secondary education includes general and vocational education and must be available for everyone (Helmstad & Jedemark, 2020: 1). Secondary education is usually regarded as the best environment for preparing young people, mostly adolescent boys and girls, for healthy and productive adult lives that include participation in social, political and economic spheres (Vairamidou & Stravakou, 2019: 50). Secondary education covers Grades 8 to 12 of schooling.

2.5.3 Higher education

Higher education is a type of tertiary education that leads to a diploma or degree. Higher education, also known as post-secondary education, third-level education, or tertiary education, is the optional final stage of formal instruction after high school. Higher education can be any schooling beyond high school. When most people speak of higher education, there are referring to colleges and universities (Brand SA, 2013: 4).

Higher education includes all post-secondary education, training, and research advice provided by educational institutions such as universities that have been designated as institutions of higher education by the state (Iqbal & Bhatti, 2020: 1). It encompasses all activities that a country considers to be higher education, not just those that take place in universities and graduate schools, but also shorter-term education and training courses (Alyahyan & Dustegor, 2020: 1).

2.6 THE PUBLIC SCHOOLS IN SOUTH AFRICA AND DIFFERENT SCHOOLING NEEDS

2.6.1 Normal or ordinary schools' needs

A mainstream school is a regular neighbourhood school that all children can attend. Normal schools' needs are the first priority. The teaching and learning needs are the main requirement of the schools, as well as the quality of educators necessary for the provision of quality education (Higgins & Abowitz, 2013: 372). In order to strengthen the quality of educators in South Africa, the South African Council for Educators was introduced. This is a professional council dedicated to elevating the teaching profession status and encouraging educators' professional development and conduct (Maddock & Maroun, 2018: 203).

2.6.2 Specialised educational needs

The education of specialised schools accommodates children with disabilities and those who are slow learners. Specialised education needs tend to be a priority and important within the DBE. DBE provides specialised schools with their required needs such as infrastructure, transportation and access to learning materials (Khumalo & Hodgson, 2017: 106). The infrastructure could be classrooms, toilets and ramps in

front of all classrooms to enable disabled learners to access in schooling programmes (Bartletts, 2016: 110).

2.6.3 Development of specialised talent

The public education system has also to develop the specialised talents of learners such as in creative arts and sports. The role of this type of specialised school is to develop and encourage the learners who want to show their high levels of competence in arts and sports. Learners are encouraged to develop in their specific field of interest (Ajani, 2018:3).

2.7 IMPACT OF THE EDUCATION SYSTEM ON THE SOUTH AFRICAN ECONOMY

Education leads to a more highly trained workforce, higher human capital productivity, and increased output. Education boosts economic innovation, resulting in new goods, new knowledge, and new processes that can propel the economy forward (Brown, 2019: 1). Education plays a crucial role in creating employment opportunities especially for skilled individuals and alleviating poverty, particularly given the emergence of knowledge based on the globalised economy. Education provides human resources with the necessary information, skills, and competencies to contribute to the economic growth (Mlachila & Moeletsi, 2019: 39).

The main purpose of growing knowledge in an economy to harness innovation and presents prospects for further economic growth (Radcliffe, 2016: 1). The understanding of the impact of education on economic growth will help to sensitise those in authority about the importance of education, since some other citizens are not aware of the importance of education on economic growth. As the number of educated workers increases, a country's economy becomes more productive. Workers who are educated are better able to complete tasks that involve literacy and critical thinking. Education is an investment in human capital and in some countries the economy becomes more productive as the number of educated workers increases (Malangeni & Phiri, 2018: 101).

2.8 THE KWAZULU-NATAL DEPARTMENT OF EDUCATION

The nature of management in the education system in South Africa is unique, with direct management being located at the provincial level so that there are great variations in how provinces support their schools, with each having their own protocols (Smutka, Maitah, & Kuzmenko, 2018: 253). The KZNDoE, located in Pietermaritzburg, has one head office that governs the department as a whole. There are twelve (12) district offices, namely, Amajuba, Ilembe, Uthungulu, Uthukela, Pinetown, Harry Gwala, Ugu, Umlazi, Umgungundlovu, UMzinyathi, Umkhanyakude and Zululand. Most of these district offices are based in rural areas (The Maurice Webb Race Relations Unit, 2018: 18). Since this study focuses on the Umzinyathi district, an overview of this district office is provided in the next subsection.

2.8.1 Umzinyathi District Office

The Umzinyathi district is one of eleven districts in KZN's northern central region. The district is situated between the main N3 route from Durban to Gauteng and the East Coast corridor. Msinga, Ndumeni, Nquthu, and Umvoti are the four-circuit management centers of the Umzinyathi district (Christie & Monyokolo, 2017: 19).

Approximately 80 per cent of the population in the Umzinyathi district in KZN live in rural areas, which are less fortunate than urban areas (Lehohla, 2016: 19). Because of their remote locations, they are geographically and culturally isolated (RSA Department of Cooperative Governance and Traditional Affairs, 2013: 10).

The Umzinyathi district alone have seven (7) administrative offices, namely, four (4) circuit management centres (CMCs) in each local municipality respectively, two (2) district offices that are located in Dundee in order to deal with district administration issues on its own and one (1) education centre that is regarded as main place when departmental official can hold meetings on pertaining district. There are approximately 640 schools. All these institutions are staffed by approximately 12000 employees, with 80 per cent of them being educators (KZN DoE Maintenance Strategy Final Signed, 2016: 3).

The study population includes all the stakeholders that are relevant to the department of education (DoE) and who make up the value chain of the public education system. The stakeholders involved in this study are follows, MEC for department of education, directors of education and departmental heads.

2.9 THE STRUCTURE OF THE EDUCATION SYSTEM IN SOUTH AFRICA

The structure of the public education system in South Africa is broken down into different categories such as Model C schools, public schools, private schools and rural schools. Each category is discussed in turn below.

2.9.1 Model C schools

A 'Model C' school refers to a defunct semi-structured private school in the government of white-only government schools in South Africa; the term was introduced in 1991 (Christie & McKinney, 2017: 2). A Model C school is one that has a distinct cultural identity that was formed during the apartheid era to serve the white community interests (Bartlett, 2016: 2). Model C schools are more ethnically diverse, and former Indian schools appear to serve both Indian and African learners.

2.9.2 Public schools

Public schools are those funded by the government for the purpose of educating the children of a community or district and are part of a free public education system. A public elementary or secondary educational entity or agency is referred to as a public school (Molnar, 2019: 54). Public schools are educational institutions supported by the local, state, and federal governments (Higgins & Abowitz. 2013: 368). A public school is one that receives its funding in whole or in part from a general state, country, or district tax (Ghavifekr & Rosdy, 2015: 189). Public schools are maintained by a public-school corporation.

2.9.3 Rural schools

A rural area is a geographical location outside of cities and towns. Therefore, rural schools are identified as schools located in such areas (Kvalsund, 2019: 180), with the majority of its students living in rural places (Plessis & Mestry, 2019: 1). The rural schools are government entities that provide rural education. The rural school is an important community asset; it adds to its social capital and provides the infrastructure for various activities. The development of people in terms of literature is an important for both preserving and developing society (Echazarra & Radinger, 2019: 29).

The aim of the rural school is to provide high quality of education in line with the democratic principles of the constitution of South Africa and improvement of rural education by providing support services (Pillay & Luckan, 2019: 9). Rural schools link the various levels of education into a holistic view of transformation where education mediates development (South Africa, 2018: 23).

2.9.4 Private schools

Private schools are the independent schools supported wholly by the payment of fees. Such schools are financed by private organisations or individuals rather than the government (Brayston & Green, 2018: 1; Squire, Robson & Smarick, 2015: 4). Learners benefit from private schools because they foster academic brilliance and high achievement, educate the whole child in a value-based environment and prepare children for life success (Anders, Green & Henseke, 2019: 1).

2.9.5 An overview of the types of schools in the Umzinyathi district

The Umzinyathi district mostly comprises of public schools and few private schools. The South African Schools Act No. 84 of 1996, has two categories of public schools namely, section 20 and Section 21 schools.

- **Section 20 schools**

A section 20 school is a school that performs the functions listed in section 20 of the South African Schools Act 84 of 1996. According to Department of Education (2002: 28), these schools do not have approval to procure their own goods and services (DoE, 2002: 28). This is a disadvantage as Section 20 schools are not able to negotiate discounts, better prices and select appropriate suppliers. They can only deal with suppliers contracted by the Department of Education.

- **Section 21 Schools**

A section 21 school refers to a school that has been allocated the responsibility of carrying out the functions listed in section 21 of the South African School Act 84 of 1996 (Mbuqe, 2020: 52). The School Governing Body of a section 21 school performs more functions than the School Governing Body of a section 20 school as they are allocated more functions because of their proven capability, knowledge and expertise. In these schools there is a significant and consistent decentralisation to the school level of authority to make decisions related to the allocation of resources (Nyambi,

2005: 29). The section 21 functions are conditional on the SGB having the capacity to perform such functions effectively (DoE, 1996: 16). The allocation of these extra powers and responsibilities make these schools self-reliant, hence they are also known as self-managing schools (Nyambi, 2005: 29).

Although section 21 schools are not independent schools, they are more responsible for their own affairs as the SGB carries considerably more responsibility for the success of the school. Much time is spent at SGB meetings, discussing finance (Mbuqe , 2020: 52).

2.9.6 Historical overview of education in South Africa

Prior to 1994, the South African education system was under the apartheid government and black people were limited to Bantu education. In 1994, a democratic government took over in the country, and now free education and accessibility to quality of education is available for everyone wherever they want (Horwitz, 2013: 289). The DBE looks after the South African education system as a whole with regard to elementary and secondary schooling.

The DBE introduced Outcome-Based Education (OBE) based on an educational theory that focused on the outcomes of each component of the educational system. This theory was adopted since the aim of education is to prepare students for life in society as well as task performance. The outcomes-based approach aims to focus as much on the learning process and the final outcome or result as it does on knowledge and skills (Maddock & Maroun, 2018: 202). OBE is an educational concept that rejects the traditional focus on what the school offers pupils in favour of requiring learners to demonstrate what they know and can do. OBE reforms emphasise setting clear standards for observation measurable results (Zhang & Fan, 2019: 246). The explicit declaration of learning outcomes, which identify the tasks students are expected to be able to accomplish after completing the course, is emphasised in outcome-based teaching and learning (Waghodekar, 2017: 26). It has been suggested that OBE has been the most significant educational development in the last two decades. For effective curriculum planning, a clear specification of the training's final product and associated learning result is required (Brand South Africa, 2013b: 8).

The public education system replaced OBE with the National Curriculum Statement (NCS) in 2008. NCS went further in redressing past educational imbalances and

focusing on the values linked with a democratic South Africa (see Table 2.1). Regardless of their financial background, race, gender, physical ability, or intellectual ability, the NCS aspired to educate learners with the knowledge, skills, and values necessary for self-fulfilment and meaningful participation in society as citizens of a democratic democracy (Spaull, 2013: 7). The NCS brought together young people from all backgrounds for a similar purpose. It provided them with new abilities and the tools they need to make a difference. It enabled individuals to discover their abilities and reach their full potential (Ramabulana, 2017: 45).

The former NCS was replaced by a national Curriculum and Assessment Policy Statement (CAPS) in 2014 (see Table 2.1), a single, comprehensive, and compact policy document developed by the DBE for all of the courses specified in the NCS from Grades R to 12. CAPS gives teachers explicit instructions on what they should teach (Grussendorff, 2014:3). CAPS was created to maintain the curricula and aims at a high level of skills and knowledge. It encourages an active and critical approach to the learning of given truths (Maarman, 2017: 20). CAPS did not explain the meaning of the understanding of subjects and re-inserted clear discipline boundaries (Grussendorff, 2014: 8). CAPS provides extensive teaching guidelines and is graded and assessed on a subject-by-subject basis (Mopeli, 2017: 2). The fundamental goal of CAPS is to relieve teachers of administrative burdens and provide consistency and direction when teaching what was formerly known as learning outcomes and assessment standards in the NCS and are now known as content and skills in the curriculum assessment policy statement (Maharaj, Nkosi & Mkhize, 2016: 371).

From this overview, it is clear that many changes have occurred in the education field since 1994 (see Table 2.1), including more access. The DBE has introduced a new curriculum in order to prepare learners for success in life. The participation of parents, students and communities has been institutionalised through the creation of school governing bodies (SGBs). According to the South African School Act of 1996, the SGB should administer and control the school's property, buildings and grounds occupied by the school and must not in any manner interfere with or otherwise hamper the implementation of a decision made by the Member of Executive Council or Department in terms of any law or policy (KZN DoE Maintenance Strategy Signed, 2016: 3). Management, according to the new paradigm, is an activity in which all members of an educational organization participate (Grussendorff, 2014: 27).

Table 2.1: Changes to the South African education system in the period 1994 to 2014

No	Year	Changes after 1994
1	1994	The country changed from apartheid era to democracy.
2	1997	The new curriculum, outcomes-based education (OBE) was introduced.
3	2000	The Level One teacher is expected to take on leadership positions in terms of subject or learning areas, contribute to colleagues' professional growth, and improve the school's administrative efficiency.
4	2008	The new curriculum, the National Curriculum Statement (NCS), was introduced, which focuses more on amending the imbalances of the past.
5	2014	The National Curriculum and Assessment Policy Statement (CAPS) was introduced in 2014. CAPS was created to maintain the curricula and is based on aiming for a high level of skills and knowledge.

Source: Compiled by the researcher

The South African education system transformed significantly from 1994 till 2014. The changes made a difference in terms of providing improved education for rural populations.

2.10 SUPPLY CHAIN IN THE EDUCATION SECTOR

In order to function in a demanding environment, the procurement of products and services via SCM will become increasingly important in the education sector. Organisations across the world are beginning to recognize the strategic importance of SCM. The public education sector recognises the value of SCM in ensuring that all components of their value chain are met (Ambe, 2012: 134). Not only does SCM play a critical role in the creating and maintaining of the value chain in the public

education sector, it serves as a tool for more efficient funds allocation and governance (Procurement Guidance, 2018: 13).

The South African education system views SCM in various ways, addressing different focus areas. A government sector-to-sector focus area may be in the education sector, with a focus on logistics and effective flow of goods and services in and out of the Department of Education. The focus might also be on simplifying the process by ensuring that teaching materials are received. The supply chain's form and the SCM methods or processes used will change dramatically depending on a range of circumstances or variety factors (Ambe & Badenhorst-Weiss, 2013a: 11005).

2.11 CHALLENGES INVOLVED IN PUBLIC EDUCATION SYSTEM

Various major SCM challenges are involved in the daily operations of the South African public education system. Key SCM challenges for the DoE hinder the delivery of services in KZN. These challenges are discussed in the following subsections.

2.11.1 Incorrect and inappropriate norms and standard allocations

The KZNDoE implementation plan provides very limited information in terms of plans and the appropriate use of the norms and standards. Incorrect and inappropriate norms and standards allocation is caused by the negligence of employees within the finance unit in the DoE (Norms and Standard for Infrastructure, 2019: 4). Negligence includes allocating the wrong funds to the wrong people at the wrong time. Therefore, the DoE fails to meet all the demands and logistics.

2.11.2 School governing bodies not prioritising maintenance

In South Africa, School Governing Bodies (SGBs) are responsible for school governance and are the most essential force in the education industry. The ability to rule is fundamental to school governance (Guilty, 2016: 15). However, SGBs are not trained before they begin their work, leading to issues with the utilisation of language specialist in meetings, and the challenges of managing the large amounts of paper, ignorance of relevant legislation and scared by the presence of other members who appear to be knowledgeable and clear in their roles (Nonyane, 2016: 31). This results

in the SGB not prioritising maintenance in their school because of not having proper knowledge in the first place (Xaba, 2013: 201).

2.11.3 Lack of close supervision of implementing agents and / or lack of a clear line of responsibility between custodian and user

The lack of close supervision of implementing agents results in a lack of encouragement and support for the employees. The roles and responsibilities are not clear to all parties. A lack of proper supervision may lead the employees to do as they please, which is a challenge in the procurement process. These issues cannot be resolved in a timely and effective manner due to the challenges (Procurement Guidance, 2018: 17).

2.11.4 Lack of custodian commitment to maintenance

The lack of custodian commitment to maintenance can be attributed to the lack of staff committed to looking after maintenance. It is the responsibility of the department to allocate someone who will take responsibility to govern the maintenance, but no employees are appointed to deal with maintenance (KZN DoE Maintenance Strategy Final Signed, 2016: 1). This can be regarded as a major's challenge.

2.11.5 Limited capacity at head office and district levels

The DoE received a briefing on the capacity assessment process in education from school management team (SMT). Uniformity had to be established in the role of district and circuit offices. The role and functions of district office have to be clarified (Cater, 2013: 41). The school principals are being encouraged to teach in addition to their management duties. Financial resources are allocated to improve the quality of teaching and learning. There is a lack of understanding at head office and district offices of the responsibility and need to improve the role of inspectors. The gap currently occurring between policies and implementation needs to be filled (Mayatula, 2013: 1). The limited capacity at head office or district level is the major challenge since it hinders smooth running of the public schools.

2.11.6 Undefined reporting lines and lines of accountability

There is no clear line of accountability, and therefore the lines of responsibility in the DOE are not known by all officials (Ntsele, 2014: 22). Without a clear line of accountability, a quality assurance programme for the DoE leads to poor functioning

of public schools (Cater, 2013: 41). The DoE should appoint proper officials to look at the line of reporting and accountability.

2.11.7 Poor maintenance planning, budgeting and implementation

Maintenance is a general phrase that encompasses the planning, budgeting, and implementation of repairs, planned maintenance, rehabilitation and infrastructure replacement to ensure that the DoE provides the best possible service (Sapp, 2017: 1). Poor maintenance of planning, budgeting and implementation means that the DoE is not able to achieve appropriate planning and budgeting. This one of the major challenges in SCM (Infrastructure Maintenance Budgeting Guideline, 2018: 2). The budget allocation is the amount of funding set out for each line of expenditure. It specifies how much money an organisation is willing to spend on a specific item or programme.

2.11.8 Lack of resources related to transport, tools and materials

The DoE has to provide allocation in terms of the budget for the SCM unit to procure sufficient resources and meet the demands of the DoE. Problems include lack of financial resources to provide transportation or logistics for the goods and services to be delivered from one designation to another. Funds may be unavailable due to lack of financial resources to public education in order to transport necessary materials or goods (Setino, 2018: 144). This is another SCM challenge in the public education system (Ghavifekr et al., 2014: 40). There are schools with limited technical support in the classroom and lack of school resources and tools. The lack of resources and tools for teaching and learning in the school leads to a low quality of education although teachers may make every attempt to use what is available (Ghavifekr, Kunjappan, Ramasamy & Anthony, 2014: 42).

The DoE also faces SCM challenges such as delays in procuring the goods and services required by schools and long lead times on the transportation of goods and services to schools (Ambe, 2012: 37).

2.12 STAKEHOLDERS IN THE PUBLIC EDUCATION SYSTEM

Stakeholders in the public education system include administrators, teachers, staff members, students, parents, families, community members, local business leaders, and

elected authorities such as the school management team and SGB. Stakeholders may also play a role in community-based learning, which is the practice of connecting what is taught in a school to the community around it, which may include local history, literature, and cultural heritages. The expanding role of the stakeholder in public education stems from the idea that schools, as public institutions, are responsible for the education of their learners (Great Schools Partnership, 2014: 1).

2.13 CONCLUSION

This chapter has provided an overview of the South African public education system, education in South Africa, categories in the South African public education system, and the level of the South African public education system. The chapter also discussed the categories of public schools in South Africa that exist for different schooling needs. The impact of public education system on the South African economy had also been covered, referring to the KZNDoE and the Umzinyathi district. In addition, the structure and stakeholders of the public education system have been described. Furthermore, a historical overview of the South Africa public education system was provided.

The next chapter (Chapter 3) presents SCM, the role of SCM in public sector, the regulation framework and the SCM challenges faced by the public education system.

CHAPTER 3: SUPPLY CHAIN, SUPPLY CHAIN MANAGEMENT AND COMMON SUPPLY CHAIN MANAGEMENT CHALLENGES

3.1 INTRODUCTION

This section presents an overview of the literature, providing insight into both the SCM challenges undermining the quality of education offered by the public education system and also the strategies to address these challenges. The two frameworks of challenges and strategies to address the challenges have been used as the foundation for drawing up the questions in the interview guide used during the data collection.

This section defines and explains the concepts of supply chain, SCM, public education and SCM challenges in the public education sector.

3.2 WHAT IS A SUPPLY CHAIN?

A supply chain is a network that connects a corporation with its suppliers in order to manufacture and deliver a specific product to the end user. Different activities, people, entities, information, and resources are all part of this network. The supply chain also represents the stages involved in getting a product or service from its initial state to its final destination. An organisation establishes supply networks in order to decrease costs and remain competitive in the marketplace (Lu & Swaminathan 2015: 1).

Thus, a supply chain is a set of actions that leads to the delivery of a product or service to a consumer. Moving and transforming raw materials into finished products, transporting those items, and distributing them to final users are all processes in the process. Producers, suppliers, warehouses, transportation companies, distribution centers and retailers are all part of the supply chain. All functions that begin with receiving an order and end with meeting the customer's request are considered supply chain elements. Product development, operations, distribution networks, and customer support are among these functions (Kenton, 2020: 1).

Businesses rely on their supply chains to get what they need to be done efficiently and effectively. Every company is a part of at least one supply chain and plays a role in each of them. The supply chain encompasses all processes involved in fulfilling a

consumer request, both directly and indirectly (Sukati, Hamid, Baharum & Yusoff, 2012: 226).

3.3 SUPPLY CHAIN MANAGEMENT

The management of the supply chain is an important component of the business or organisation globally. Procurement, logistics, and operations management are some of the most important corporate processes covered by SCM (Lu & Swaminathan, 2015: 2). It refers to the movement of resources, funds, and information from a supplier to a manufacturer, then to a wholesaler, retailer, and finally to the final customer (Kumar & Kushwaha, 2018: 86). Internally and externally, SCM entails coordinating the flow of goods and processes (Min, Zacharia & Smith, 2019: 45; Asadi, Sadjadi & Sadeghian, 2018: 246).

According to the Council of Supply Chain Management Professionals (2016:1), SCM can be defined as all the activities related to sourcing and procurement, conversion, and logistics management that must be planned and managed. It is a set of methods for efficiently integrating suppliers, warehouses, manufacturers, and shops so that items are created and transported in the correct quantities, to the right locations, at the right time, to meet business requirements while minimising costs (Dulababu, Lakshmi & Girish, 2018: 9). SCM is the management of processes involved in the procuring of raw materials, the conversion of these resources into completed goods, and the delivery of these goods to the final customer (Chalmeta & Santos-deLeon, 2020: 1).

Felea and Albrastroiu (2013:81) define SCM as the process of coordinating, integrating, and monitoring the flow of raw materials, work-in-progress, and finished goods from point of origin to point of consumption. It is a process of integrating all the stakeholders that are involved in movement of goods and services for an organisation in order to meet customer demand (Anca, 2019: 209). The upstream movement of resources from suppliers and the downstream transfer of goods to the final customer are both part of SCM (Sabegh, Ozkurkoglu & Kim, 2015: 983). It is the integration of business processes from the service providers of product, information, and service to the value-added activities at the end user (Ahmad, Khan, Bajwa, Khan, Khalid & Khalid, 2018: 403). Coordination and collaboration with channel partners, such as suppliers, intermediates, third parties, service providers, and

customers, are also part of SCM (Saeed & Kersten, 2019: 2). SCM, in essence, integrates supply and demand management across businesses (Kumar, Guo, Shaw, Colicchia, Garza-Reyes, Kumari & Bak, 2018: 2).

From the above definitions, it can be concluded that all the activities, processes, and relationships involved in the flow of materials via the supply chain are included in SCM. The use of SCM in the public education sector is dealt with in the next section.

3.4 THE ROLE OF SUPPLY CHAIN MANAGEMENT IN THE PUBLIC PROCUREMENT SECTOR

In the public sector, SCM is responsible for enabling the government to implement policies and practices across all spheres of government. In South Africa, SCM in the public sector under government departments has been growing in importance. This is because the South African government is reorganising its cost structures to save funds (Republic of South Africa National Treasury, 2015: 3). SCM is a major operational area that has a direct impact on business efficiencies, according to the South African government (Republic of South Africa National Treasury, 2015: 4).

In the public sector, SCM has become a vital aspect of financial management. This has occurred because systems and financial management manages and oversees the government's supply chain processes, as well as putting in place and maintaining a standardised financial system (Bent, 2014: 18). On behalf of the government, SCM sets the policy that governs SCM operations in the public sector, evaluates policy outcomes and facilitates and maintains cross-border term contracts. This aims to regulate public sector SCM, as well as standardise national and provincial government financial systems, while coordinating the implementation of the Public Finance Management Act (PFMA) (OECD, 2014: 42).

The aim of SCM in the public sector is to make it easier for the sector to transact by improving processes, norms and infrastructure, and by giving manufacturers and other service providers with a clear understanding of the government’s present and future purchasing needs. It increases officials’ understanding of the available goods and services, as well as identifying which providers can be trusted to give the highest quality and value (Razak, Rowling, White, & Mason-Jones, 2016: 44).

The SCM frameworks employed require that institutions and governmental entities should create SCM units under their individual chief financial officers' offices to ensure clear lines of authority and accountability, streamline sourcing procedures and processes, and improve asset and inventory management (Sibanda, Zindi & Maramura, 2020: 1).

Technology, programme reviews, and public and political expectations for service improvement have all contributed to increased scrutiny of public procurement (Ambe & Badenhorst-Weiss, 2013a: 246). Procurement is an important aspect because it supports goals that are arguably secondary to the fundamental goal of procurement. The use of procurement to advance social, industrial, or environmental policies, the government service delivery system is a good example (Ambe, 2016: 278). However, procurement has been given constitutional significance in South Africa, and it is now recognised as a tool for addressing previous discriminatory policies and practices (JOPA, 2017: 324).

South Africa started public procurement reforms to fulfil socio-economic goals, the National Treasury implemented as a preference system to promote the ideals of good government (Fourie & Malan, 2012: 2). Policy inconsistencies, a lack of accountability and supportive structures, and fragmented processes all hurt the reform effort (National Treasury, 2020: 13). The introduction of SCM in the public sector and policy instrument is a result of differences and fragmentations in governance, interpretation, and execution of the PPPFA Act No. 5 of 2000 (National Treasury, 2005:8).

Despite the use of SCM as a strategic instrument in public procurement, there are problems in South African procurement procedures, including non-compliance with procurement and SCM-related legislation and norms, as well as tender irregularities (National Treasury, 2016: 110). For example, service providers are given opportunities to show themselves and provide quality of service that is required but they are failing to comply with the specified quality and quantity.

In order to give value for money and ensure high-quality service delivery, public sector SCM must strictly adhere to all applicable laws, policies, and regulations (Heller, 2013a: 107). This helps supply chain managers in planning, managing, and developing the supplier base, as well as creating understanding of the types of goods

and services included in the government's expenditure portfolio, their intended use, and the source of supply. Furthermore, it assists in finding the procurement leverage point, where the government has buying power or influencing power to affect the industry, developing appropriate sourcing strategies, reducing costs and increasing the benefits and value of the services or commodity to the public sector (Mafini, 2016: 256). It improves understanding of how the contract will be implemented and the main supply chain linkages, which improves the ability to spot risks or bottlenecks in contract execution (Ambe & Badenhorst-Weiss, 2013b: 242). It implements the government's efficiency initiative throughout the public sector. Sustainable development and the function of public sector procurement are important as an aspect for achieving wider policy objectives (Mhelembe & Mafini, 2019: 1).

The aim of SCM is to add value at every stage of the process, from demand for goods and services to acquisition management in the logistics chain, and finally to the disposal of things after use (Saad, 2018: 39). The basic function of SCM is to manage and coordinate all supply chain activities required to support the organisation's strategy of delivering the right quantity of product to the right location at the right time. It comprises managing upstream and downstream interactions with suppliers and customers to increase customer value while lowering supply chain costs (Saha & Chakrabarti, 2018: 208).

The coordination of all parties engaged in delivering a given combinations of inputs, outputs, or results is the focus of SCM in the public sector. This can be done by using funding from the state. The procurement can be performed by selected SCM officials to deal with it. These parties include external suppliers, partner organisations, and internal corporate service divisions, both inside and outside the organisation (Ambe & Badenhorst-Weiss, 2013b: 11003).

As stated earlier, the public sector's SCM differs from SCM in general. SCM in the public sector is governed by the legislative framework of Republic of South Africa. The following section provides an overview of the legislative frameworks that govern SCM in the public sector.

3.5 THE REGULATION FRAMEWORK GOVERNING SUPPLY CHAIN MANAGEMENT

The Constitution of the Republic of South Africa Act 108 of 1996 (Section 217), the Preferential Procurement Policy Framework Act (PPPFA) (Act 5 of 2000), which was enacted to provide a framework for the implementation of such policies, and the PFMA (Act 1 of 1999), which regulates procurement in South Africa, are all relevant legislation provisions (Livhuwani, 2013: 9). The purpose of public procurement regulations and policies is to introduce and enforce a procedure that produces a cost-effective and efficient result while respecting the public aspect of the process and the supplier's duty of fairness (Matolong, 2015: 14).

3.5.1 Constitution of Republic of South Africa Act 108 of 1996 (Section 217)

The Constitution is the highest law, and since South Africa is a law-governed state, all public sector authorities follow it. The basic principles of procurement, such as justice, equitability, transparency, competitiveness, and cost effectiveness, are addressed under Section 217 of the Constitution of the Republic of South Africa. Procurement is a state agency that contracts for products and services in the national, provincial, and local spheres of government, as well as any other institution recognised in national legislation. It must do so in a competitive and cost-effective manner (South Africa, 1996: 26). This means that any government organ, including the national, provincial, and local governments, as well as any institution named in national legislation, must contract for goods and services in compliance with these procurement standards and principles (Livhuwani, 2013: 10). Table 3.1 outlines the public procurement objectives as outlined in the Constitution.

Table 3.1: Public procurement objectives as outlined in the Constitution

Objective	Descriptions
Primary Objective	A fair, equal, transparent, competitive, and cost-effective procurement system is required.
Secondary Objective	Category preference in contract allocation and protection and advancement of persons, or category of persons disadvantaged by unfair discrimination, may be provided by procurement policy.

Source: Compiled by the researcher

The next section provides an overview of the Public Finance Management Act No. 29 of 1999.

3.5.2 Public Finance Management Act No. 29 of 1999

The South African public sector SCM system is overseen by the Office of the Chief Procurement Officer (OCPO), which ensures that procurement of products and services, as well as construction work, is fair, equitable, transparent, competitive, and cost effective (Dlomo, 2017: 18). The accounting officers and authorities of departments and entities are responsible for all day-to-day SCM actions under the PFMA. They are responsible for creating their own SCM policies and management systems, as well as staff training and development in accordance with the national supply chain network. They are also be expected to follow national supply chain regulations and reporting and compliance standards (National Treasury, 2015: 6).

The PFMA is a piece of legislation that encourages national and provincial governments to pursue excellent financial management goals. The PFMA's main goal is to modernise the financial management system in the public sector, allowing public sector managers to better manage and be more accountable while also ensuring timely supply of high-quality information and the elimination of waste and corruption in the use of public assets (Matolong, 2015: 14).

3.5.3 Local Government Municipal Finance Management Act, 2003 (Act 56 of 2003)

The Municipal Finance Management Act (MFMA) is a significant component of the broader legislative framework governing municipalities, with the goal of strengthening financial management and assisting municipalities in moving toward a more sustainable future. This guideline was created to provide practical assistance to all municipalities and municipality entities in the process of managing public assets. It is part of National Treasury's comprehensive support package for municipalities undergoing financial reforms (Scholtz & Guilati, 2018: 30).

The aim of this guideline is to help all municipalities create accurate and complete asset registers based on existing rules and accounting standards. It was also designed to help municipalities and municipal entities comply with accounting standards and repowering requirements. The OCPO is responsible for overseeing the implementation of the national department's and top municipalities' SCM systems under section 11 of the MFMA. The OCPO oversees how provincial treasuries carry out their SCM responsibilities (National Treasury, 2018: 63).

3.5.4 Preferential Procurement Policy Framework Act No. 5 of 2000

The most recent PPPFA regulations were published on 20 January 2017 and came into effect on 01 April 2017. These regulations are called the Preferential Procurement Framework Regulations. The regulations outline several significant components, including the identification of a preference point system, a designated sector, and pre-qualification standards or criteria for preferential procurement, tender to evaluate on functionality and objective criteria and subcontracting (Hlakudi, 2015: 68).

In February 2000, the Public Procurement Policy Framework Act was passed. On August 10, 2001, regulations to the PPPFA were issued to provide norms and standards for the framework established by the act. Section 217 of the Constitution of the Republic of South Africa requires legislation to be implemented. The provisions of the PPPFA must be followed by all spheres of government (Livhuwani, 2013: 12). This act aims to help formerly disadvantaged people who were unable to participate in the mainstream economy. The Preferential Procurement Regulations of 2001 support the PPPFA by establishing a preference point system, assessing tenders, excluding tenders with low points, withdrawing and re-inviting proposals (Mokotedi, 2016: 23).

3.5.5 Black Broad-Based Economics Empowerment Act No. 53 of 2003

The Broad Based Black Economic Empowerment Act 53 of 2003 (BBBEE Act) is legislation that promotes black economic empowerment. The major objective of the BBBEE Act and Code is to address the legacy of racist apartheid policies and to help black people in South Africa prosper economically (Pike, Purchert & Chinyamurindi, 2018: 2). This law was published in the Government Gazette on October 11, 2013, and it went into effect on May 1, 2015. The BBBEE Act amendments went into effect on October 24, 2014. The modifications to the BBBEE Act and rules radically alter the current BBBEE structure, demonstrating the government's commitment to promote and implement BBBEE (Forbes, 2018: 8). According to the Estate Agency Affairs, black broad-based economic empowerment refers to the range of interconnected socio-economic policies, the economic empowerment of all black people, including women, workers, youth, individuals with disabilities, and those who live in rural regions (Bolton, 2016 2319).

3.6 SUPPLY CHAIN MANAGEMENT IN THE SOUTH AFRICAN PUBLIC SECTOR

To replace outdated procurement and provision processes, the South African cabinet established a SCM strategy in 2003. The primary aim was to adopt SCM responsibilities throughout all levels of government, as an integral part of financial management and in accordance with international best practices. The aim of the SCM policy framework was to:

- Ensure that SCM techniques are applied consistently and uniformly across the government;
- Facilitate the standardisation and uniform interpretation of the government's preferred procurement policies and legislation; and
- Complete the financial management reform cycle started by the PFMA by establishing complete responsibility and accountability for SCM functions (Motuba, 2014: 18).

3.6.1 The scope of supply chain management

As the centralised management of the flow of goods and services, SCM encompasses all activities that transform raw materials into finished goods or services. Public organisations can decrease costs and deliver products or services to the end user by managing the supply chain (Min, et al., 2019: 45).

The broad range of activities required to plan, control, and execute a product's flow from materials to production to distribution in the most cost-effective manner is known as SCM. SCM refers to the coordinated planning and execution of procedures that optimise the flow of materials, information, and capital in tasks such as demand planning, sourcing, inventory management, and logistics, as well as stage and transportation (Munoz-Villamizar, Solano, Quintero-Araujo & Santos, 2019: 703).

Compliance with SCM policies, procedures, norms, and standards is monitored by the OCPO. In an ongoing attempt to improve transparency in public sector procurement, procurement plans, deviations, and contract expansions to departments and public bodies have been published (Hugos, 2015: 1).

There is a division between the procurement and provisioning processes, which are both outdated. The Office of the Accountant-General (OAG) and the OCPO are the two divisions that make up this programme. The programme promotes effective, efficient, cost-effective, and transparent management of revenue, spending, assets, and liabilities across all spheres of government and public bodies, facilitating accountability, governance and oversight. Within the National Treasury, the OAG is the custodian of both the PFMA and the MFMA. The OAG is in charge of ensuring accountability and openness in the country's financial management (National Treasury, 2018: 61).

The use of technology to modernise SCM in the government has enabled the OCPO to advance. The purpose of the system is to increase openness and make public-sector procurement possibilities more accessible. It helps potential suppliers lower the expense of doing business while reducing costs of the government funds on printing (National Treasury, 2018: 64).

Supply chain management in the education system is an essential practice in the management of public resources. It performs a strategic role in public schools' ability to deliver on its obligations of service delivery in line with public education system.

Procurement is a vital aspect in public education as it guides the functionality of the public education system as the whole (Masete & Mafini, 2018: 1).

3.6.2 The pillars of supply chain management

The public education system should implement the use pillar of supply chain management, in order to be more effective and efficient. The pillars of supply chain management ensure that the procedures are being followed in a proper manner. The National Treasury keeps track of how SCM is being implemented across the spheres of government (National Treasury, 2015: 25). The four elements of SCM in the public sector are demand management, acquisition management, logistics management, and disposal management. These elements are each discussed in the following subsections (National Treasury, 2015: 26).

3.6.2.1 Demand management

Demand management is the first step in SCM, and it involves demand forecasting. The basic aim of demand forecasting is to determine future wants for goods or services, as well as the resources required to meet those needs. The demand management element of SCM in the DoE indicates the resources necessary to meet the needs specified in the department's year plan (Melo & Alcantara, 2015: 2). This is the phase of SCM that puts supply chain practitioners closer to the end user in order to ensure that value for money is realised, according to SCM laws and regulations (Motuba, 2014: 19).

Demand management is a SCM method that balances the needs of customers with the supply network's capabilities (Motuba, 2014: 20). According to Livhuwani (2013: 15) there many models of SCM with different stages and it ensures an optimal inflow in terms of quantity, quality, localisation (location), and timelessness in the supply chain. Needs are assessed at this stage to ensure that goods and services are available (Livhuwani, 2013: 15). The main objective of demand planning is to ensure that goods and services are provided on schedule and in accordance with the demands identified (Ambe and Badenhorst-Weiss, 2013a: 11005).

3.6.2.2 Acquisition management

Procurement is often taken to be the same as acquisition management, but it is a well-established government activity with a set of management duties that are believed to

be greater in scope than procurement (Rodrigues-Sanchez, Mora-Valentin & Urbina-Criado, 2018: 1). The basic acquisition principle is to provide customers with the best value product or service in a timely manner while adhering to and meeting policy objectives. Acquisition management is the process of acquiring the goods and services as a fundamental aspect of procurement, in order to meet organisational needs (Araujo, Alencar & Mota, 2017: 353).

Through acquisition management, potential procurement policy objectives that could be addressed by a given contract are identified and the strategy for approaching the market is determined (Van den Akker & Raid Samir, 2019: 4). This is procurement management. Each government entity determines how to approach the market, determines the overall cost of ownership of assets, ensures that bid documentation, including evaluation criteria, is complete, evaluates bids according to defined criteria, and ensures that suitable contract documents are signed (Ambe & Badenhorst-Weiss, 2013b 244).

3.6.2.3 Logistics management

Logistics is the strategic management of materials (inventory) purchase, movement, and storage within an organization and its marketing channels in order to maximize revenues through cost-effective order fulfilment. It is a supply chain process component that implements, manages, and ensures the effective flow of goods and services (Heller, 2013b: 3).

Isacsson & Klitte (2019: 63) state that logistics comprises the planned SCM processes. It deals with implementing and controlling the effective, efficient flow and storage of raw materials, completed goods, services, and related information from point of origin to point of consumption in order to meet client requirements (Jaradat, 2018: 11). The logistic management part of SCM handles issues such as item coding, inventory levels, order placement, receiving and distribution of supplies, store or warehouse management, expediting orders, transportation management, and vendor performance (Motuba, 2014: 22).

3.6.2.4 Disposal management

Disposal management entails overseeing all aspects of asset disposal, including the management of unserviceable, reductant, or obsolete assets (Ambe & Badenhorst-Weiss, 2013b: 246). Asset disposal or transfer to another state organ is accomplished

by selling the asset at a market-related price or, when suitable, free of charge. Donation, auction, transfer to another state institution, burn and bury, or destruction are among options for disposal management (Mahajan & Vakharia, 2015: 198). Figure 3.1 presents the SCM model illustrating the different elements.

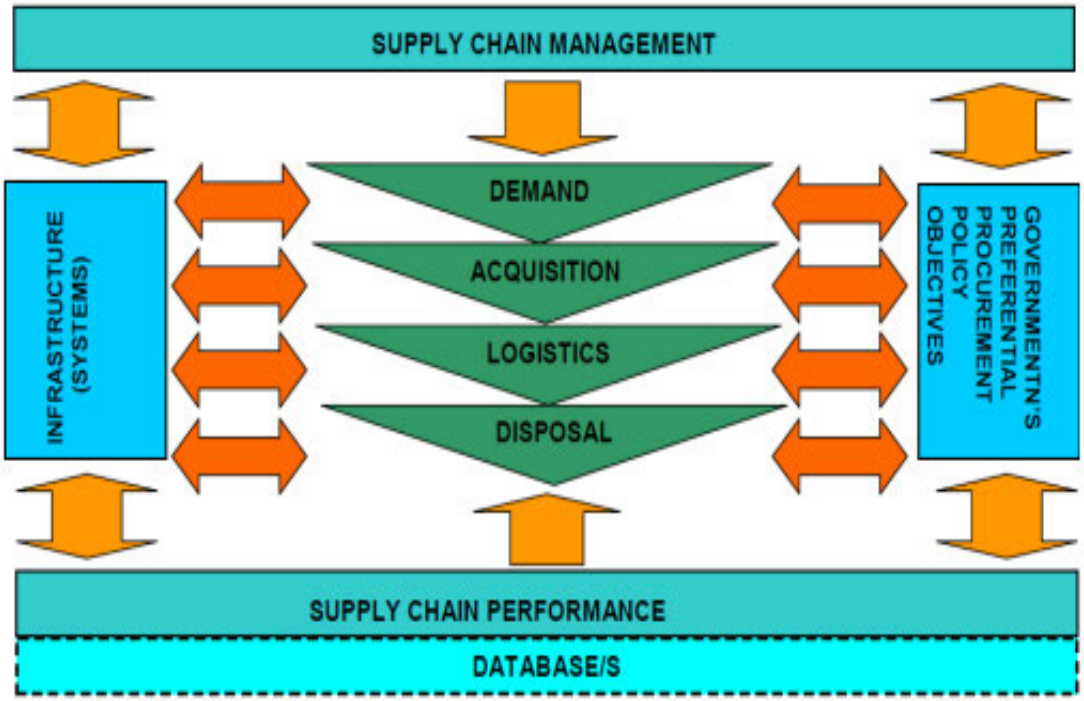


Figure 3.1: Supply chain management model
Source: National Treasury, 2005a

The model should be fully implemented and continuously monitored in an ideal SCM environment. To ensure effective and efficient SCM operations, the four elements of SCM must be in place.

The supply chain management model shows how the implementation of supply chain management should carried out in order to ensure efficiency. In the context of this study, the public education system should implement this SCM model in order to eradicate the supply chain management challenges. These pillars assist in terms of performance in supply chain management.

3.7 SUPPLY CHAIN MANAGEMENT CHALLENGES IN THE PUBLIC EDUCATION SECTOR

The following section provides a framework of identified supply chain challenges experienced by stakeholders in the public education system drawn from various academic texts and articles. These are outlined in Table 3.2 and explained thereafter.

Table 3.2: Framework of the supply chain challenges in the public education sector

Supply chain challenges	Section and source
Inadequate planning and linking demand to the budget	Glover, 2014: 18; Oppelt, 2019: 2
Lack of proper knowledge, skills and capacity	Mukwevho, 2015: 127
Accountability, fraud, corruption and unethical behaviour	Ambe & Badenhorst-Weiss, 2013a: 251; Motuba, 2014: 28; Glover, 2014: 20
Lack of knowledge and information sharing between departmental officials	Kajtazi, 2013: 321; Rambiyana, 2015: 5
Long processes and procedures	Motuba, 2014: 29
Insufficient information	Rexhepi, 2018: 81; Mvubu, 2015: 51; Hennessey & Heryer, 2013: 1; Ngwenya, 2015: 24; Great Schools Partnership, 2015: 1
Lack of information technology	Mvubu, 2015: 52
Lack of top management commitment	Tzempelikos, 2015: 32
Transportation challenges	Hasselgren & Tore, 2016: 540; Evren & Akad, 2019: 796
Poor quality of human resources	Mehlape, 2017: 106; Chandrakumar, Gowrynathan, Kulatunga & Kesawan, 2015: 1
Lack of organisational encouragement	Joseph, 2015: 63; Ravi & Shankar, 2013: 67; Mvubu, 2015: 58
Lack of organisation support	Eisenberger, Malone & Presson, 2016: 3
Demand uncertainty	Hou & Zhao, 2013: 5775; Chopra & Meindl, 2013: 190

Irregular supply patterns	Ngwenya, 2015: 23
Longer lead time	Li, Fei, Zhou, Gajpal & Chen, 2019: 1; Ngwenya, 2015: 23
Insufficient resources	Great Schools Partnership, 2015: 10

Source: Compiled by the researcher

The supply chain management challenges presented in Table 3.2 are dealt with in the following sections.

3.7.1 Inadequate planning and linking demand to the budget

Inadequate planning is a significant challenge in the public education system in KZN. Cost effective procurement expert abilities are required to guarantee that purchasing requirements are consistently determined, appropriate contract strategies are developed, contracts are successfully executed, and opportunities are realised in order to achieve the best agreement at the right time and at the right price (Glover, 2014: 18).

All administrative officials should undertake planning because it is an essential component of strategic management. Unfortunately, the majority of procurement officials or stakeholders in the public education system do not plan ahead of time (Oppelt, 2019: 2).

3.7.2 Lack of proper knowledge, skills and capacity

Sufficient volume in the arrangement of suitable structures with fully experienced and professional SCM personnel is a crucial success factor for appropriate SCM. It has been found that, in some government departments, the employee's skills and capability are well below standard. In addition, there is a deficiency of knowledge of how to follow purchasing processes, which contributes to corrupt governance (Bolton, 2014 24). Consequently, procurement activities within the DoE are handled by personnel who lack the proper knowledge, skills and capacity to conduct conventional value for money procurement practices (Mukwevho, 2015: 127).

3.7.3 Accountability, fraud, corruption and unethical behaviour

Accountability is key in public purchasing in South Africa. One of the challenges the public procurement system faces is fraud and misappropriation of funds, which costs tax payers' funds and should be eradicated in South Africa. Other suppliers are able to

get officials to secretly reveal competition quotations in order to enable them to submit a cheaper price in order to win the contract. Some dishonest officials accept late applications for personal advantage or selfish gains. These methods undermine procurement management practices in various public sector organisations (Ambe & Badenhorst-Weiss, 2013b: 251). Ethical behaviour is that which refers to guidelines for governing the association between people to benefit all concerned. SCM deployment may be affected by lack of ethics and conflicts of interest. The National Treasury's guide for accounting officers produced a model approach to the SCM process, but there has been a lack of compliance and application of the procedures on various occasions (Motuba, 2014: 28).

Unethical behaviour negatively affects procurement management practices at public organisations. Some procurement officials engage in unethical behaviour by disclosing information on bid quotations to their preferred suppliers in order to assist them in quoting more favourable prices and thereby winning the contract. High-ranking officials have been known to persuade and convince procurement officials to ensure that their preferred candidate wins the bid contract (Glover, 2014: 20).

3.7.4 Long processes and procedures

The DoE faces many delays due to the long processes and procedures that take place in procurement. These long processes and processes have a bad impact on the public education system as a whole (Motuba, 2014: 29). One example is that the process and procedure start by public schools arranging a meeting with their committee members and SGB in order to determine the need for that particular service or product before procuring it. This process itself causes delays.

3.7.5 Lack of knowledge and information sharing between departmental officials

Lack of information sharing between department officials can pose a challenge (Kajtazi, 2013: 321). There may be certain constraints during information sharing, but there may also be issues in terms of information availability. For example, it happens that some members of senior management are selfish about sharing information with subordinates. Therefore, it is important for the DoE to be aware of SCM challenges that affect the public education system (Rambiyana, 2015: 5).

3.7.6 Insufficient information

The poor communication and information gap lead to poor procurement management when officials lack information regarding procurement and SCM as the whole (Mvubu, 2015: 51). One of the most important variables affecting the effectiveness of any supply chain operation is the flow of accurate information. The management of information is critical when it comes to SCM challenges (Hennessey & Heryer, 2013: 1). Commercial supply chains have recognised the need of excellent information management in improving their competitiveness (Ngwenya, 2015: 24).

With regard to SCM challenges faced by the public education system, there is insufficient information regarding the operations of public schools, leading to the major SCM challenges faced by the DoE. Ambe (2012: 273) cite that public schools face supply chain challenges that negatively influence public education system. The operations in public schools will improve once the department communicates the appropriate information to its officials (Rexhepi, 2018: 81).

3.7.7 Lack of information technology

An information technology system has the ability to enable cooperative supply chain activities and improve supply chain performance (Briggs, 2015: 2). As a result, having an effective information and technology system in place to support the public-school system is critical (Mvubu, 2015: 52). Information technology can support public education because it will enable the operations of the DoE in the Umzinyathi district to run efficiently and effectively. Enabling information technology will increase automated operations and decrease paperwork Lack of information technology execution could be an internally focused challenge for the public education system (Ejiaku, 2014: 59).

3.7.8 Lack of top management commitment

According to Zhu and Sarkis (2013: 121), top management commitment is required for the successful implementation of any strategic programme. For the public education system, top management support is vital. The function of senior management is to motivate subordinates to participate in the DoE operations. The top management is always there to support and guide the employees in all activities they are performing within the organisation. The lack of top management commitment is

an internally focused challenge faced by the public education system (Tzempelikos, 2015: 32).

3.7.9 Transportation challenges

The main aim of transportation is to distribute products or services from one destination to another. The public sector experiences challenges when it comes to delivering the goods and services that are required by public schools (Hasselgren & Tore, 2016: 540). This is an internal and external challenge and can be caused by the high costs of transportation. The public sector can outsource transportation when a large number of products or services have to be delivered (Evren & Akad, 2019: 796).

3.7.10 Poor quality of human resources

An organisation that enhances its workforce's training or education will be more equipped to deal with SCM challenges faced by public sector (Mehlape, 2017: 106). The organisation can also encourage innovative ideas by investing in quality human resources who can learn to operate new technology easily and share their knowledge. The presence of low-quality human resources is a challenge that could harm the DoE as a whole (Chandrakumar et al., 2015: 1). It is critical that the DoE recruits and hires the appropriate people to cope with the SCM issues that public schools face.

3.7.11 Lack of organisational encouragement

Organisational encouragement is aimed at maintaining the informal relations and enhanced communications that will enable the public education system to deal with SCM challenges faced by public schools (Joseph, 2015: 63). According to Ravi and Shankar (2013:67), training and education are essential in dealing with the public sector SCM challenges. Top management may support and encourage the workforce in the operations of the DoE (Mvubu, 2015: 58).

3.7.12 Lack of organisational support

Government regulations can either facilitate or hinder innovation. The lack of organisational support is a challenge that could have a negative impact on the public education system in the Umzinyathi district as a whole. Therefore, a lack organisation support from the government is a potential internal focused challenge in the DoE (Eisenberger, et al., 2016: 3).

3.7.13 Demand uncertainty

One of the most important factors influencing supply chain efficiency is demand. Commercial organisations are constantly working to improve and strengthen their demand forecasting systems. All organisations, especially public education agencies, need to put together accurate demand predictions. Uncertainty in the supply chain is a challenging issue to control (Hou & Zhao, 2013: 5775).

3.7.14 Irregular supply patterns

Some of the challenges that are faced as a result of irregular supply trends involve the inflating of the prices of suppliers as it has a direct increase in demand (Ngwenya, 2015: 23). This is caused by failure of an organisation to supply the required goods on time. The DoE in some cases has failed to supply the public schools with the required goods and services and other facilities timeously in order for the schools to function efficiently and effectively (Hou & Zhao, 2013: 5776).

3.7.15 Longer lead times

Lead time refers to the time required to acquire a product, which involves its purchase and assembly (Li et al., 2019: 1). It represents the time between when an order is placed and when it is delivered. Lead time is a common SCM measure of efficiency in commercial organisations. The public education system has longer lead times when the required goods and services are ordered (Ngwenya, 2015: 23).

3.7.16 Insufficient resources

There are insufficient resources in the form of a well-established infrastructure, for example, there is a lack of electricity in public schools, proper transportation channels and water. There are insufficient resources such as the provision of goods and services and other facilities required by a school in order to provide proper quality of education (Great Schools Partnership, 2015: 10).

3.8 STRATEGIES TO ADDRESS CHALLENGES

The supply chain challenges that public education system faces that have been dealt with have been summarised in Table 3.3. In this table, the strategies that can be used by public schools to address these challenges are outlined. Table 3.3 presents a

framework listing the supply chain challenges presented in the previous section together with strategies used to address these challenges.

Table 3.3: Framework of Strategies to Address Challenges

Supply chain challenges	Strategies to address these challenges
Inadequate planning and linking demand to the budget	A workshop could be hosted which would include the officials who are dealing with the planning, demand, and budgets. This workshop would offer training to the officials in order for them to be effective and efficient when planning demand and budgets (Motuba, 2014: 65).
Lack of proper knowledge, skills and capacity	Funds need to be budgeted for the training of finance, supply chain management and asset management officials to improve their knowledge, skills and capacity (Ambe & Badenhorst, 2013b: 11012).
Accountability, fraud, corruption and unethical behaviour	External audits should be conducted to investigate the accounts, funds and operations of public departments. Irregularities must be reported on in order to eradicate fraud and corruption within the departments. Critical measures must be put in place; if officials have been found guilty, they must be charged (Mokotedi, 2016: 63). Policies that guide the public sector must be enforced and officials should set their own policies within their department that would guide their officials to practise ethical behaviour at all times (Glover, 2014: 25).
Lack of knowledge and information sharing between departmental officials	The information must be available to all departmental officials, so that all supply chain management unit teams will be aware of everything that has occurred as a challenge in the past. This is an internal focused challenge that needs to be resolved by management within their DoE (Khuzwayo, Msimang & Langa, 2016: 70).
Insufficient Information	There must be communication within the management for the efficient and effective procurement and operations (Saad, 2018: 47). Information must always be available to

	supply chain management units so that they will always be able to face challenges in difficult times. To hide information causes supply chain management units to be dysfunctional (Ngwenya, 2015: 24).
Lack of information technology	Organisations must always ensure that their officials are taught about information technology and how to use new advanced technology. The organisation must host training sessions for its officials (Mokotedi, 2016: 62).
Lack of top management commitment	Mafini (2016:261) suggests that members of the executive and heads of department train management on how they should commit themselves. The Member of Executive Committee (MEC) could host workshops sessions to train management.
Transportation challenges	The department must outsource the transportation of products or services to other companies in order to deal with challenges. This will reduce long lead times on the delivery of goods and services (Matolong, 2015: 82).
Lack of organisational encouragement Lack of organisation support	Holding training and educational sessions for departmental employees is the key requirement so that employees are encouraged to work efficiently and effectively. The management in the Department of Education must encourage employees to improve constantly (Ravi & Shankar, 2013: 67; Shanker, 2013: 119). Organisational support for the employees is vital in the Department of Education. Employees always require support and encouragement in their jobs so that they can achieve their full potential with regard to their work (Mvubu, 2015: 56).
Demand uncertainty	Demand is a significant variable in supply chain management. The Department of Education must ensure that they meet the demand for public schools. This can be done through proper planning and the control of supply

	chain management variables (Chopra & Meindl, 2013: 190).
Irregular supply patterns	The Department of Education must ensure that they have reliable suppliers, resulting in efficiency and effectiveness during challenging times (Ngwenya, 2015: 26).
Longer lead time	The organisation must set time frames from when the order has been placed by the school and the time of delivery in order to reduce the long lead time on their requisition books (Li et al., 2019: 1).
Insufficient resources	The public sector must provide enough resources in order for the employees to perform their duties efficiently and effectively. The availability of resources enables good supply chain management (Great Schools Partnership, 2015:10).

Source: Compiled by the researcher

Table 3.3 outlined the supply chain management challenges and how these can be addressed. These could assist the public education system.

3.9 CONCLUSION

This section provided an overview of supply chain management and the linkages with South African public education system. A brief overview of supply chain management, processes and procedures was provided. It also provided an historical overview of the South African public education system and SCM challenges in the public education system. The chapter also discussed SCM, its role in the public education system and regulatory frameworks.

The next chapter (Chapter 4) presents the research design and methods used to address the research objectives of this study.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The preceding chapters have presented an overview of the public-school system in South Africa and have provided insight into both the SCM challenges experienced by the public education system that undermine the quality of education offered and also strategies to address these challenges. The purpose of this chapter is to set out the research process and methods that were followed in order to address the research objectives. The study's research questions and objectives are revisited, as well as the many methodologies and strategies that were employed to attain them.

4.2 REVISITING THE RESEARCH QUESTIONS AND RESEARCH OBJECTIVES

The research questions and objectives were outlined in Chapter 1 but, for clarity, they are repeated in this section.

4.2.1 Research questions

- What are the supply chain challenges experienced by stakeholders in public education in KZN that undermine the quality of education?
- What methods or strategies could these stakeholders use to manage the identified SCM challenges?
- What recommendations can be suggested to stakeholders in the public education system to better manage or overcome the identified SCM challenges?

4.2.2 Research objectives

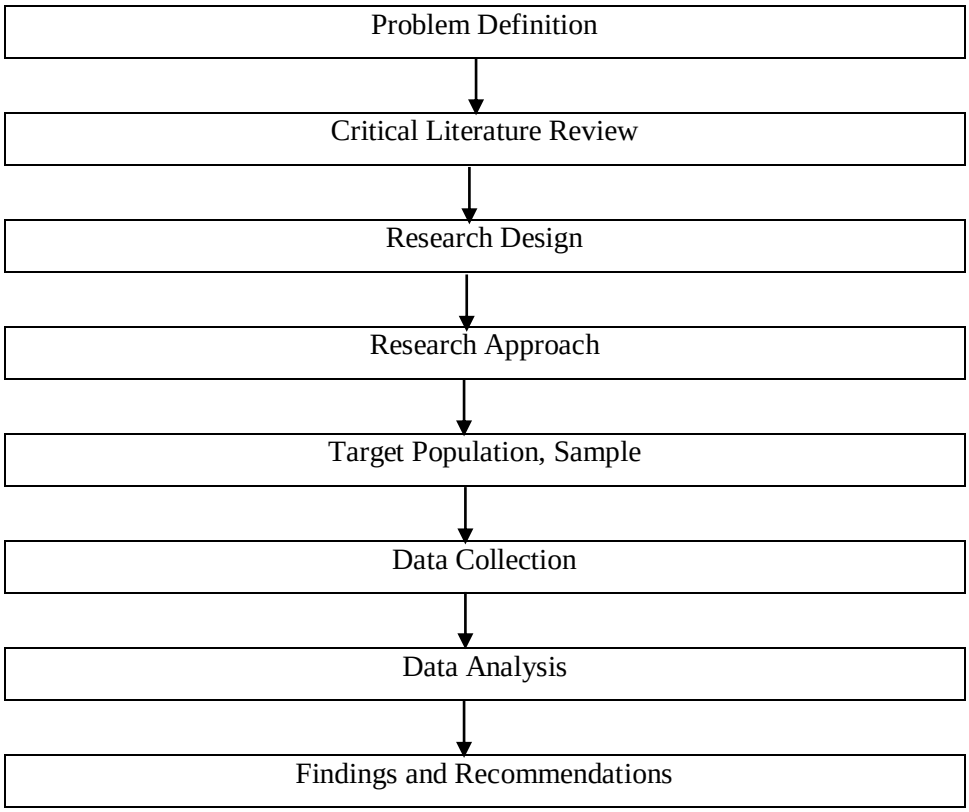
- To determine supply chain challenges experienced by stakeholders in the public education system in KZN that undermines the quality of education.
- To examine the methods or strategies that the stakeholders could use to manage the identified SCM challenges.
- To recommend how stakeholder in the public education system can better manage or overcome their identified supply chain challenges.

4.3 RESEARCH PROCESS

The research process involves identifying, assessing and analysing the data or information the research needed to support the research questions and then developing and expressing the ideas (Tobi & Kampen, 2017: 3). The aim of the research process is to establish a framework for the study and to steer it through the planning and implementation phases. The study's research process comprises of step-by-step instructions for gathering data for analysis in order to answer the research questions and reach a conclusion. In other words, it consists of collecting analysing and interpreting information to answer questions. It often begins with a very broad idea for a topic that the research would like to know more about, and the researcher has to do some preliminary research to identify a problem.

The research process followed in this study is shown in Table 4.1.

Table 4.1: Research process



Source: Adapted from Sekaran & Bougie (2013: 53)

Eight stages of the research process were followed as indicated in Table 4.1. The processes began with the identification of the research problem, which was then analysed, utilising a review of relevant literature. The next step was to create the

research design that this study would use to accomplish its objectives. The target population was identified using the research method. This was followed by the actual data collection regarding SCM challenges in public schools from the Umzinyathi district and the analysis of the data using the data analysis techniques. The research goes on to explain the findings and make recommendations at the end of the study.

The next section covers the research design and techniques.

4.4. RESEARCH DESIGN

The technique for collecting, analysing, interpreting, and reporting data in a research study is known as the research design (Boru, 2018: 3; Van Wyk, 2013: 67). It can be viewed as an overall approach that explains how the researcher intends to conduct the study in order to answer the research question (Jilcha, 2019: 1). The research design specifies how the required data will be collected and analysed, as well as how all of this will be used to answer the research questions (Tobi & Kampen, 2017: 3).

The research design tries to combine relevance to the research purpose with economy and procedure in data collecting and analysis. The research design is the plan, structure, strategy, and investigation involved in obtaining and ensuring that the research questions are answered, and variance is controlled (Akhtar, 2006: 68). Wachauf-Tautermaen & Werchert (2015: 72) opine that there are three basic categories of research design available to researchers for data collecting and analysis. These are descriptive, explanatory, and exploratory, as indicated in the following sections.

4.4.1 Descriptive research

McCombes (2019:2) notes that descriptive research can be characterised as a study that intends to define type of subject or behaviour; it is utilised to find out what factors are present. A descriptive study's purpose is to paint a picture of a situation, person, or event, or to explain how objects are related to one another in the natural world (Sharma, 2019: 5). Saunders, et al. (2016: 175) defines descriptive research as answering the questions "*what, who, how, when and where*" to gain a description of events and of the population of the study or situation. Descriptive studies cannot explain why something happened, so they are best suited to a new or unexplored

research subject. In a descriptive design, quantitative and or qualitative methods are appropriate (McCombes, 2019: 1).

4.4.2 Explanatory research

The aim of an explanatory study is to explain how variables cause and impact each other. The significance of this study design is that it attempts to investigate a topic in order to understand how and why a link exists between the variables (Saunders, Lewis and Thornhill, 2016: 176). It identifies the association between variables that are relevant to the study problem. Explanatory research seeks to answer questions like "*why*" and "*how*" (Zukauskas, Vveinhardt & Andriukaitiene, 2014: 190). Thus, the goal of explanatory research is to explain and account for the descriptive data.

4.4.3 Exploratory research

An exploratory study attempts to provide insight into a phenomenon in order to uncover new ideas and improve information about it (De Vos et al., 2013: 13). According to Sekaran and Bougie (2013: 43), exploratory research is appropriate when only a few facts are known but more information about a phenomenon or a problem is needed. When there is not enough information regarding a phenomenon or a problem that has not been precisely defined, exploratory research is conducted (Reiter, 2017: 142). Its goal is not to provide conclusive answers to the research question, but to investigate the study topic at various depths. It does not aim to provide definitive solutions to the research issue, but rather to examine the study topic in various depths. The exploratory research sets the initial research concept, sample methodology, and data gathering method, and serves as a foundation for more decisive research (Brown, 2016: 28).

This study uses a descriptive and exploratory research design as it explores, investigates and describes the SCM challenges faced in the public education system and what methods or strategies stakeholders could use to manage the identified challenges.

4.5 RESEARCH APPROACH

A research approach is a set of processes used in research to narrow the data set from broad assumptions to specific data collection, analysis, and interpretation methods.

Qualitative, quantitative, and mixed method research design are the three methods to research design (Castellan, 2013: 34; Cresswell, 2013: 37). Each of these are dealt with below.

4.5.1 Qualitative method

Data in the form of words is referred to as qualitative data (Mohajan, 2018: 24). Qualitative research is a type of study that focuses on the development of theories and understanding (Rahman, 2016: 102). Qualitative research deals with subjective data that are usually obtained through interviews and depend on understanding and discovering the thought, experiences and perspective of participants. It identifies the perspectives of individuals in real-life situations (Yin, 2015: 7). Thus, the focus of qualitative research is to immerse the researcher in a setting in order to contemplate or make sense of it (Jameel, Shaheen & Majid, 2018: 1). Interviews, transcripts of focus groups, and copies of video recordings are all examples of qualitative data collecting (Sekaran & Bougie, 2013:43).

4.5.2 Quantitative method

Quantitative data can be counted or measured, and it is commonly used to figure out how variables are related and to tally the frequency of observations (Eyisi, 2016: 92). It is utilised to assess objective numerical data. Thus, quantitative research is a type of research that produces data that can be counted or quantified to arrive at a conclusion (Bacon-Shone, 2015: 44). Quantitative research is frequently used to test hypotheses, and the findings may often be applied to larger populations (Bolte, 2014: 67). It uses collection techniques such as questionnaires (Apuke, 2017: 40).

4.5.3 Mixed methods

A mixed method of research uses data that is acquired both qualitatively and quantitatively at the same time or one after another (Saunders et al, 2016: 168). This approach combines both qualitative and quantitative approaches to discover a phenomenon and turn it into data that can be measured (Almeida, 2018: 138). In a mixed methods study, both quantitative and qualitative data are collected and mixed or integrated. The mixed method approach is relatively new and has developed in the health and social sciences. It can be extremely beneficial in getting a deep understanding comprehensive of the phenomenon (Techo, 2016: 4).

To conclude, in this study a qualitative approach was deemed appropriate as it assisted in the understanding of the benefits, reasons and opinions relative to the supply chain challenges faced by the public education system (Sharma, 2019: 6). The qualitative method in the form of conducting semi-structured interviews was used as the method of collecting data. Interviews were conducted in the Umzinyathi district with DoE management and stakeholders (see Section 4.9).

4.6 RESEARCH STRATEGIES

A research strategy is a comprehensive plan for undertaking a study. It is a step-by-step plan of action that guides the researcher's thoughts and actions, allowing research to be conducted in a systematic and timely manner and resulting in high-quality data and detailed reporting (Dimen, 2014: 1). Some key research strategies are explained in the following subsections.

4.6.1 Experiments

A scientific experiment is a technique used to create a discovery, test a hypothesis or demonstrate a known fact. It is a form of research approach in which one or more independent variables are manipulated and their impact on one or more dependent variables is measured (Sekeran & Bougie, 2016:97). Creating a set of procedures to test a hypothesis is known as an experimental design (Bevans, 2019: 1). The experimental technique entails changing one variable in order to see if changes in one variable result in changes in another (Cherry, 2020: 1).

4.6.2 Survey research

Survey research is the systematic collection of data on people's preferences, thoughts, and behaviour using standardised questionnaires or interviews. A survey is a method for gathering data in a standardised manner. A survey is a way of collecting data from a sample of entities in order to create quantitative descriptors or qualities for the larger population of which the entities are members (Avedian, 2014: 1). Surveys allow for the collection of data from large groups of people. They are also well suited for acquiring demographic information from large groups (Gaille, 2020: 1). The survey approach can be utilised for descriptive, exploratory, or explanatory research, (Ponto, 2015:168).

4.6.3 Observation

The qualitative research technique of observation is when the researcher observes participants' continuous behaviour in a natural setting. In the social sciences, observation is a way for gathering information about people, processes, and cultures. It is a data gathering approach in which researchers observe unobtrusively within the research field (Kabir, 2016: 240). It involves making a methodical description of events, behaviour, and artefacts in a social situation (Smidova & Lei, 2017: 190).

4.6.4 Case studies

Case studies are becoming increasingly prominent as a research method. They are descriptive in nature and provide a wealth of information about certain individuals or organisations. Case studies, according to Heale and Twycross (2017: 7), involve ideographic research methodologies that examine an event or action, such as in a specific business unit or businesses. Case studies entail an in-depth examination of similar scenarios that may also arise in other organisations if the nature and description of the problem are similar to those encountered by other organisations (Harrison, Birks, Franklin & Mills, 2017: 1).

4.6.5 Grounded theory

Grounded theory is a method, an approach and a strategy (Roman, Osinski & Erdmam, 2017: 986). The best definition of grounded theory is a research technique that aims to generate theory from data (Khan, 2014: 226). Thus, grounded theory is a data gathering strategy used in qualitative research that is entirely dependent on data. It is a theory that is based on data that has been collected and analysed in a systematic manner during the research process. Data gathering and analysis are at the heart of grounded theory (Wiesche, Jurisch, Yetton & Krcmar 2017: 685). According to Flynn and Korcuska (2017: 103), grounded theory follows an inductive rather than deductive inquiry approach.

4.6.6 Action research

Action research is the superordinate term for a range of approaches that simultaneously investigate and promote democratic change and collaborative engagement in specific social situations (Burns, 2009: 289). Participants in action research use a self-reflective, systematic, and critical approach to inquiry while also

being members of the research community. Action research encompasses a wide range of evaluative, investigative, and analytical research methodologies aimed at identifying problems or weaknesses (Antonellis & Berry, 2017: 41). It is a method used for improving practice; for example, through action research, teachers can research their own practice of teaching (Wessels & Wood, 2019: 1).

4.6.7 Triangulation

The process of using numerous sources of data or multiple ways to data analysis to improve the credibility of a research study is known as triangulation (Turner, Carding & Burton, 2015: 1). Triangulation is an effective approach for validating data by combining information from two or more sources (Fusch, Fusch & Ness, 2018: 20). It is the practice of using more than one method, theory, researcher, and data collection method and methodology to improve the validity, reliability, and generalisability of research findings. Triangulation is the process of using different points of view to validate, dispute, or extend existing findings (Johnson, O'Harra, Hirst, Weyman, Turner, Mason, Quinn, Shewan & Siriwardena 2017: 6).

This study followed the case study approach as the aim of the study was to gain insight in a particular phenomenon, namely, the supply chain challenges that stakeholders in the public education system in KZN experience that undermine the quality of education. Therefore, interviews were carried out using an interview guide. This explained in more detail in Section 4.10

4.7 STUDY SITE

The site of the study refers to the location where data will be collected (Arikkok, 2017:9). In this study the research was conducted within the department in the Umzinyathi district offices. The Umzinyathi district is one of the districts located in the north of KZN with four circuit management centres, namely Msinga, Ndumeni, Nquthu and Umvoti. The district lies between the main N3 corridor from Durban to Gauteng and the Coast corridor, running along the East Coast. The researcher chose this particular district in KZN firstly because most of the public schools located in this district face SCM challenges and secondly because the Chief Education Specialist (CES) of the DoE agreed to assist in the study.

4.8 TARGET POPULATION

The target population of the study refers to the group of persons, occasion or things of interest from which the researcher would like to generalise results (McLeod, 2019: 1; Murphy, 2016: 6; Sekaran & Bougie, 2013: 240). The total group of respondents who fulfil the specified set of criteria is referred to as the target population. The researcher explains, quantifies, or collects data from the target population in order to come up with a conclusion or analysis (Majid, 2018: 3). In this study, the target population refers to all the individuals working in the DoE in the Umzinyathi district of KZN province. This is dealt with in Section 2.8.1 of this study.

4.9 SAMPLING STRATEGY

When a researcher does research on a group of people, it is rare that data can be collected from each individual in that group. Instead, a sample is selected, that is a subdivision that is chosen from the target population and that represents its features (Sekaran & Bougie, 2013: 237). The sample consists of those respondents who will actually engage in the research (McCombes, 2019: 1). Probability sampling and non-probability sampling are the two categories of sampling strategies.

4.9.1 Probability sampling method

The term "probability sampling" implies that each sample has an equal chance of being chosen in probability sampling. This method is generally employed in quantitative studies. A probability sampling strategy is required if the researcher wishes to get findings that are representative of the entire population (Baran & Jones, 2016: 111).

Simple random sampling, stratified random sampling, systematic random sampling, cluster sampling, and multi-stage systematic sampling are the five types of probability sampling procedures.

4.9.1.1 Simple random sampling

Simple random sampling is a completely random method of selecting a sample in which each combination of items in the population has an equal chance of being chosen (Alvi, 2016: 16; Rahi, 2017: 3). This method is a fair way to select a sample because it is one of the simplest forms of random sampling.

4.9.1.2 Stratified random sampling

The population elements are sorted into strata based on specific criteria, and a predetermined number of units are drawn at random from each of these smaller homogeneous groups (Frey, 2018: 1). This sampling method is acceptable when the population contains a mix of characteristics and the researcher wants to ensure that each one is proportionally represented in the sample.

4.9.1.3 Systematic random sampling

A comprehensive knowledge of the population is required for systematic random sampling. This sampling method selects one unit from the sampling frame and then performs calculations, choosing every *n*th element in the population for the sample (Datta, 2018: 3; Taherdoost, 2016: 21).

4.9.1.4 Cluster sampling

Cluster sampling is one of the most effective random sampling methods, in which the population is divided into clusters and then a sample is randomly taken from each cluster. Each cluster should have shared features or characteristics similar to the whole sample. Instead of selecting people from each category, entire subgroups are chosen at random (Turner, 2020: 8). The entire cluster is sampled in pure cluster sampling (Sedgwick, 2014: 1).

4.9.1.5 Multi-stage sampling

The multi-stage sampling method uses a mix of techniques in order to create the sample. In this strategy the population is divided into groups at various levels, with sub-groups within groups. Finally, a sample is taken from the smallest of all the groupings (Khan, 2020: 5).

4.9.2 Non-probability sampling

When a sample is formed using a non-random technique, it is referred to as non-probability sampling. Individuals are chosen in a non-random process for a non-probability sample and not every individual has a chance of being included (Vehouvar, Toepoel & Steinmetz, 2016: 327). Most non-probability sampling methods entail judgment (Uprichard, 2013: 1). The non-probability sample is used to investigate or develop current theoretical concepts (Baker, Brick, Bates, Battaglia,

Couper, Dever, Gile & Tourangeu, 2013: 90). For exploratory and qualitative research, non-probability sampling strategies are frequently acceptable.

Convenience sampling, purposive sampling, quota sampling, and snowball sampling are examples of non-probability methods used in qualitative research.

4.9.2.1 Convenience sampling

A convenience sample is made up of individuals who are most easily accessible or available to the researcher (Etikan, Musa, & Alkassim, 2016: 1; Parveen & Showkat, 2017: 8). Subjects who are easily accessible to the researcher are chosen for convenience sampling.

4.9.2.2 Purposive sampling

In purposive sampling, the researcher chooses the participants based on his or her own judgment while keeping the study purpose in mind (Ames, Glenton & Lewin, 2019: 3). This type of sampling is used in exploratory research or field studies (Elliott, 2018: 1; Palinkas, Horwitz, Green, Wisdom, Duan & Hoagwood, 2016: 533).

4.9.2.3 Quota sampling

A population is divided into subgroups based on factors such as age or geography, and targets for the number of participants needed from each category are defined. Quota sampling is a non-probability sampling technique in which a researcher selects a sample of people who represent a population. Individuals are chosen based on specific characteristics or qualitative factors (Smith & Dawber, 2019: 2).

4.9.2.4 Snowball sampling

Snowball sampling, also known as chain referral sampling, is a method of collecting a sample in stages. Although some may regard snowball sampling as a type of accidental sampling, it is useful when members of a specific population are difficult to reach, such as homeless people and migrant workers (Naderifar, Goli & Ghaljaie, 2017: 2). The snowball sample works by recruiting the help of certain sample members, who then recruit others they know to join the sample (Kirchherr & Charles, 2018: 1).

Since the study is of qualitative nature, to pick the relevant organisation to be investigated, a non-probability purposive sampling technique was deemed appropriate. The aim of the study was to investigate the SCM challenges faced by

public schools in the Umzinyathi district, so therefore participants with the requisite knowledge were selected to partake in this study.

4.9.3 Sample size

Participants are those who take part in the research (McLeod, 2019: 1). A sample is a subset or segment of a larger group or population. Sampling is the procedure of selecting the respondents or participants of the study. The number of participants or units chosen to participate in the study is referred to as the sample size (Barnett, Thorpe & Young, 2018: 2). The sample size is a smaller number of participants selected from the large population of the study (Muthusamy, 2015: 27).

The purposive non-probability sampling from the target population of the study included 20 participants from the DoE in the Umzinyathi district. The researcher conducted preliminary research before data collection and found that 20 participants would be enough for this study. All relevant stakeholders were included in this in order to make this research study valuable. The researcher communicated with the supervisor of the study and the number of participants were agreed to. Participants comprised the circuit manager, supply chain, logistics and asset management official, together with twelve schools' principals (eight from primary schools and four from secondary schools) and stakeholders from different schools. The researcher collected data from 12 school principals – eight from primary schools and four from secondary schools.

The moment in the research process when no new information is discovered in the data analysis referred as data saturation (Sim, Saunders, Waterfield & Kingstone 2018: 1). In qualitative research, saturation points define sample size since they signal that enough data has been collected for a thorough analysis (Saunders, et al., 2016: 1). Thus, saturation is a criterion for excluding further data gathering and/or analysis (Kindsiko & Poltimae, 2019: 2). During the interviews, it was found that the participants were providing the same information or data with regard to supply chain management challenges faced by public schools in the Umzinyathi district, hence data saturation was reached.

4.10 DATA COLLECTION

4.10.1 Data collection method

Data collection methods describe how the data for a study was collected. Research is a highly specialised activity, and data collecting is at the centre of each research strategy. Data collection is the process of carefully acquiring the desired information with the least amount of distortion possible so that the analysis can produce answers that are both believable and logical (Elyazyi, 2018: 311). Both primary and secondary data can be collected.

4.10.1.1 Primary data

The original data that the researcher acquires for the purpose of a study is referred to as primary data. Primary data is data that has been gathered from first-hand experience and can be acquired directly from research interviews, surveys or questionnaires (Saunders, et al, 2016: 276). Primary data is more reliable than secondary data since it has not been edited or manipulated by humans (Kabir, 2016: 204). The data for this study was acquired through semi-structured interviews with DoE participants.

4.10.1.2 Secondary data

Secondary data refers to information obtained by someone other than the researcher and is available to the general public. When primary data is obtained for one study and then used in another, it is referred to as secondary data (Parveen & Showkat, 2017: 3). Information collected from past studies, academic reports and journal articles is secondary data. It can also include the data collected by government individuals, classified records and data from diversified foundations (Saunders, et al., 2016: 727).

4.10.2 Data collection tools

Data collection tools are used to collect data. These tools may include questionnaires, interview guides, surveys and observation. For a study to be conducted, it is vital that the instrument chosen is valid and reliable (Annum, 2016: 97; Taylor, et al., 2015: 9). Interviews are frequently used in exploratory and descriptive research (Jamshed, 2014: 87).

The chosen instrument for this study was a semi-structured interview guide. The researcher made use of probing questions in such a way that the research objectives of the study were addressed. A copy of the interview guide is attached as Appendix D.

4.10.2.1 Interviews

An interview is a technique for gathering information and can be explained as a structured conversation where the researchers ask questions and the participants answer (Annum, 2016: 97). There are three types of interviews, namely, structured, semi-structured and unstructured. Structured interviews involve posing a series of questions to each participant and recording their responses (Croix, Barrett & Stenfors, 2018: 2). A semi-structured interview mixes a set of pre-determined questions with open-ended questions (Harwell & Bradley, 2013: 87). Semi-structured interviews are empirical in the sense that they entail gathering information on a specific topic, but they can also be defined as theoretical because they include the development and testing of hypotheses (Ngwenya, 2015: 77). Unstructured interviews are less prescribed as there is no predetermined set of questions (DeJonckheer & Vaughn, 2018: 1).

An interview is a natural way to engage with the target group or population, and it fits well with an interpretive research strategy. For the current study the researcher conducted semi-structured interviews using an interview guide with participants. An interview guide is a list of the topics to be discussed during interviews, together with the probing questions the participants will be asked to respond to (Harwell & Bradley, 2013: 87; McGrath, Palmgren & Liliedahl, 2019: 1002). The interview guide is a vital data collection strategy that involves the researcher and the subject communicating verbally.

In this study, the research contacted the participants telephonically to set up a date and time for interview. The interviews were conducted face to face because, at the time of the interviews, locks down regulation levels were reduced to Alert Level 1. Face-to-face interviews were appropriate because the participants lacked the required facilities to connect via Zoom. All the interviews were recorded, maintaining the Covid-19 safety regulations.

4.10.2.2 Pre-testing

Pre-testing is a stage in the research where the interview questions are tested on members of the target population or study population to determine the instrument's reliability and validity before it is used to gather data (Hilton, 2017: 1; Horward, 2018: 2). Academics from the School of Management, IT & Governance at UKZN and one school principal were used to pre-test the interview guide.

4.10.2.3 Time horizon

Independent of the research methodology chosen, time boundaries are required for the research design. Longitudinal and cross-sectional time horizons are the two types of time horizons. Longitudinal studies are those that are repeated over a long period of time. Short-term studies, often known as cross-sectional studies, are restricted in time. The cross-sectional time horizon was used because this study is limited to a specific time frame (Dean, 2016: 12; Reilly, Souder & Ranucci, 2016: 1). The data was collected during the months of February to April 2021.

4.11 DATA QUALITY CONTROL

Data quality control refers to the determinations and techniques that the researcher puts in place to make sure that the data gathered is accurate and reliable (Jaya et al, 2017: 2647). Guba's model of trustworthiness will be used to ensure the accuracy of the current study. Guba's trustworthiness model examines the trustworthiness and dependability or reliability of the tools used to collect data (Mvubu, 2015: 11). Guba's model of trustworthiness claims that it is necessary to implement a strategy to assure the credibility, transferability, dependability, and conformability of qualitative research (Korstjens & Moser, 2018: 121).

Credibility ensures that the researcher presents the most accurate image of the phenomena under study (Gunawan, 2015: 4). Credibility of the research is crucial in qualitative research. It is regarded as the measure instruments of collection data and analysis. This ensures that the research is credible and believable (Shenton, 2004: 68). This study ensured credibility by using verbatim quotes from the participants and by making brief personal notes on observations to validate the findings. An audit trial is

available in the form of voice recordings, documents and field notes of the primary data collected.

Transferability refers to the extent to which the researcher is able to generalise the findings or maybe transfer them to other contexts and with other participants (Shenton, 2004: 69). The following should be considered before transference is made: the number of organisations participating in the study and where they are located; any limitations on who was allowed to contribute data; the number of people working in a particular field; the number and length of data collection sessions, and the duration of the data collection (Elo, Kaariainew, Kantse & Polkki 2014: 2). This study ensured transferability in the qualitative study by providing evidence that the research findings could be applicable to other contexts, situations and populations.

Confirmability refers to triangulation to reduce the effect of researcher's bias. The researcher must take steps to show that the findings are based on the data rather than their personal opinions (Devault, 2019: 1). In this study, interviews were voice recorded and the recordings were transcribed verbatim. The transcribing process was carried out by the researcher.

Dependability refers to whether the research data is genuine and of unquestionable origin (Shenton, 2004: 72). The dependability of this study was assured by making sure that all the participants' responses were recorded and transcribed verbatim and the participant's responses were accurately reported by checking the voice recordings of the interviews to the transcripts.

4.12 DATA ANALYSIS

The researcher's intention to usefully arrange both primary and secondary data obtained throughout the research project is referred to as data analysis (Harding & Whitehead, 2020: 142). The data analysis approach must ensure that the study objectives are achieved. Data analysis usually entails reducing a large amount of data to a manageable size by the creation of summaries, the detection of patterns and the use of statistical techniques (Archer, 2018: 5).

Content analysis, thematic analysis, and other statistical analysis tools are used by various research studies in order to analyse their data. Thematic data analysis was

used to satisfy the study objectives, and it was the primary instrument for making sense of the data acquired from semi-structured interviews and document analysis. The following section gives a detailed account of thematic analysis and explains how it was used in this study.

4.12.1 Thematic analysis

The data was analysed using thematic analysis. Thematic analysis is a process for identifying, analysing, and reporting patterns in data (Braun & Clark, 2013b: 13). Thematic analysis has been frequently used, mostly in research projects that employ qualitative data (Herzog, Handke & Hitters, 2019: 1). It entails searching for and identifying common threads throughout an interview, and the analysis offered an accurate representation of a complex and sensitive subject (Scharp & Sanders, 2018: 1).

Just because it categorises data into numerous themes that are relevant to the subject under inquiry, the technique is extremely versatile. Its goal is to ensure that the different themes arising in any document and interview transcripts are clearly identified and categorised into classes to facilitate accurate analysis (Vaismoradi & Snelgrove, 2019: 2). Thematic analysis organises data by identifying similar themes and separating the study information into chunks and units that can be simply and successfully analysed (Nowell, Norris, White & Moules, 2017: 2). The common themes aim to capture significant data trends that are valuable in accomplishing the research study objectives, and they frequently categorise the data into patterned meanings (Wang, Wang & Khalil, 2018: 204).

4.12.1.1 The steps involved in thematic analysis

As a data interpretive process, thematic analysis is one of the most significant qualitative research methods, as it involves analysing data methodically for occurring patterns. There are steps and procedures that must be followed to ensure that the process is accurate and reliable (Scharp & Sanders, 2018: 1). These steps are explained as follows:

Step 1: Transcribing the interview recordings

After all interview sessions have been recorded, the next stage is to transcribe the interviews. Transcripts make the recording's patterns visible and accessible, allowing the researcher to examine the pattern that emerges in each interview session. The process of transcribing, according to Saunders, et al. (2016: 130), entails reproducing a recorded account and presenting it as written text.

The way data is transcribed affects every phase of the thematic analysis process. The transcription process is a data analysis process in and of itself, and it needs a significant amount of time for careful consideration. Audio transcription can be done with the help of a transcribing machine, which usually provides playback, rewinding, and stop options, allowing the researcher to listen to all of the material accurately (Loubere, 2017: 2; Moore & Llompart, 2017: 409). In this study the interviewer used a recording machine to record all of the dialogues during the semi-structured interviews. This was further reinforced by notes taken during the interview to guarantee that all the session's highlights were recorded.

Step 2: Familiarisation and immersion in the data

It is important for the researcher to have a preliminary understanding of the data in order to conduct an efficient data analysis. The researcher must be completely engaged in the data, setting aside time to review the texts (interview and transcript notes) several times (Ogunbanjo, Mabuza, Govender & Mash, 2014: 1). During this stage, the researcher is able to thoroughly comprehend the depth and breadth of the data, as well as find frequent and important themes that may discover to be crucial in addressing the research questions. If this is done properly, the researcher will have a good understanding of the data and will be able to quickly determine where various and similar data trends can be found, as well as what types of interpretations are likely to be supported by individual data set.

The next stage of thematic data analysis is the coding of primary study findings, the organisation of the codes into related regions to construct descriptive themes, and the development of analytical themes (Neuendorf, 2019: 212).

Step 3: Coding inducing themes

Before the coding process begins, themes are identified in the data. Themes should ideally emerge naturally from data sets, ensuring that the study questions can be

answered and that objective themes may be identified (Vaismoradi, Jones, Turunem, Snelgrove, 2016: 103). This study involved gaining insight into the SCM challenges faced by public schools. Following the introduction of the themes, they need to be completely developed and individually investigated to see if they were related to the study objectives.

Step 4: Defining and naming themes

This is an important phase in the analysis since it allows the data to be linked with the study's objectives. Individual themes generated in the previous step are enhanced even further. The importance of this phase lies in the manner in which it examines each theme in order to establish what it symbolises and what it does not. It needs to be determined whether all of the adopted themes are relevant to the study. The researcher must ensure that the process used is accurate and reliable (Landrum & Garza, 2015: 199).

Step 5: Developing categories and a coding scheme

The process of inducing and developing themes should occur concurrently with the coding of the data, as this saves time and encourages uniformity. The data presents great detail and complexity and the analysis is done by constructing codes using a coding scheme. Coding is the process of categorising data in order to make it easier to retrieve and analyse the information (Linneberg & Korsgaard, 2019: 22). Coding can be done with phrases, sentences, or paragraphs, which are coded according to how rich their content is in representing a theme.

Coding is a time-consuming process, yet it is necessary in order to provide answers to the underlying questions of the study. Coding units used to fine-tune data can be sentences or phrases, allowing the researcher to count how many times a code appears in a single interview or article, as well as to analyse the relationship of one code to others in terms of occurrence or sequencing (Elliot, 2018: 2855).

According to Elliot (2018: 2855), key features of the coding are as follows.

- Patterns are noted in the data and those patterns are labelled in order to ensure that distinctions and variations in the data are identified.
- The codes are described in a coding frame, which should list their labels, detailed definitions and examples of text segment.

Step 6: Elaboration

The data is divided into different chunks, events, and remarks during the theme development and coding phase, and some of them are combined to address the study questions and objectives. This helps the researcher to gain a fresh perspective on the data and compare linked sections of the data throughout time. The elaboration process reveals new tendencies and, in many cases, the researcher realises that the data which is grouped under a single theme may actually point to different subjects and that there are other issues and themes that can be introduced (Gaudreau, 2018: 1).

A thematic map is used for thematic analysis of qualitative and mixed method research. It is used to analyse unstructured text, audio, video, and image data, such as interviews, focus groups, surveys, social media posts, and journal articles (Gaudreau, 2018: 1).

The various steps of the thematic analysis were followed in this study to analyse the collected data and are further explained in Section 5.5.

4.13 ETHICAL CONSIDERATIONS

Ethics is defined as a set of norms or standards for controlling interpersonal relationships in a way that benefits all parties involved while also respecting the interests and desires of each individual (Arifi, 2018: 30). Blumberg, Cooper and Schindler (2013:15) define ethics as the moral decisions about our behaviour and association with others.

In this study, the ethical clearance guidelines set out by the University of KZN were adhered to. No primary data was collected prior to the issuing of the ethical clearance approval notification for the study by the ethics committee at UKZN (see Appendix A). Permission from the DoE was required for this, and a copy of the gatekeeper's letter is given as Appendix B. Finally, the participants were informed that they might withdraw on the study at any moment.

4.14 CONCLUSION

This chapter has focused on providing a full overview of the steps taken during the data collection and analysis. It has described the various research approaches used by

the researchers and how they influenced the research study. The research map that was followed in this study was designed to ensure that the objectives and research questions were met.

A summary of the elements of research design decisions of this study is presented in Table 4.2.

Table 4.2: Research design decisions

Key Research Element	Description of key research element
Main objective of the study	The main research objectives were to determine the supply chain management challenges the public education system faces and the strategies that have been put in place to address these challenges.
Research design	Exploratory and descriptive
Research approach	A qualitative study
Research strategy	Semi-structured interviews
Study site	The DoE in the Umzinyathi district offices.
Population	All individuals working in the DoE in the Umzinyathi district of KwaZulu-Natal.
Sampling	Non-probability (purposive) sampling
Sources of data	Primary and secondary research (Refer to Section 4.10.1.2)
Data collection method	Face-to-face interviews using an interview guide (Appendix C)
Quality of the research data	Achieved through credibility and trustworthiness measures
Ethical considerations	Ethical clearance from the ethics committee at the University of KwaZulu-Natal (Appendix A).

Source: Compiled by the researcher

The data analysis, findings, and discussion are presented in the following chapter, Chapter 5.

CHAPTER 5: PRESENTATION, ANALYSIS AND DISCUSSION OF THE FINDINGS

5.1 INTRODUCTION

The research questions, research objectives, and literature evaluation reported in the previous chapters of this study explored the organisation of the South African public education system, the supply chain and the supply chain challenges in the South African public education system. The research methodology that directed this study was described in Chapter 4. This chapter explains how the empirical data was analysed and interpreted at the DoE and public schools in the Umzinyathi district.

The empirical research consisted of semi-structured interviews. A semi-structured interview guide (Appendix D) was used as the key data collection instrument, which comprised open-ended questions that address the objectives of this study. Thematic analysis was used as the primary tool for making sense of the information gathered or data collected.

The study findings are provided in the form of a thematic map. Each theme, categories and codes are dealt with individually and includes verbatim quotes made by the participants so as to provide the reader with a comprehensive understanding of the data. This chapter concludes with a summary.

5.2 REVISITING THE RESEARCH OBJECTIVES

Before getting into the data analysis and findings, the research objectives are revisited, so as to set the scene.

5.2.1 Research objectives

- To determine the supply chain challenges experienced by stakeholders in the public education system in KZN that undermines the quality of education.
- To examine the methods or strategies that stakeholders could use to manage the identified SCM challenges.
- To recommend how stakeholders in the public education system can better manage or overcome the identified supply chain challenges.

5.2 PROFILE OF PARTICIPANTS

A total of twenty participants were selected to partake of this study. Twelve of the participants are the school principals and six are stakeholders, including the school management team (SMT), SGB and administration clerks in the schools. Two participants are based in the DoE office – one is the circuit manager and the other one is the SCM, procurement and asset management clerk.

Table 5.1 presents the demographics of the people who took part in the study. It contains each participant's profile, which includes gender, position in the institution, department or institution where they work and highest degree of certification.

Table 5.1: Profile of the participants

Participant	Gender	Position held	Department/ Institution	Highest Qualification	Date and Time of Interview
Participant A	Male	School Principal	Mzomusha Combined School	Undergraduate Degree	18 February 2021 10:42-11:00
Participant B	Male	Teacher/ Stakeholder	Mzomusha Combined School	Undergraduate Degree	18 February 2021 11:20-11:36
Participant C	Male	School Principal	Ntili Primary School	National Diploma	23 February 2021 09:28-09:46
Participant D	Male	Administration Clerk/ Stakeholder	Ntili Primary School	Undergraduate Degree	23 February 2021 10:02- 10:17
Participant E	Male	School Principal	Emkhamo Combined School	National Diploma	24 February 2021 09:05-09:26
Participant F	Female	Administration Clerk/ Stakeholder	Emkhamo Combined School	Matric	24 February 2021 09:37-09:51
Participant G	Male	School Principal	Makhankana Combined School	Master's Degree	25 February 2021 12:01-12:24
Participant H	Female	Administration Clerk/ Stakeholder	Makhankana Combined School	Undergraduate Degree	25 February 2021 12:34-12:50
Participant I	Female	School Principal	Bunyebethu Secondary School	Honours Degree	04 March 2021 08:47-09:22
Participant J	Female	School Principal	Nini Primary School	Undergraduate Degree	10 March 2021 14:14-14:26
Participant K	Male	School Principal	Mashunka Primary School	Undergraduate Degree	15 March 2021 08:50-09:10
Participant L	Male	School	Pomeroy Primary	Honours Degree	16 March 202

		Principal	School		10:12-10:33
Participant M	Female	School Principal	Pomeroy State Aided Primary School	Undergraduate Degree	18 March 2021 12:16-12:31
Participant N	Male	School Principal	Collessie Primary School	Honours Degree	24 March 2021 09:02-09:17
Participant O	Male	School Principal	Emzweni Primary School	Undergraduate Degree	24 March 2021 14:20-14:48
Participant P	Male	Deputy Principal/ Stakeholder	Dlenyane Combined School	Honours Degree	29 March 2021 09:27-09:51
Participant Q	Male	Deputy Principal/ Stakeholder	Mandleni Primary School	National Diploma	09 April 2021 08:25-08:40
Participant R	Male	Circuit Manager/ Departmental Official	Msinga Circuit Management Centre (CMC) - Umzinyathi District	Master's Degree	13 April 2021 16:06-16:25
Participant S	Female	Supply Chain, Procurement and Assets Management Clerk/ Departmental Official	Msinga Circuit Management Centre (CMC) - Umzinyathi District	Undergraduate Degree	16 April 2021 08:24-08:38
Participant T	Female	School Principal	Kukhanyakezwe Primary School	Honours Degree	16 April 2021 10:43-11:04

Source: Compiled by the researcher

The next section presents the thematic analysis process used to analyse the collected data of this research study.

5.3 THEMATIC ANALYSIS

A qualitative method for detecting or recognizing, analysing, and reporting patterns within a data corpus is thematic analysis (Scharp & Sanders, 2018: 1). Thematic analysis provides a type of qualitative analysis that examines, classifies, and presents data-related themes (patterns). Thematic analysis allows the researcher to link a frequency analysis of a theme to one of the entire contents. The researcher can use thematic analysis to identify the exact relationship between concepts and compare it to the replicated data (Ibrahim, 2016: 39).

Thematic analysis is a technique that is primarily used in qualitative data research studies, and it has recently been identified as a foundational method of qualitative analysis by a number of researchers (Herzog, et al., 2019: 1). It entails searching for and identifying common threads throughout an interview, as well as providing an accurate account of a complex and sensitive phenomenon (Scharp & Sander, 2018: 1).

Because it categorises data into multiple themes relevant to the subject under investigation, the technique is extremely versatile. The technique tries to ensure that the various themes that emerge in any document or interview transcript are properly identified and classified into classes, allowing for more accurate analysis (Vaismoradi & Snelgrove, 2019: 2). Identifying common themes and separating the study information into chunks and units that may be simply and successfully analysed are two ways to organise data in thematic analysis (Nowell et al, 2017: 2).

In this study, handwritten notes were made during the interviews, and the interviews were recorded and transcribed verbatim. The consecutive steps of the thematic analysis were presented in Section 4.12.1.1 and the steps undertaken to analyse the collected data in this study are elaborated on in Section 5.5.

5.4 INTERVIEWS WITH THE DoE EMPLOYEES

The responses of the twenty participants (see Table 5.2) at the DoE in the Umzinyathi district are presented in this section. The purpose of the interviews was to identify the SCM challenges faced by participants in public schools in the Umzinyathi district and to examine the strategies that stakeholders could use to overcome the identified SCM challenges.

As explained in section 4.10.2, an interview guide was drawn up (Appendix D). Different open-ended questions were offered to participants based on their tasks in their respective departments. The use of a recording device during the interviews was permitted by the participants (Appendix C). The interviews lasted around 25 minutes, and each participant was agreeable for the researcher to email or contact them for clarification or to answer additional questions if necessary. This was done to clarify some aspects and to guarantee that the findings were accurate and reliable in terms of indicating exactly what the participants meant.

The findings and analysis of the data acquired during interviews, as well as the thematic map, are presented in the next section of this chapter.

5.5 FINDINGS

The findings based on the thematic analysis of the interviews are presented in this section of the study. Thematic analysis is a data interpretative process that involves searching data systematically to identify arising patterns. The steps followed for this research study to transform the data into findings include transcribing the recorded interviews, familiarisation with and immersion in the data, creation of themes, coding, elaboration and interpretation and checking.

Data was transformed into findings through the following steps:

- Data was gathered through semi-structured interviews. Interviews were voice recorded and once the interviews were concluded, the recordings were transcribed verbatim. In other words, the interview recording of each participant was transcribed verbatim, which made it easier to analyse the data. Transcripts make the patterns that emerge from each interview recording transparent and accessible (McGrath, et al., 2018: 1002).
- It is vital for the researcher to have a thorough preliminary understanding of the data in order to conduct efficient data analysis (Van Beek, Metze, Kunseler, Huitzing, Blois & Wardekker, 2020: 73). The second step of thematic analysis in this study was familiarisation and immersion in the data. This ensured that the researcher had a good understanding of the data and made it easier to identify where various and similar trends could be found and what types of interpretation were likely to be supported by individual data sets. The researcher fully immersed himself in the data and spent time studying the interview and transcript notes.
- Coding themes was the third step in the thematic analysis. Before beginning the coding procedure for this study, themes were identified in the data. Themes should ideally emerge spontaneously from the data sets, allowing the study questions and objectives to be addressed (Valsmoradi et al., 2016: 103). The aim of this study was to provide insight into SCM challenges faced by public education system.

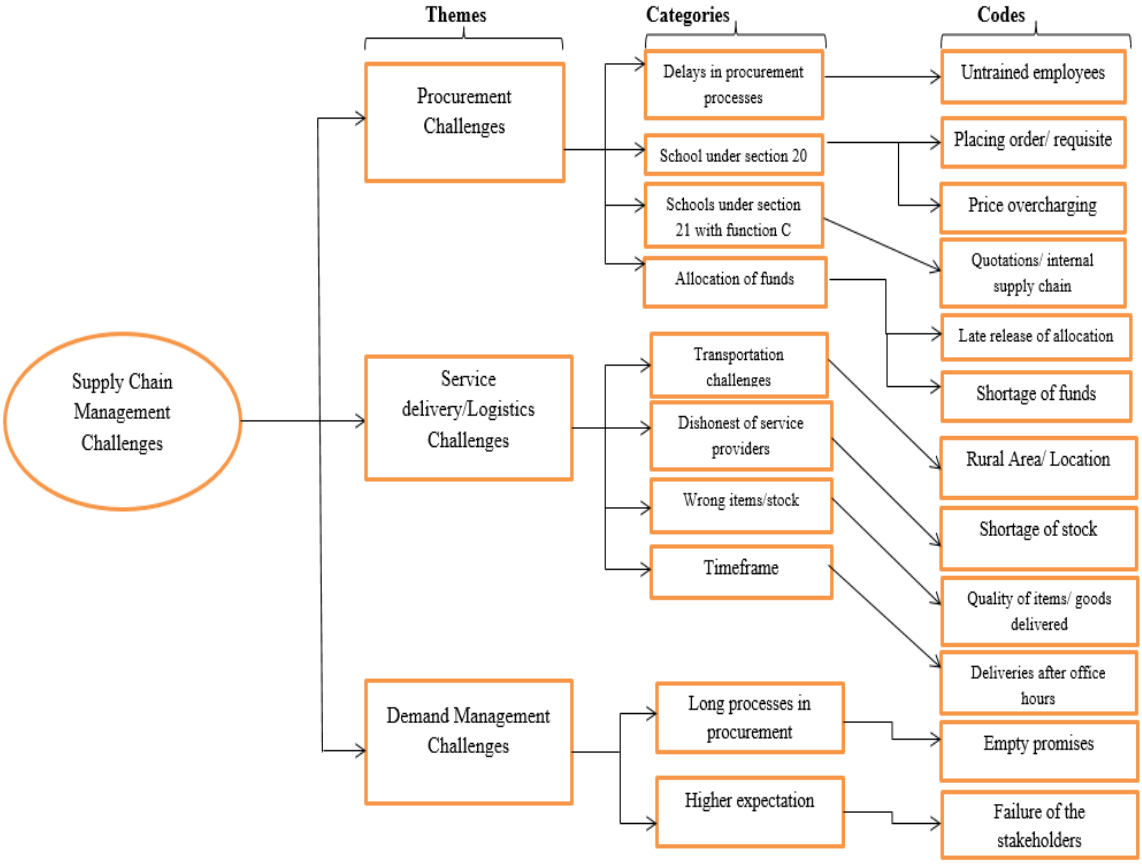
- Defining and labelling themes is a crucial phase in the analysis since it allows the data obtained to be aligned with the study objective (Landrum & Garza, 2015: 199). Individual themes that had been developed in the previous step were further refined. This phase is significant because of the way it examines each topic to identify what it represents and what it does not reflect. This demonstrates that all the adopted themes are relevant to the research.
- The process of inducing and developing themes includes creating categories and a coding scheme. This should be done simultaneously with coding the data, as this saves time and promotes consistency. Coding can be defined as the process of categorising data in order to facilitate data retrieval and analysis. Coding is an important stage that must be completed in order for the coding to provide answers to the study's underlying questions (Linneberg & Korsgaard, 2019: 22). In this study, developing the categories and a coding scheme was carried out using the data collected during the interviews.
- The sixth step of thematic analysis is defined as the induction of themes and coding process that categorises data into different chunks, events, and remarks, some of which are merged in order to address the study questions and objectives. This helps the researcher to gain a fresh perspective on the data and compare linked areas of the data throughout time. The elaboration process reveals new tendencies, and in many cases, the researcher realises that the data grouped under a single theme may encompass a variety of themes.

The above-mentioned steps of the thematic analysis were followed by the researcher to analyse the collected data. All steps in the thematic analysis were conducted manually and a graphical presentation of the themes, categories and codes was prepared (Figure 5.1). Thematic maps are vital for visually displaying cross-connections between concepts and between primary themes, codes, and categories while designing and organising themes (Kiger & Varpio, 2020: 5).

5.5.1 Thematic map

A thematic map is a graphic depiction of themes, categories, and their linkages that contains a full description of each subject, its categories, and codes. It helps to outline the objectives that were achieved from the conducted interviews as part of data analysis ((Herzog, Handke & Hitters, 2019: 1).

Figure 5.1 is the thematic map summarising the SCM challenges faced by public schools in the Umzinyathi district.



Source: Compiled by the researcher

Figure 5.1: Thematic map

The three themes of the thematic map are ‘unpacked' in the following sections of this chapter. These themes are procurement challenges, service delivery or logistics challenges, and demand management challenges. These themes demonstrate a link between what the empirical data reveals and guiding constructs of the study. Each part of the map will be examined and discussed in detail in order to gain a thorough grasp of the issues that arose from the data. Some of the sections also include exact quotations from the participants to substantiate the conclusions. Since the participants at the DoE in the Umzinyathi district consist of departmental officials, school principals and other stakeholders (see Table 5.2), different challenges were identified.

5.6 ANALYSIS OF DATA

5.6.1 Theme 1: Procurement challenges

In section 3.7.2, a framework of possible procurement challenges has been defined. The open-ended questions used in the empirical research study's interview guide were based on this paradigm. The challenges raised by the participants associated with procurement include the following: delays in the procurement processes; school under Section 20; schools under section 21 with function C; and allocation of funds. Schools under section 20 means that these are schools that perform the functions listed in sections 20 of South African Schools Act 84 of 1996. Schools under section 21 refer to schools that have been allocated the responsibility of carrying out the functions listed in section 21 of South African Schools Act 84 of 1996. The categories and codes in this study are derived from the semi-structured interviews that have been conducted. The sub-themes or categories for the primary theme are highlighted in the categories. The categories and the codes relating to this theme are dealt with in the following section. Table 5.2 indicates the sub-themes and the codes.

Table 5.2: Theme 1 - Procurement challenges

Theme	Sub-Themes	Codes
Theme 1: Procurement Challenges	Delays in procurement process	Untrained employees
	School under Section 20	Placing order/requisitions Price of overcharging
	Schools under Section 21 with function C	Quotations/ internal supply chain
	Allocation of funds	Late release of allocation Shortage of funds

The procurement challenges theme has four sub-themes that were identified from the research results. These are delays in the procurement process, school under Section 20, schools under Section 21 with function C, and allocation of funds. Table 5.3 presents the challenges identified by each participant.

Table 5.3: Theme 1 - Procurement challenges as per participant

	Participants (p)																			
Theme 1 – Procurement challenges	**PA**	**PB**	**PC**	**PD**	**PE**	**PF**	**PG**	**PH**	**PI**	**PJ**	**PK**	**PL**	**PM**	**PN**	**PO**	**PP**	**PQ**	**PR**	**PS**	**PT**
Sub-theme and Code																				
Delays in Procurement Process	√	√		√			√		√		√	√		√	√		√	√	√	√
Untrained employees																		√	√	
School under Section 20*							√	√	√	√			√			√				
*Placing orders/ requisitions***				√			√		√	√	√		√					√	√	
Price overcharging			√				√		√									√		√
Schools under Section 21 with function C*	√	√	√	√	√	√					√	√		√	√		√			√
Quotations/internal supply chain	√	√	√		√		√				√	√		√	√		√	√		
Allocation of funds	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Late release of allocation														√			√			
Shortage of funds	√		√	√	√			√	√					√	√		√	√	√	√

*****Two participants are from the department of education hence they are neither from a section 20 or 21 school.

**Participants who were formerly from a section 20 school provided input with regard to schools under section 20

5.6.1.1 Delays in the procurement processes

Any constraints that hinder procurement from taking place in line with the procurement plan and timetable are referred to as procurement delays. Unethical procurement could also cause delays in procurement procedures. Delays are frequently caused by a lack of competence in compiling the requisite paperwork or documents and conducting the necessary research (Banobi & Jung, 2019: 2). Failure to begin the procurement process on time could generate delays throughout the public schools' system. The findings revealed that 13 participants stated that department officials are prolonging the procurement process, which results in delays in providing the goods or services on time, negatively affecting the public education system. A reason that could be attributed for the delay in the procurement process of goods and services could be lack of staff training. Two participants who are circuit managers and

deal with the DoE administrative side identified that employees in the department of education need training. Employees lack knowledge regarding new strategies, policies and procedures in the SCM department.

The findings further revealed that delays in the procurement process are also caused by the service providers. For example, a school will place an order for goods and services or other facilities, but the service provider or supplier is facing financial constraints.

> *"Sometimes the service provider has got less money and breaks orders into small quantities which delays the delivery of the items. This delays the whole process of getting the goods on time"* (Participant G).

As noted by Li et al. (2019: 1) in Section 3.7.15, delays or long lead times refer to the time required in acquiring a product. When the supplier or service providers lack funds, it delays the whole process of getting the goods on time, because they have to borrow money in order to be able to render the service required. Thus, financial constraints may cause the supplier or service provider to increase delivery lead time.

- **Untrained employees**

The findings revealed that employees are not well trained and that the DoE does not provide employees with training regarding new strategies, policies and procedures in the SCM department. These participants unpacked the hidden part of DoE since they are from the administration side. Furthermore, it was found that the directorate and senior departmental officials failed to employ the most suitable candidates for the positions in the supply chain department.

> *"The problem we have in our office is that the management in the supply chain department failed at the beginning to take the best suitable candidates to deal with the supply chain management department. Most of the people who are in supply chain management do not qualify to be in that office, they are not well trained to be in the supply chain management department. That's why we are facing so many delays"* (Participant S).
>
> "*The Department of Education needs to formulate and host workshops that would train departmental officials for better outcomes in the Department of Education"* (Participant R).

As explained in Section 3.7.2, because of a lack of proper knowledge, skills and capacity, proper procedures in the procurement process are not followed. Participants noted that in some government departments the skills and capability of employees in the SCM department are below standard.

> *"Most of the people who are in supply chain management department do not qualify to be in that office"* (Participant S).

> *"As office personnel, if you order a particular item from the district office and that item is out of stock no one informs you that that particular item is out of stock. You keep waiting for nothing"* (Participant R).

5.6.1.2 Schools under Section 20

A Section 20 school is one that fulfils the requirements set forth in Section 20 of the South African Schools Act, 84 of 1996. The SGB is established under Section 20, but it is not granted the same powers as Section 21 schools.

Although Section 20 schools receive little money directly, the provincial agency does provide them with services and materials. In other words, they do not receive an allocation for textbooks and stationery into the school bank account. Section 20 schools, according to the DoE, do not have the approval to acquire their own goods and services, but they must be notified of their paper budget in order to comprehend the true cost of running the school (Mahlangu, 2018: 2).

Six participants in this study are from schools under Section 20. They explained that, when they require particular items or facilities, they send a requisition to the DoE. Other participants who were formerly from a section 20 school also provided input with regard to schools under section 20. Thereafter, the DoE arranges for the deliveries.

> *"Since we are the school under Section 20, with regard to procurement first of all as the school we are not given a choice in terms of quotations. That is hidden from the school. We do not know how many quotations the Department of Education has and which supplier they choose and what reason for that is. We are not given a choice and we don't have access to their quotations"* (Participant I).

- **Placing orders or requisitions**

The schools under Section 20 have no choice when it comes to selecting suppliers. Most of the schools in the Umzinyathi district are under Section 20. Orders are placed or a requisition is sent to the DoE.

> *"Since we are the school with Section 20, the Department of Education is placing orders for us. We send a requisition by writing down a list of goods or materials we require to the Department of Education. The list we compile is according to the priorities of materials we require and the Department of Education places orders for us"* (Participant J).

> *"We have no choice of determining quotations particularly as Section 20 schools, we have no right of getting the companies of our choice to procure from them. There are no comparable quotations given to the schools or institutions before placing orders. The quality of goods or services is not guaranteed from the agent"* (Participant K).

Furthermore, there is poor communication between the school or an institution and the DoE.

> *"Deliveries are not known to the school. The Department of Education does not inform schools about deliveries that are going to take place. The communication from the Department of Education is very poor* (Participant K).

In addition, the findings revealed that red tape is a challenge when it comes to procurement.

> *"We need to fill in the forms and submit them to the district office. The district office also fills in the forms and submits them to the head office and that takes a lot of time to render a service in the circuit management centre or sub-district offices especially in our office"* (Participant R).

The requisition is a long process that delays the entire procurement process in the public education system.

- **Price overcharging**

Suppliers are important business partners so that the public education system can ensure that supply chain activities are carried out in accordance with the appropriate

level of education. The participants in the study identified the challenge of service providers overcharging when procuring from them.

> *"The cost of goods and services are multiplied, they are overcharging us for the goods they are providing. The prices of their goods are way too high"* (Participant C).

The findings revealed that for schools under Section 20, when they order from the DoE using the allocation of the other LTSM, the prices are too high, and the schools do not know the criteria for the orders and why the charges are so high.

> *"Only to find that when the materials are delivered to the school the prices are way too high. For example, at some point I have included dictionaries as part of my order to the Department of Education, only to find that the cost of one dictionary was R895.00 and when you do your own quotation the cost of the dictionary was R199.00 and the highest price was R220.00 for the same dictionary" (*Participant I).

> *"At some point we asked to have two laptops for departmental heads only to find that the price for the two laptops was R24 000.00, meaning each laptop was R12 000.00. When you go straight to game store and other stores where you can purchase the same laptop, the cost was R4 500.00" (*Participant I).

Most of the participants stated that the DoE is misusing the allocation of funds for the school by overcharging for no reason. If the school is under Section 20, there is an amount known as the 'other learning and teaching support material (LTSM) amount' in the school allocation and this amount are kept in the district office. LTSM is an integral and vital part of every education system and the effective management, utilisation and maintenance of these valuable resources to ensure access and support of the delivery of quality education. The district office takes 30% of the school allocation and reserves it at the district as 'other' LTSM can be used to enable learning for all. LTSM are important for driving effective classroom teaching and learning (Milligan, Koornhof, Sapire & Tikly, 2018: 1)

> *"The main challenge is that if you purchase a laptop, desk or textbooks using that 'other LTSM amount' it will be more than 200% profit. For example, you purchase a laptop that cost around R6 000.00 with the 'other LTSM amount' and they will charge around R16 000.00. Same applies to desks. Each desk costs around*

R400.00 but when you buy from it, will cost R2 800.00. There is no one who is controlling this high amount" (Participant G).

The circuit manager as the departmental official also mentioned that the prices within the DoE are excessive.

"When you happen to look at the pricing you find that some of the prices are doubled if not tripled in terms of items that are given to us. When you look at the pricing sometimes you become shocked that you can buy an item at any shop for R5.00 but from our department you may end up receiving the same item buying it at R35.00" (Participant R).

5.6.1.3 Schools under Section 21 with Function C

Section 20 and Section 21 schools are two types of public schools defined by the South African School Act no. 84 of 1996. Section 21 schools get funds from the DoE and are responsible for ordering stationery, textbooks, paying water and power bills, and doing their own maintenance. A Section 21 school is one that has been charged with carrying out the additional functions outlined in Section 21 of the South African School Act 84 of 1996. The SGB of a Section 21 school performs more functions that the SGB of a Section 20 school (Basson & Mestry, 2019: 2). Because of their proven capability, knowledge and expertise, they are given increased responsibilities. These schools have the power to make decisions regarding resource allocations. The SGB's ability to undertake Section 21 functions is conditional to their doing so successfully (Ndou, 2015: 154).

In the Umzinyathi district, some schools are under Section 21 with function C. Those schools are in charge of their operations in terms of procurement. The allocation of funds of the school goes straight into schools' bank accounts.

"In Section 21, it is better in terms of buying although it takes time for the Department of Education to approve the application of Section 21 with function C" (Participant A).

However, the findings revealed that schools under Section 21 with function C also face various SCM challenges. Twelve participants are employed at schools under Section 21 with function C. The participants have their own SCM processes with their SGB in their respective institutions.

The following subsection presents some of the identified challenges.

- **Quotation and internal supply chain management**

Eleven participants in this study prepare and analyse quotations and place orders together with their SGB members. A quotation is a document that a supplier or service provider sends to a potential client that includes a proposed price for the supplier's goods and services based on certain terms and conditions. Once the quotations are received, they are analysed, agreed to and orders are placed.

> *"We have a right to choose or get any service provider or supplier"* (Participant E).

One participant explained the process on how they procure goods and services in their school.

> *"We are a primary school under Section 21 with function C, so we do procure goods and services or any other resources on our own. We always rely on service providers but we do our own buying. We need to invite quotations - three quotations so we able to identify or choose the best service provider who we think will give us the quality and the quantity that we require"* (Participant N).

> *"For the schools under Sections 21 with function C, it easy for them in terms of procurement, since they have their internal supply chain management"* (Participant R).

One participant explained the measures or operations involved in procuring the goods and services.

> *"I, the principal, also serve as a person who is on the finance committee that is responsible for procurement in the school. The school is under Section 21 with function C, whereby we are able to purchase from a variety of suppliers. We have a right to buy from any supplier"* (Participant O).

Even though these schools have their internal supply chain arrangement, all government entities are guided by the regulations and procedures of SCM. The DoE has a policy stating that, in order for SCM to be fair and transparent, at least three quotations are required from service providers, and the best suitable service provider that meets specifications must be selected.

"The Department of Education requires the schools to obtain at least three quotations in order for us to procure" (Participant Q).

5.6.1.4 Allocation of funds

The department of basic of education allocates funding for the public education system in order for it to function. Funds are allocated by the government to an institution or a school, based on the number of learners enrolled in the institution. Without the allocation of funds, the school will not survive and will not be able to function.

All the public schools have concerns regarding the allocation of the funding from the DoE because the resources and facilities they require exceeds the funding received. The findings revealed that most of the participating schools are not performing well due to a shortage of funding and also to the late release of this funding.

"Schools under Section 21 with function C, are better off in terms of procurement, even though the funds that are allocated to schools are not enough to procure what is required" (Participant A).

- **Late release of allocation**

The late release of allocation (funding) was identified as a challenge by one participant. When the allocation is delayed, schools have to wait for funding in order to procure the required resources for the school. Consequently, this hinders the improvement on providing quality of education by public schools. It was found that when the DoE delays the release of allocation, the schools do not have enough resources and materials needed to teach, for example, not enough textbooks to cover the curriculum on time. Learners are then left behind in terms of the essential coverage of the syllabus and curriculum and this negatively affects their learning and education.

"The late release of funding becomes a problem because, we don't get funding on time. Therefore, the later we receive allocation of funds into the school account the later we start with our procurement processes and procedures" (Participant N).

"The challenge starts when the money is not deposited into the school account. We cannot procure the materials if we don't have money. The delays are caused by

Department of Education by not releasing the funds to the school account on time" (Participant Q).

- **Shortage of funding**

The findings revealed that insufficient funding is a key challenge, which results in schools not being able to procure goods and service or facilities that are needed by the school timeously. If schools do not have enough funding to procure the required resources and learning materials for the school, it will negatively impact learners' education.

"*As the school principal, it is better to run the school efficiently and effectively because failure to do so will be a disaster. As the manager of the school you have to be proactive even though the funding allocated to the school is not enough"* (Participant A).

"I can also say to reduce these challenges we should be get sponsors from different companies. As we speak, I am looking for computers from a sponsor. Sponsors always keep their promises" (Participant A).

"As a school we keep on procuring goods and services, if we don't have enough money that will hinder the quality of education. We won't be able to procure enough resources for our school to function efficiently and effectively" (Participant N).

"We always have strategies to utilise the resources called finance which the Department of Education provides. The funding is always insufficient, compared to the needs that we have as the school" (Participant O).

The findings of a lack of resources in the form of well-established infrastructure such as water and electricity in public schools and of a shortage of funds from the DoE is in line with literature (see Section 3.7). Insufficient resources such as the provision of goods and services and other facilities required by a school negatively impact on teaching and learning (Great Schools Partnership, 2015: 10).

5.6.2 Theme 2: Service delivery/logistics challenges

Section 3.7.9 of the literature review dealt with service delivery and logistical challenges. The public education system as the whole subcontracts or outsources transportation to third parties, which delays the process of service delivery. There are

long lead times when public schools have placed orders with the DoE, which delays the process of teaching and learning. For example, a school has to wait for the department to deliver the required teaching and learning materials and services (Evren & Akad, 2019: 796).

As noted previously, the categories and codes in this study are derived from the semi-structured interviews. The categories were highlighted as the sub-themes of the main theme. The following section covers the categories and codes related with this theme. Table 5.4 indicates the sub-themes and the codes.

Table 5.4: Theme 2 - Service delivery/logistic challenges

Theme	**Sub-Themes**	**Codes**
Theme 2: Service Delivery/ Logistics Challenges	Transportation challenges	Rural area/location
	Dishonest service providers	Shortage of stock
	Wrong items/stock	Quality of items/ goods delivered
	Time frame	Deliveries after office hours

The service delivery/logistics challenges theme has four sub-themes that were identified from the research results. These are transportation challenges, dishonest service providers, wrong items/stock and time frame. Table 5.5 presents the challenges identified by each participant.

Table 5.5: Theme 2 - Service delivery or logistic challenges as per participant

	Participant (P)																			
Theme 2 – Service delivery or Logistics Challenges	**PA**	**PB**	**PC**	**PD**	**PE**	**PF**	**PG**	**PH**	**PI**	**PJ**	**PK**	**PL**	**PM**	**PN**	**PO**	**PP**	**PQ**	**PR**	**PS**	**PT**
Sub-theme and Code																				
Transportation challenge			√	√			√				√	√	√	√	√	√		√		
Rural areas or location				√			√				√	√				√		√		√
Dishonesty of service providers and poor service delivery	√							√					√	√	√			√		√
Shortage of stock			√		√	√	√	√		√		√	√		√	√		√	√	√
Wrong items or stock delivered							√	√	√				√					√	√	√
Quality of items or goods delivered									√			√	√					√		√
Time frame	√	√	√		√			√	√		√	√		√	√		√	√	√	√
Deliveries made after office hours								√	√		√							√		

5.6.2.1 Transportation challenges

The findings revealed that participants had experienced transportation challenges.

> *"The service providers mention that they do not have enough transportation for deliveries. That is the main challenge not to deliver on time"* (Participant C).

> *"There are delivery delays because transporters face some difficulties to locate the school"* (Participant D).

This finding is in line with the literature in Section 3.7.9, as the public sector experiences challenges when it comes to delivering the goods and services required by public schools (Chandrakumar, et al., 2015: 1).

- **Rural areas and location**

It was found that some service providers find it difficult to find the schools in rural areas where they have to make deliveries.

> *"We are located in rural areas and the supplier takes a long time to deliver and even to find the place where the school is located. Access is hard"* (Participant D).

> *"The suppliers do not have enough transportation when it comes to delivering textbooks that are required by the school because they mentioned these books are*

being ordered from different destinations, so it's hard to travel long distance and that causes delays in terms of deliveries" (Participant C).

"There are challenges when it comes to logistics on my side. I used to collect the textbooks from other schools and I had to organise transport on my own because orders were delivered to the wrong school" (Participant G).

"There are a lot of inconveniences when it comes to transportation for deliveries. You find that the goods are delivered to our neighbouring school, where we have to go and collect. You may have a challenge of getting transportation to pick up those goods" (Participant K).

"There are transportation challenges. You find the service provider telling us that he has procured what you have requested for but the transport that he has cannot access your place because you are situated in a rural area. I then have to request other business partners to help, those who have transport that can easily get to your school" (Participant L).

"When it comes to transport, the company might not have trucks. The company will end up using bakkies, which means that the bakkie has to come more than three times to deliver" (Participant P).

Location is a key challenge when it comes to deliveries.

"You may find that the supplier does not have the correct physical address where deliveries have to be made" (Participant R).

"As a rural area, our main challenge is road in terms of transport. Most suppliers are having problems. Beside the road, the location of the area because maybe you are unable to find that place in the global positioning system (GPS). You find that the driver has arrived but still driving around asking questions – where is the place? And maybe the name of the place is written wrongly. The service providers have to use transport that will have access to that area" (Participant P).

5.6.2.2 Dishonesty of service providers and poor service delivery

It was found from the participants that many of the service providers are not trustworthy, which poses a challenge. Service providers make promises but often fail to keep them.

"You get a call stating that goods will be delivered to your school on certain day only to find that after a month the goods are not yet delivered" (Participant A).

"The service providers are delivering the textbooks and workbooks in the wrong language – we are not using Afrikaans as a language of teaching and learning. Sometimes it happens that the quantity of goods written on the invoice is not matching the goods received" (Participant H).

One participant indicated that as the manager of the school one has to improvise by having alternative ways of dealing with these challenges.

"Suppliers are not trustworthy. Sometimes they deliver broken goods, so you end up taking whatever is broken and you will fix because of the delivery that is poor" (Participant R).

Other service providers use catalogues to trick school principals' minds, which is unethical. When the material is delivered, maybe the quantity or quality is not the same because you said you want 10 poles in a line and you find that there are 8 poles in a line. (Participant T).

This finding is in line with the literature discussed in Section 3.7.3, which indicated that some of the suppliers are not trustworthy and that their behaviour is unethical (Ambe & Badenhorst-Weiss, 2013a: 251). There is poor service delivery from the service provider, they cannot delivery on time after promises that have been made.

- **Shortage of materials ordered**

Service providers frequently do not fulfil orders due to the insufficient stock on hand – in other words, orders are incomplete. This appears to happen mainly in schools or institutions under Section 21 with function C. These schools are directly involved in their own procurement processes and procedures. When an order is incomplete, it affects teaching and learning in schools. If schools do not receive learning materials on time or the materials are in short supply, learners are negatively affected since schools then would not be able to cover their curriculum on time.

"The suppliers are late when delivering and when they are delivering goods there are always shortages. They also mention that they do not have enough transportation to deliver on time" (Participant C).

"There is a great problem in terms of deliveries, the book shop doesn't give enough stock to suppliers, they have to wait that's why they don't deliver on time" (Participant E).

"It just that they give us incomplete order of what has been ordered" (Participant F).

"They used to deliver shortage of items ordered when it comes to textbooks and workbooks in the school" (Participant H).

"They don't deliver on time and also the stock is not enough from the things that we ordered from" (Participant M).

One of the participants stated that, since the start of the Covid-19 pandemic, some service providers use the pandemic as an excuse for non-delivery.

"They make promises and they would apologise for not keeping their promises and say as you know we are under Covid-19 pandemic so many things are not happening as they should" (Participant O).

5.6.2.3 Wrong items or stock delivered

With regard to all public schools under Section 20, it was found from the six participants that poor service delivery (for example, the delivery of wrong items to the schools or institutions) is a challenge in the public education system. It was noted that the principals do not know who to consult when incorrect items are delivered as they do not know who is responsible for the order in the DoE. This is frustrating for the principals as they will only find out on the day of delivery that the service provider is.

"We don't even know who to consult in terms of these late deliveries and wrong items delivered and that is time consuming" (Participant I).

"The service provider delivered the wrong textbooks and workbooks in Afrikaans" (Participant H).

"There should be a face-to-face contact with their suppliers in order to avoid this thing of receiving the inferior goods from the service provider" (Participant R).

"Sometimes when we ordered the books from the managing agent, we received grade 10 books but we are a primary school. When we enquired about that we

would be told to keep those books and that they would come and collect them and give the correct textbooks" (Participant T).

- **Quality of items or goods delivered**

The quality of goods delivered is another challenge that was identified by five of the participants. The schools or institutions order goods or services from the catalogues that the service providers give to the principals. The findings revealed that items listed in the catalogues are ordered but, when these items are delivered, they are different from those in the catalogues of which is the poor service delivery. Furthermore, since prices are not included in the catalogues, the principals have no idea of the prices of the items ordered.

"*We experience a challenge with these people who are supplying schools who are called service providers. Sometimes you give them the specifications of what you want, maybe giving a brand. For example, asking for a desk of certain material or brand. When they deliver you do not notice because the delivered goods are the same. When the time goes by, the life span of what was delivered is totally different to the life span of items that were ordered* (Participant T).

"Sometimes quantity, quality and under quoting are the main challenges. For example, you want somebody to do fencing for you. You come up with a specification of material and requirements and the service provider underquotes. When you discuss with the supplier you find that he or she under quoted and thus the quality of the product is not met" (Participant T).

5.6.2.4 Time frame

Two participants explained that the managing agent from the DoE who supplies schools with textbooks fails to meet the time frame in terms of deliveries. They noted that deliveries are always late.

"The service providers fail to meet our time frame because the bookshop does not give them enough stock. They have to wait and that's why they don't deliver on time" (Participant E).

"I would like to say something with regard to time frame. When we send out our requisitions, we do them early in the year for the following academic year only to

find that goods are delivered in November. That's how we manage our time frame as the school" (Participant I).

As a result, the findings revealed that orders are placed well in advance. For example, the participants indicated that they placed orders in January 2021; judging by their past experience, these orders will be delivered during November 2021, in time for the 2022 academic year.

"The Department of Education determines only the month but there is no time frame in terms of date and time" (Participant K).

"Again, the issue of time frame comes in because we do have a time stipulated as to when these goods or resources should be delivered, at a certain time, certain dates. But they don't meet that. They fail to comply with the time frame" (Participant N).

- **Deliveries made after office hours**

Four participants stated that some service providers make deliveries after office hours. This becomes a challenge for an institution where they have to delegate someone to wait for these deliveries.

"Only to find that the service provider will arrive after hours. It becomes a challenge for you waiting for somebody that you don't know and office hours are no longer permitting you to be in the office by that time" (Participant R)

"You can find that goods are delivered in December for the following year whilst we are not at school. The service provider asks the principal to make arrangement for someone to receive these goods. When the people come to deliver at school there will be someone who will be waiting to receive those goods. This is inconvenient because when you are calling people during holidays to be at school to expect that delivery it is kind of taxing. Sometimes they deliver after hours, while we are out of school. The suppliers come late when they have to deliver and they keep on calling that they are outside the gate of the school at around 4:00pm. Therefore, you have to request someone who is from the community to come and receive the goods on my behalf" (Participant I)**.**

5.6.3 Theme 3: Demand management challenges

Demand management is a component of SCM where the required resources are identified and it is ascertained whether the procurement plan allows the DoE to acquire those goods or services (Melo & Alcantara, 2015: 2). This was mentioned in the literature review section 3.6.2.1. The findings of the study revealed that most of the demand required by the participants is not met by the DoE as demand exceeds supply.

As noted previously, the categories and codes in this study are derived from the semi-structured interviews. The categories and the codes relating to this theme are dealt with in the following section. Table 5.6 indicates the sub-themes and the codes.

Table 5.6: Theme 3 - Demand management challenges

Theme	**Sub-Themes**	**Codes**
Theme 3: Demand Management Challenges	Long processes and procedures	Empty promises
	Higher expectations	Failure of the stakeholders

The demand management challenges theme has two sub-themes that were identified from the research results. These are long processes and procedures, and higher expectations. Table 5.7 presents the challenges identified by each participant.

Table 5.7: Theme 3 - Demand management challenges as per participant

	Participant (P)																			
Theme 3 – Demand Management Challenges / **Sub-theme and Code**	**PA**	**PB**	**PC**	**PD**	**PE**	**PF**	**PG**	**PH**	**PI**	**PJ**	**PK**	**PL**	**PM**	**PN**	**PO**	**PP**	**PQ**	**PR**	**PS**	**PT**
Long processes and procedures	√		√		√	√	√	√	√	√		√	√		√	√	√	√	√	√
Empty promises	√	√			√	√						√	√		√				√	√
Higher expectations				√			√					√		√	√	√	√	√	√	√
Failure of the stakeholders		√	√	√	√		√		√	√		√		√		√		√	√	

5.6.3.1 Long processes and procedures

The challenge of long processes and procedures was identified by 16 of the participants. The long process of procuring goods and services for the schools under Section 21 with function C hinders the flow of teaching and learning as they have to wait for books that have been procured to be delivered. These long processes and procedures delay the process in SCM.

> *"We are in process of phasing out the double combination, so we have ordered single desks since last year. We are told that the process is in that sub-section now and it is going to move to another sub-section. Can you imagine the schools have already opened and the departmental officials are telling you now about these processes? If the money was deposited in the school's account, we would have bought all these materials by now"* (Participant G).

> *"The participants noted that when they apply for Section 21 with function C, to enable them to receive allocated funds into their school accounts and to conduct their own purchases, the Department of Education prolongs the process in such a way that their application will not be approved"* (Participant I).

> *"The Department of Education is prolonging the process of getting this allowance of Section 21 with function C. The department is doing this intentionally because, if all schools can receive the funds into their account, they are not going to benefit anything with their companies. Since the money is controlled by the departmental officials it is easy to channel it to their companies" (*Participant G).

One participant stated that even for schools under Section 21 with function C, there is a long process involved in procurement, including the SMT, the SGB and the finance committee within the school.

> *"This long process is hard. Even if we are trying to access something quickly or we need it, we cannot, because of these processes involved"* (Participant L).

- **Empty promises**

The challenge of empty promises from the DoE was identified by nine participants. There are many demands in the schools and, when they are reported to the DoE, it takes many years for the department to fulfil these demands. They keep on promising until the schools lose patience and give up.

"Sometimes we don't get any response from the Department of Education, and they tell you that you are on the waiting list in order to fulfil your demands. (Participant T).

"The departmental officials will tell you to wait in order to have your order delivered. Sometimes you don't get your order at all" (Participant S).

"Unfortunately, truly speaking, there are no actions we take as departmental officials on these empty promises" (Participant R).

"They are many promises that are not yet kept" (Participant A).

5.6.3.2 Higher expectations

Public schools always have higher expectations of the DoE. They expect the department to offer more in terms of funding. Ten participants indicated that their requirements are more than the funding that is allocated.

"The needs of the school are more than what is allocated in terms of funding; the demand is higher than the supply" (Participant O).

- **Failure of the stakeholders**

The failure of the stakeholders from the public education system to support the schools with regard to supply chain was identified as a challenge by 12 participants. One of participants suggested that the stakeholders should delegate someone in the circuit management centre who will look after all public schools.

"In this school we use a router for network or internet. The storm damage happened and our network has been destroyed. We asked the Department of Education to come and assist and fixing it. Until now there is nothing since 2019" (Participant E).

"The chairs are getting broken each and every time, but yet we don't have enough funding so to replace them but we are trying our best" (Participant N).

5.7 METHODS AND STRATEGIES THAT STAKEHOLDERS COULD USE TO MANAGE THE IDENTIFIED SUPPLY CHAIN CHALLENGES

This section provides the responses from the participants as to what strategies stakeholders could use to overcome the identified SCM challenges in public schools in the Umzinyathi district. These strategies are broken down into three sections, namely, the strategies that could be used to overcome the challenges in procurement, in service delivery and in demand management.

5.7.1 Theme 1: Strategies that could be used to overcome the procurement challenges

It has been found that procurement is the major subsection in SCM at the DoE. If stakeholders can reduce the challenges identified under procurement, the public education system as a whole would improve as resources and equipment would be available timeously.

5.7.1.1 Delays in the procurement process

The findings from the participants revealed that the DoE could eliminate the delays in the procurement processes by working from a procurement plan and schedule.

> *"Each and every district should have a member from the head office to check all the schools' delay challenges so that the principals will liaise with that particular official in order to reduce that particular challenge"* (Participant A).
>
> *"If there is enough communication between the Department of Education and the public schools, there should be no delays"* (Participant E).
>
> "*As a school we have to minimise committee meetings when we have to purchase. This will reduce the procurement delays*" (Participant L).

The findings revealed various strategies or methods which participants could implement to overcome the challenges in procurement. These are outlined below.

- **Improving speed in the procurement process**

Thirteen participants noted that delays in the procurement process can be overcome by improving speed during the process within the DoE. The procurement processes should take place in accordance with procurement plans and schedules. The DoE

should host training sessions that would assist departmental officials to be more effective in handling the procurement processes.

- **Supplier management**

Five participants noted that when it comes to supplier management, supplier performance needs to be monitored and managed. Supplier management enables an organisation to carefully select its vendors and negotiate the best prices for the goods and services it requires. Procurement, contract formulation and administration, logistics, strategic planning, and supplier evaluation are all aspects of supplier management (Suraraksa & Shin, 2019: 5). Supplier management also allows the purchasing organisation to keep track of supplier performance, ensuring that its objectives are met, and to reduce pre-tender stage violations.

- **Emphasising the importance of procurement plans**

Thirteen participants emphasised the importance of having procurement plans in place. A good procurement plan will eliminate delays in the procurement process (Procurement policy and procedures, 2018: 9). A procurement plan is a key aspect that would help the DoE to plan purchases timeously. The findings revealed that delays are mainly caused by departmental officials, either due to negligence or because the public schools' principals had not formulated a proper procurement plan. The public education system should make sure that procurement plans are implemented before the actual procurement processes and procedures take place. Once again, the DoE could host workshops in order to train departmental officials on how to draw up appropriate procurement plans.

5.7.1.2 Schools under Section 20

The participants proposed various strategies that could by implemented to address the challenges identified by schools under Section 20 as follows:

> *The DoE should approve all public schools to be under Section 21 with function C in order for them to be able to receive the allocation of funds into their schools' bank accounts"* (Participant G).

> *"I think if the DoE can allow schools to be directly involved in the procurement processes, that will help a lot because schools will be getting value for money"* (Participant K).

However, the findings revealed that schools under Section 20 implemented the following two strategies and methods for dealing with the identified supply chain challenges, namely, fundraising and looking for sponsors.

- **Fundraising**

Four participants revealed that they perform various activities and functions in the form of raising funds within the school. These funds help them to cover some of their needs since the DoE fails to provide the schools with the required allocated funds. An example of fundraising could be to arrange for a beauty contest in the school.

- **Looking for sponsorships**

It was noted by participants that looking for sponsors helps many public schools to survive in terms of curriculum delivery and financial challenges. Since the DoE has authority over public schools, they could look for sponsors to help the public schools' principals to manage the school more efficiently and effective. The findings revealed that the school principal is in charge of working with sponsors and the SGB. As noted by Participant A, if the sponsors approve the school's application, they make sure that they deliver.

> "*I can also say to reduce these challenges we should be get sponsors from different companies. As we speak, I am looking for computers from a sponsor. Sponsors always keep their promises*" (Participant A)

5.7.1.3 Schools under Section 21 with Function C

Participants suggested that the DoE should arrange finance workshops or training courses to train all public schools principals who run schools under Section 21 with function C.

> *"We as schools also would like to buy something that is value for money, things that are durable, things that are quality and things that we can be able to use for the long period of time"* (Participant I).

> *"The communication between the Department of Education, stakeholders and public school could help a lot especially in supply chain management as a whole"* (Participant N).

The participants from schools under Section 21 with function C suggested strategies and methods that can be used to overcome the identified challenges. Eight of the

participants identified two strategies or methods, namely, improving the quality of education and continuous improvement.

- **Improving the quality of education**

Eight participants suggested that improving the quality of education could be a strategy to assist in overcoming the identified supply chain challenges faced by public schools. The public education system does not provide learners with the necessary knowledge and skills or fulfil their performance expectations. This can be transformed by the DoE through implementing new ways of teaching and learning so that education institutions can deliver more personalised learning. This could be done by implementing policies that can guides the DoE in procurement processes in order to reduce supply chain challenges.

Participant A suggested that in order to improve the quality of education, schools should acknowledge and address the issue of overcrowding. The DoE should make school funding a priority and raise standards for teachers. In addition, the schools could put the running of classrooms and curriculum-building decisions in the hands of the teachers and the supporting staff within the school.

- **Continuous improvement**

Three of the participants suggested that continuous improvement be implemented by the DoE so as to ensure that the identified supply chain challenges are addressed. Furthermore, the DoE needs to make sure that quality of teaching and learning in the public education system is improved. Continuous improvement is a systematic approach to identifying chances for improvement that can assist a company in achieving its objectives and overcoming challenges (Kollenburg & Wonters, 2019: 2).

5.7.1.4 Allocation of funds

The public schools depend on government for funding.

> "*It is suggested that the government should increase the allocation of funds in the public education system, since the public schools' needs are higher than what we get"* (Participant B).
>
> *"For public schools to improve the education of learners there should be enough resources and other facilities available for the schools to produce better outcomes"* (Participant O).

Thus, it was suggested that the South African government should invest more in the public education system in order to ensure that learners receive the appropriate level of education.

Twelve of the participants suggested methods or strategies on how the identified supply chain challenges in the allocation of funds can be overcome. The proposed methods and strategies include cash flow management, good governance and accountability and a reduction in administration. These methods and strategies are dealt with below.

- **Cash flow management**

Four of the participants noted that tight and appropriate control of cash flow is essential. This is the process of tracking how much cash flow is coming in and out of the public schools through a set of practices and strategies to help track, analyse and improve the financial issue at an institution. It is suggested that schools manage their cash flow within the school carefully. As such, public schools should work together with the SGB.

- **Good governance and accountability**

Twelve participants stressed the importance of transparency and accountability when it comes to allocation of funds within schools. The school principal together with SGB should be transparent when it comes to the funds spent and other activities that have taken place within the school. All stakeholders should be accountable in terms of activities such as procuring of goods and services and other facilities that are required. This would help to avoid the wasteful expenditure in public schools.

- **Reducing the administration burden on the department**

Ten participants identified the reduction of the administration burden for the department as a good strategy or method to overcome the identified supply chain challenges when allocating funds. It is suggested that the DoE should allow all public schools to fall under Section 21 with function C so that their allocation of funds would go straight into the school bank account. This would mean that they would follow the procurement policies when procuring any goods and services. They would work together with their SGB. This could reduce the departmental administration work and would allow the DoE to put more focus on important aspects such as procuring goods and service for public schools.

5.7.2 Strategies that could be used to overcome challenges in service delivery

Based on the data collected, it can be concluded that logistics and service delivery is possibly the most important aspect in SCM as a whole. For the public education system to provide learners with the appropriate level of education, the timely provision of service delivery is crucial.

5.7.2.1 Transportation challenges

> *"The best thing that the Department of Education could do is that they must have enough transport that they use to make deliveries"* Participant A.
>
> *"The department could also outsource the transportation services to other companies for them to be efficient and effective in their deliveries"* (Participant P).

Participants noted that service providers should have enough transportation vehicles or else they should outsource the transportation services to companies with sufficient vehicles that are able to access different locations.

Some of the strategies the participants suggested for addressing the transportation challenges include reducing lead times and costs and improving quality and on-time delivery.

- **Reducing lead times and costs**

Ten participants opined that reducing lead times and costs would be a good way to address identified transportation challenges. For example, by reducing lead times, it is envisaged that the transportation schedule would be more effective and efficient. Participant K was of the opinion that, if the DoE reduces lead time, they would become effective in terms of transportation and there would be no delays.

- **Improving quality and on-time delivery**

Ten participants noted that by improving quality of education and on-time delivery the DoE would ensure that public school deliveries would be on time. This would result in learners having the appropriate learning material available at their disposal at the right time.

5.7.2.2 Dishonesty of service providers

> "*The Department of Education together with all public schools should have policies in place that protect them from the dishonest of service providers, as some service providers are not trustworthy"* (Participant M).

"The schools department should implement policies that would work against dishonest service providers. This could stop this thing of the inconvenience caused by service providers. If service providers fail to work with these policies, it should ruin their reputation" (Participant N).

Four participants provided strategies that could be used to address the challenge of dishonest suppliers. These include effective supplier participation, and maintaining and promoting a high standard of professional ethics.

- **Effective supplier participation**

It was suggested that the service provider could be directly involved in the supplier relationship management. Supplier relationship management is a key strategy for engaging with suppliers at a level that reflects the customer's priorities. Effective supplier participation would improve communication during the procurement processes (Ilkka, Khuram & Elina, 2015: 10).

- **Maintaining and promoting a high standard of professional ethics**

The moral principles that guide a person's behaviour are known as ethics. Social norms, cultural behaviours, and religious influences all influence these moralities (Chowdhury, 2016: 1). Four participants remarked that high standards should be followed in order to ensure ethical consideration within the public schools. All decisions that public schools make have an ethical or moral dimension and have an effect on others. Maintaining and promoting a high standard of professional ethics should guide all the stakeholders in public education system. The findings revealed that the DoE has a policy in place with regard to the procurement of textbooks. This policy states that all textbooks must be delivered to the schools by April of the current academic year.

5.7.2.3 Wrong items or stock delivered

The following strategies to address the challenge of wrong items or stock delivered were suggested by the participants:

"The service providers should eliminate this thing of poor service delivery, since it becomes a challenge to public schools. The Department of Education should avoid wrong deliveries of items or stock that has been ordered. Therefore, there should be a policy that deals with service providers when they deliver wrong items or stock that have been ordered" (Participant T).

"For all schools under Section 20, the Department of Education should be responsible for this since they perform all procurement processes on behalf of the public schools. The quality of items that have been ordered ensures that the reputation of the service provider is being maintained. Therefore, all service providers should ensure the quality of goods or services is being delivered" (Participant R).

Service providers need to make sure that stock or items are correctly delivered. The strategies that were suggested by the participants to address this shortcoming include efficiently monitoring deliveries.

- **Efficient monitoring of deliveries**

Tracking and monitoring deliveries efficiently on the ground would enable the DoE to verify that the correct stock and items are delivered timeously. The participants suggested that this strategy would address the identified SCM challenges of incorrect stock/items being delivered. After a careful consideration of service providers and their deliveries, efficient monitoring is needed.

5.7.2.4 Setting time frames

The findings revealed that the time frame is significant when it comes to procurement processes as a whole.

"The Department of Education must have further consideration when it comes to time management for procurement processes. There should be no long lead times when the public schools place some orders to the Department of Education for those under Section 20" (Participant K).

"The principal should make sure that they come up with better plans to run their schools. Since they have to ensure the appropriate level of education from the school" (Participant A).

It was suggested that the DoE set time frames when concluding procurement processes and procedures. The participants identified the strategies that the public education system could put in place that would address timely delivery. These include effective time management and the drawing up of a schedule.

- **Effective time management**

The DoE could implement effective time management so as to avoid delays in terms of procurement processes and transportation challenges. Effective time management means that the right time is allocated to the appropriate activities in order of importance, and thus more could be achieved (Cyril, 2015: 38). Thirteen participants suggested that time management is an aspect that could assist in addressing supply chain challenges faced by public education system with regard to procurement processes and transportation challenges. Three participants noted that effective time management can be achieved through a method of planning and exercising conscious control over the amount of time spent on specific activities, with the goal of increasing effectiveness.

- **Drawing up a schedule**

Thirteen of the participants stressed the importance of drawing up a schedule when it comes to deliveries. This is an important aspect that could help to manage things that need completed in a certain period of time. Drawing up a schedule helps to set a timetable that will assist the DoE to be more effective.

5.7.3 Strategies that could be used to overcome challenges in demand management

The public education system tries to fulfil the promises of the public schools. The demands of the school are the significant aspect in public education system as a whole. The demands of the public schools need to fulfil the quality of teaching and learning.

5.7.3.1 Long processes and procedures

> *"The long processes and procedures hinder the flow of teaching and learning"* (Participant B).

> *"This challenge can be overcome by the Department of Education by advising all the department officials to put their effort into the procurement processes to avoid delays, long processes and procedures. This challenge can be caused by the negligence of the departmental officials, and at the end it affects the flow of teaching and learning"* (Participant R).

"The public schools should also try to be fast when placing orders to avoid long procedures. The Department of Education should also avoid making empty promises to public schools knowing very well that they would not keep those promises" (Participant S).

Long processes and procedures can hinder the flow of teaching and learning as the public schools have to wait for a long period of time for textbooks to be delivered. The participants suggested strategies and methods that can be used to overcome the identified supply chain challenges as presented below.

- **Demand planning and forecasting**

Demand planning is a SCM process that involves forecasting or estimating product or service demand in order to ensure that they can be provided and satisfy customers which in this case are public schools (Basson, Kilbourn & Walters, 2019: 3). Sixteen participants suggested that demand planning and forecasting could be used as a strategy to assist the public education system in addressing long processes and procurement procedures. Planning and forecasting the demand of the procurement of the public schools would help to reduce long lead time and delay.

- **Strong contract management**

Ten participants proposed strong contract management, which is an important aspect with regard to the DoE and public schools. The department should have good communication skills, which is closely tied to collaboration. Communication is a key aspect in giving stakeholders information about a purchase or contract. Improving communication could assist in overcoming long processes and procedures. Furthermore, it was suggested that the principals of public schools under Section 21 with function C should negotiate with their service providers.

- **Efficiently monitoring procurement patterns, contracts and prices**

It was suggested by five participants that the DoE should employ an official who would effectively monitor all procurement patterns, contracts and prices within the department. The participants suggested that this strategy could assist in reducing the long procurement processes and procedures.

5.7.3.2 Meeting higher expectations

The public schools have expectations in terms of LTSM required from the DoE. Therefore, public schools expect more from the department and hence the public education system is failing.

> *"It would be better if the Department of Education can listen to all public schools regarding their demands. The public schools have higher expectations from the Department of Education, even though the department can't keep them all"* (Participant N).

> *"The Department of Education should listen to the public schools, what they think is right for them to ensure the quality of teaching and learning, rather than doing what they think is right for public education system"* (Participant G).

> *"We are looking at the whole school and all resources that make a school function effectively. The managing plan of the LTSM should go hand in hand with the budget"* (Participant N).

> *"We have a year planner that we developed with the educators and the SMT so we show them in order to receive inputs and we also highlight these at the SGB meetings"* (Participant N).

Ten participants suggested the following strategies and methods to address the shortcomings: the department should listen to public schools; and the department must ensure that public schools' expectations are met.

5.8 CONCLUSION

This chapter has presented the data analysis. The chapter began by reiterating the study objectives, before listing those that had already been discussed prior to the data analysis and then indicating which ones the chapter planned to address. The participant profile, the thematic analysis technique, and the thematic map were all presented in this chapter. Following that was the data analysis section, which considered the responses obtained from the participants during the interviews. Procurement issues, service delivery or logistical challenges, and demand management challenges were recognized as three major themes. To organise the empirical data in a meaningful order, several categories and codes were devised for

each theme. Lastly, the chapter dealt with the methods and strategies that stakeholders suggest that could be used to address the identified SCM challenges.

The next chapter, Chapter 6, is the concluding chapter of this dissertation. It summarises the main findings. Each objective is examined separately and the relevant literature and empirical findings are revisited in order to draw conclusions and provide recommendations.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

The dissertation began with the research issue statement, research questions, and research objectives in the first chapter. The literature review was presented in Chapters 2 and 3, and the research methodology and methodologies were presented in Chapter 4. The research findings were analysed and reported in Chapter 5.

In this concluding chapter, the summary, conclusion and recommendations are presented. The chapter reflects on the research objectives and discussion of the findings, concluding with a summary, conclusion, limitations and suggestions for future research. It serves as the dissertation's broad summary.

The chapter begins with a discussion of the research questions and objectives.

6.2 REFLECTING ON THE RESEARCH QUESTIONS AND OBJECTIVES

In Chapter 1, the research questions and objectives were presented as follows:

The main research question was:

"What are the supply chain challenges that undermine the quality of education in KwaZulu-Natal and how can the identified challenges be managed?"

6.2.1 Research questions

From the main research question, the secondary research questions were derived:

- What are the supply chain challenges experienced by stakeholders in the public education system in KZN that undermine the quality of education?
- What methods or strategies could these stakeholders use to manage the identified SCM challenges?
- What recommendations can be suggested to stakeholders in the public education system to better manage or overcome the identified supply chain challenges?

6.2.2 Research objectives

The primary objective of this study was to determine the supply chain challenges that undermine the quality of education in KZN and how these identified challenges can be managed. To address this objective, the following secondary objectives were deemed appropriate:

- To determine the supply chain challenges experienced by stakeholders in the public education system in KZN that undermine the quality of education.
- To examine the methods or strategies that stakeholders could use to manage the identified SCM challenges.
- To recommend how stakeholders in the public education system can better manage or overcome the identified supply chain challenges.

Table 6.1 provides a summary of the research objectives and how each of these objectives has been achieved.

Table 6.1: Research objectives and sections dealing with the objectives

Research Objectives	**Secondary Data**	**Empirical Data**
To determine the supply chain challenges stakeholders in the public education system in KwaZulu-Natal face that undermine the quality of education.	Chapter 2: Section 2.11 Chapter 3: Section 3.7	Chapter 5: Sections 5.6.1, 5.6.2 and 5.6.3
To examine the methods or strategies that the stakeholders could use to manage the identified supply chain management challenges.	Chapter 3: Section 3.8	Chapter 5: Section 5.7.3
To recommend how stakeholders in the public education system can better manage or overcome their identified supply chain management challenges.	Chapter 3: Section 3.8	Chapter 5: Section 5.7.2

6.2.3 Linking existing literature with the primary data

The literature was studied in order to lay the groundwork for the study's empirical research, which aimed to identify and examine the SCM challenges faced by public schools in the South African education sector.

The data collected through the interviews with participants from public education consisted of voice recordings that were transcribed word-for-word. The findings from the data are dealt with in Chapter 5 of this study. The literature collected in Chapters 2 and 3 is linked to the primary data in Table 6.2. The data is reflected in the first three columns, and in the last column the findings are linked to what was reported in the literature review.

Table 6.2: Linking the literature review and the data collected

THEME	SUB-THEMES/ CATEGORIES	CODE	ELEMENTS OF LITERATURE REVIEW
THEME 1: Procurement Challenges (Section 5.6.1)	5.6.1.1: Delays in the procurement processes	Untrained employees	2.11.3: Lack of close supervision of implementing agents and lack of clear responsibility line between use and custodian.
	5.6.1.2: Schools under Section 20	Placing orders, price/ overcharging	3.7.5: Lack of knowledge and information sharing between departmental officials
	5.6.1.3: Schools under Section 21 with function C	Quotation and internal supply chain management	3.7.2: Lack of proper knowledge, skills and capacity
	5.6.1.4: Allocation	Late release of	2.111: Incorrect and

	of funds	funding, shortage of funding	inappropriate norms and standard allocations
THEME 2: Service Delivery Challenges (Section 5.6.2)	5.6.2.1: Transportation Challenges	Rural areas and location	2.11.8: Lack of resources relating transports, tools and materials 3.7.9: Transportation challenges
	5.6.2.2: Dishonesty of service providers	Shortage of stock	3.7.3: Accountability, fraud, corruption and unethical behaviour 3.7.16: Insufficient resources
	5.6.2.3: Wrong items or stock delivered	Quality of items or goods delivered	3.7.6: Insufficient Information
	5.6.2.4: Time frame	Deliveries made after office hours	3.7.9: Transportation Challenges 3.7.15 Long lead time
THEME 3: Demand Management Challenges (Section 5.6.3)	5.6.3.1: Long processes and procedures	Empty promises	3.7.1: Inadequate planning and linking demand to the budget
	5.6.3.2: Higher expectations	Failure of the stakeholders	3.7.8: Lack of top management commitment

6.3 DISCUSSION OF THE RESEARCH FINDINGS

This section provides an overview of how each research objective was addressed, as well as demonstrating how each objective contributed to solving the study's core research challenge.

6.3.1 Objective 1: To determine the supply chain challenges faced by stakeholders in the public education system in KwaZulu-Natal that undermine the quality of education

The study's initial goal was to identify the SCM challenges faced by stakeholders in the public education system in KZN that undermine the quality of education and thus negatively impact on learners' education. This goal was met by the empirical study undertaken with the DoE. The study involved semi-structured interviews conducted with the help of an interview guide. The conceptual framework derived from the literature review findings and the study objectives were used to create the interview guide. The findings of this study show that the SCM challenges that public schools faced can be divided into three categories based on the use of the conceptual framework (see Section 1.8, Figure 1.1). The themes are procurement challenges, service delivery challenges, and demand management challenges.

6.3.1.1 Procurement challenges

The findings of this study reveal that procurement challenges include the following:

- **Delays in procurement processes –**Delays in procurement processes result in DoE operations as the whole being rendered ineffective. Therefore, having a procurement plan and schedule would assist in the efficiency and effectiveness of the DoE. Procurement delays could stem from failure to start the procurement processes in time, causing delays in the public education system as the whole. The procurement delays can be in the form of late delivery of learning material and of late release of allocation.
- **Incompetency of staff** – It was found that employees are not getting the appropriate training with regard to new strategies, policies and procedures in the SCM department.

- **Poor communication between public schools and DoE** – Schools under Section 20 have to send their purchasing requisitions to the DoE, which is a lengthy process causing delays in the procurement processes.
- **Allocation of funds is insufficient for public schools** – Public schools are unable to perform all their procurement activities because the demand exceeds the supply. In order for public schools to perform such procurement processes and activities, the DoE should provide sufficient funds. Furthermore, the allocation of funds should be made in time for public schools to procure goods or services.

6.3.1.2 Service delivery challenges

According to the study findings, the following are some of the service delivery challenges:

- The public education system subcontracts or outsources transportation to other companies, which delays service delivery. This was identified by Participant R.
- There are long lead times in the DoE that affect the delivery of teaching and learning materials to public schools.
- Transportation is a challenge. It was found that in some cases service providers have to hire transport to deliver goods and services to rural areas.
- Service providers are sometimes dishonest. Participant O indicated that service providers make promises but often fail to keep them. In some instance, service providers do not deliver the full quantity of materials that the public schools require.
- The wrong items or stock are delivered.
- Time frames are not adhered to in terms of deliveries.
- Delivery may take place after hours.

6.3.1.3 Demand management challenges

The following are the demand management challenges based on the study findings:

- Long processes and procedures are a challenge hindering the public schools from receiving the required goods and services on time and thus also the flow of teaching and learning.

- Empty promises were revealed as a challenge. The DoE makes empty promises to the public schools which are not then met.
- It was found that public schools have higher expectations with regards to the DoE. In most cases the DoE fails the public schools since demands are not met.

6.3.2 Objective 2: To examine the methods or strategies that stakeholders could use to manage the identified supply chain management challenges

The second objective of this study was to find out from the participants what strategies stakeholders could use to overcome the identified SCM challenges in public schools in the Umzinyathi district.

The participants identified some strategies that the DoE and stakeholders could use to overcome these challenges. The following are the strategies or methods:

- ***Emphasising the importance of procurement plans*** – A procurement plan is a key aspect that would help the DoE to plan any purchases timeously. A good procurement plan will eliminate delays in the procurement processes. This was regarded as a key aspect that would help the DoE to plan any purchases timeously. The challenge for schools will be for DoE to adhere to it.
- ***Supplier management*** – Implementing supplier management would allow the purchasing department to monitor supplier performance.
- ***Fundraising*** – The findings revealed that some of the participants perform various activities and functions in their schools to raise funds in order to purchase LTSM. This is as a result of the DoE failing to provide the schools with the required allocated funds.
- ***Looking for sponsors*** –Some of the participants suggested that public schools look for sponsors to help them with funding and schools facilities. This strategy was identified as an initiative that helps many public schools to survive in terms of curriculum delivery and financial challenges. It was found that one of the school principals and the SGB work with sponsors.
- ***Continuous improvement*** – The findings revealed that the DoE could implement continuous improvement to ensure that the identified supply chain challenges are addressed. Continuous improvement is a systematic approach to

identifying opportunities for improvement that can assist a company in achieving its objectives and overcoming challenges. This can be achieved by encouraging all employees to take part in eradicating supply chain challenges that public schools face.

- ***Cash flow management*** – Cash flow management is a process of tracking how much cash is coming in and out of public schools. It was suggested that schools should manage their cash flow within the school carefully.
- ***Good governance and accountability*** – The participants stressed the importance of transparency and accountability with regard to the allocation of funds within schools. The school principals together with the SGBs should be transparent with regard to the funds spent and the other activities that take place within the school. All stakeholders should be accountable in terms of activities such as procuring of the goods and services and other facilities that are required.
- ***Reduce the administration burden for the DoE*** – The participants identified reducing the administration burden for the DoE would be a good strategy or method to overcome the identified supply chain challenges when allocating funds. The public schools could work together with their SGB and this would reduce the departmental administration work and would allow the DoE to focus on more important aspects rather than procuring goods and services for public schools.
- ***Reducing lead times and costs*** – Participants opined that reducing lead times and costs would be a good way to address identifies transportation challenges. The findings revealed that that, if the DoE reduces lead time, it would become effective in terms of transportation and there would be fewer or even no delays. This can be done by working within time frame with the service providers.
- ***Improving quality and on-time delivery*** – Participants were of the opinion that by improving quality of education and on-time delivery all public school's deliveries would likely be on time and late deliveries would be avoided. This would make sure that learners have the appropriate learning material available at their disposal at the right time.

- ***Efficient monitoring of deliveries*** – Monitoring deliveries efficiently would enable the DoE to verify if the stock or items ordered are correct. The findings revealed that this strategy would address the identified SCM challenge of incorrect stock/items being delivered.
- ***Effective supplier participation*** – It was suggested that the service provider should be directly involved in supplier relationship management. Supplier relationship management is a vital approach for engaging with suppliers at a level that reflects the customer's goals.
- ***Maintaining and promoting a high standard of professional ethics –*** Participants noted that ethical standards should be followed with regard to the public schools. The findings revealed that the DoE has in place an ethical policy for the procurement of textbooks, since it states that there must be a certain percentage from the allocation of funds allocated for textbooks. The policy also states that all textbooks must be delivered within the school by April of the current academic year.
- ***Effective time management*** – The DoE could implement effective time management to avoid delays in terms of procurement processes and transportation challenges. Effective time management means that the right time is allocated for appropriate activities in the order of their importance. If this is put in place, more could be achieved.
- ***Drawing up a schedule –*** The participants stressed the importance of drawing up a schedule for the deliveries. This is an important aspect that could help to manage deliveries that have to be made within a certain period of time. Drawing up a schedule would help to set a timetable that will assist the DoE to be more effective.
- ***Demand planning and forecasting*** – The participants suggested that demand planning and forecasting could be used as a strategy to assist the public education system in addressing long processes and procurement procedures. Planning and forecasting the demand of the procurement of the public schools would help to reduce long lead times and delays.
- ***Contract management*** – The participants proposed strong contract management, which is an important aspect in the DoE and public schools. The department should have good communication skills which closely ties in with

collaboration. Communication is a key aspect for stakeholders in order to understand a purchase or contract. This could assist in overcoming long processes and procedures.

- ***Efficiently monitor procurement patterns, contracts and prices*** – It was suggested by five participants that the DoE should employ a dedicated monitoring team who would effectively monitor all procurement patterns, contracts and prices within the DoE, to make sure that deadlines are met.

6.3.3 Objective 3: To recommend how stakeholders in the public education system can better manage or overcome the identified supply chain challenges

The study's third main objective was to provide findings and recommendations with regard to how stakeholders in the public education system can better manage or overcome the identified SCM challenges. The public education system tries to fulfil the promises of the public schools. The demands of the schools are the significant aspects of the public education system as a whole.

Recommendations:

- The researcher recommends that the public education system should confirm that the procurement rules and procedures in place be adhered to since the implementation and interpretation of these policies is lacking leading to many challenges (Mbuqe, 2020: 136).
- The DoE should increase the allocation of funds. Public schools should get sufficient funding from the DoE so that the school principals could manage their schools efficiently and effectively. It is suggested that should the public schools' procurement be managed effectively and efficiently there would be a better outcome in public education system.
- All public schools should be approved as under Section 21 with function C so that the principals, together with the SGBs, would be in charge and accountable for the allocation of funds. The public school should be involved in the quotations for goods and services.
- Public schools should follow their own internal supply chain processes in order to select the most suitable service providers.

- Communication between the DoE and public schools needs to be improved.
- The public education system should release the allocation of funds on time in order to avoid delays in procurement processes.
- Each district should have dedicated monitoring official with whom principals can liaise in case of any challenges.
- The DoE should allow the public schools to be directly involved in processes of procurement – this could result in the schools getting value for money. Furthermore, the DoE should provide sufficient funding so that the quality of teaching and learning at the school level could be maintained.

Table 6.3 presents the challenges and recommendations for SCM, including a brief indication of the probable outcomes when the prescribed remedies are implemented.

Table 6.3: Summary of Findings and Recommendations

Literature findings	**Findings**	**Recommendations**
The literature discusses potential supply chain challenges faced by public education system. These are briefly recapped below: (Section 3.7) • Inadequate planning and linking of demand to the budget • Lack of proper knowledge, skills and capacity • Accountability, fraud and corruption • Unethical behaviour • Lack of knowledge and information sharing between departmental officials	The following are the main supply chain management challenges identified from the empirical research: (Section 5.6) • Delays in procurement processes • Untrained employees • Schools under Section 20 • Prices and overcharging • Late release of funding • Shortage of	• The researcher recommends that the public education system ensure that procurement policies and procedures in place are adhered to. • The DoE should increase the allocation of funds. Public schools should get enough funding from the DoE in order to manage the schools efficiently and effectively. • Public schools' procurement should be managed effectively and efficiently so there would be a better outcome in

• Insufficient information • Lack of information technology • Lack of top management commitment • Transportation challenges • Poor quality of human resources • Lack of organisational encouragement • Lack of organisation support • Demand uncertainty • Irregular supply pattern • Long lead time • Insufficient resources	funding • Transportation challenges • Rural areas in terms of location • Dishonesty of service providers • Stock being short • Wrong items or stock delivered • Deliveries made after office hours • Long processes and procedures • Empty promises • Failure of the stakeholders to assist in addressing the supply chain challenges	public education system. • All public schools should be approved as Section 21 with function C schools so that the public schools will be accountable for their allocation of funds. • The public schools must be involved in quotations of the institution. • Public schools should have their own internal supply chain processes. • There is a need for improved communication between DoE and public school. • The public education system should release the allocation of funds on time to avoid delays in procurement processes. • Each district should have a dedicated monitoring official with whom principals can liaise in case of any challenges. • The DoE should provide sufficient funding so that schools could maintain the quality of teaching and

		learning at the school level.

6.4 CONTRIBUTION OF THE RESEARCH STUDY

This research contributes by identifying and examining the SCM challenges faced by public schools in the Umzinyathi district. No evidence of similar studies conducted in the Umzinyathi district, KZN, was found. The study findings highlighted the areas that result in inefficiencies in the education system. If these areas are addressed, it could improve the education system in the study district.

The research study contributes to the public education system and public schools in KZN with regard to how they could address the identified supply chain challenges faced by the schools. The study also contributes to the field of SCM, particularly supply chain challenges, in the public education system in KZN.

6.5 LIMITATIONS OF THE STUDY

The study achieves its aim of providing insights into the SCM challenges faced by public schools. However, the study is not without its limitations. These are listed below:

- The researcher interviewed only twenty representatives from one rural district. Therefore, the conclusions of this study cannot be applied to all South African public schools.
- The study focused on the SCM challenges faced by public schools. The school principals and stakeholders in the area and two departmental officials were interviewed about SCM challenges faced by public education system. The stakeholders included teachers or deputy principals who are involved in the provision of quality education. Therefore, the supply chain challenges identified in this study are not exhaustive.
- The service providers, who are important stakeholders in the supply chain processes, were not included in the study. For example, the service providers may be one of the stakeholders who partly responsible for these supply chain

challenges that public schools face. Thus, the researcher did not report on their experiences when dealing with the DoE.

Suggestions for future research are presented in the next section.

6.6 SUGGESTIONS FOR FUTURE RESEARCH

Future research areas were identified during this study as follows:

- A study could be undertaken to identify and examine the SCM challenges faced by the public education system in South Africa.
- It is recommended that more research be conducted to include all stakeholders in the public education system and to identify the supply chain challenges that all stakeholders face.
- It is suggested that studies could be carried out to examine how the SCM challenges in the public education system are managed and monitored in the KZNDoE.

6.7 SUMMARY AND CONCLUSION

This research is both descriptive and exploratory in nature. According to the literature review, the DoE has a variety of SCM challenges. This was evidenced from the interviews with circuit managers, departmental officials, and the school principals and other stakeholders during the empirical study. The first chapter of the dissertation explained and introduced the topic, the study background, the research objectives and major concepts, as well as providing a brief overview of the research techniques employed.

Chapter 2 then presented the literature with regard to SCM as well as defining the DoE and the public education system as a whole. Following that, Chapter 3 examined the literature on SCM and the challenges in the public education system that have already been suggested. The research approach and methodologies were then described in detail in Chapter 4, and the collected data was analysed and discussed in Chapter 5.

The purpose of this final chapter is to present a summary of the research findings and to validate the achievement of the study research objectives. The major research

questions of the study focused on identifying the SCM challenges that public schools face. This chapter has provided answers to those questions. The information gathered in Chapters 2 and 3 was combined with the main data in order to ensure that the research questions were answered and the study objectives satisfied. To conclude the study, recommendations were presented on how the supply chain challenges faced by public schools could be overcome.

In conclusion, the research study focused on the research question: *"What are the supply chain challenges that undermine the quality of education in KZN and how can the identified challenges be managed?"* The study identified the SCM challenges faced by public schools. The findings of the study revealed that the supply chain challenges encountered by public schools have a negative impact on the quality of teaching and learning at the school level. The findings also identified possible strategies and methods that can be used to overcome the identified supply chain challenges and benefit the public education system as a whole.

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APPENDIX A: ETHICAL CLEARANCE APPROVAL NOTIFICATION

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

01 December 2020

Mr Nkanyiso Langa (213503352)
School Of Man Info Tech & Gov
Pietermaritzburg Campus

Dear Mr Langa,

Protocol reference number: HSSREC/00002134/2020
Project title: Supply chain management challenges faced by public schools: An Umzinyathi district, KwaZulu-Natal case study
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 27 October 2020 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL** on the following condition:

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 01 December 2021.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,

[redacted]

Professor Dipane Hlalele (Chair)

/dd

APPENDIX B: GATEKEEPER'S LETTER FROM THE DEPARTMENT OF EDUCATION

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Mr. B.S. Ntombela **Date: 25/03/2020**

REF: Gate Keeper 25/03/2020
Date 25 March 2020

RE: REQUEST FOR APPROVAL OF CONDUCTING A RESEARCH WITHIN DEPARTMENT OF EDUCATION IN UMZINYATHI DISTRICT

Dear Mr. Nkanyiso Langa – 213503352

This letter seeks to confirm that the above mentioned student registered in the Discipline of Supply Chain Management and Marketing within School of Management, IT and Governance at the University of KwaZulu-Natal has been given permission from my office to conduct research study entitled: **"Supply chain management challenges faced by public schools: An Umzinyathi District, KwaZulu-Natal case study".**

I am aware that the study will take place during office hours within the department of education offices and it also include the interviews for which he will be using to collect data.

As per your request, I (Mr. B.S. Ntombela – Chief Education Specialist (CES)) grant you permission to conduct your study within Department of Education under Umzinyathi district in Msinga Circuit Management Centre (CMC).

Sincerely

[redacted]

Mr. B.S. Ntombela
Msinga CMC – Chief Education Specialist (CES)

KZN DEPARTMENT OF BASIC EDUCATION
UMSINGA CMC
PRIVATE BAG X503 TUGELA FERRY 3010
2020 -03- 25
UMZINYATHI DISTRICT OFFICE
KZN DEPARTMENT OF BASIC EDUCATION

..Championing Quality Education - Creating and Securing a Brighter Future

KWAZULU-NATAL DEPARTMENT OF EDUCATION
Postal Address: Private Bag X503 • TUGELA FERRY • 3010 • Republic of South Africa
Physical Address: D1272 MSINGA HIGH ROAD • TUGELA FERRY • 3010
Tel.: +27 33 493 0055 • Fax: +27 033 493 0122• Email: msingacmc@gmail.com •Web: www.kzneducation.gov.za
Facebook: KZNDOE ...Twitter: @DBE_KZN ...Instagram: kzn_education ...Youtube:kzndoe

APPENDIX C: INFORMED CONSENT

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL
For research with human participants

Information Sheet and Consent to Participants in Research

Date: 16 November 2020

Good day.

My name is Nkanyiso Langa I am a Masters student from the University of Kwa-Zulu Natal in Pietermaritzburg. My contact details are: phone: 072 939 9889 email: 213503352@stu.ukzn.ac.za

You are being invited to consider participating in a study that involves researching the supply chain challenges faced by public schools in the Umzinyathi District. The study will contribute to the field of supply chain management, particularly supply chain challenges, focusing on the public education system in the Umzinyathi district. It is foreseen that the findings and recommendations of the study could benefit the South African public education system as it may gain insight into the supply chain challenges facing the public education system in KwaZulu-Natal and how these challenges could be addressed.

The study is expected to include the public schools within Umzinyathi district. It involves the following procedures:
A signed gatekeepers letter was obtained from Chief Education Specialist (CES) from the Department of Education confirming their permission to conduct the study, an application for ethical clearance was made, and after the approval of the ethical clearance, the participants were contacted to set an appointment via Zoom for data collection. The interviews will last approximately 30 minutes.

The study is not funded. It does not involve any risks and/or discomforts. We hope that the study will assist the participants to understand the factors that influence demand forecasting and planning in the South African apparel industry.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number HSSREC/00002134/2020).

In the event of any problems or concerns/questions you may contact the researcher at 0782211230 or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus,
Goven Mbeki Building

Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All the data collected will be stored in a safe and secure location and made accessible only to the researcher and the supervisor. On completion of the research study all interview transcripts will be handed to my supervisor for safe keeping. My supervisor will keep this data for a period of five years after which time the data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

ACADEMIC RESEARCH INFORMATION AND CONSENT FORM

I, Nkanyiso Langa have been informed about the study entitled "Supply chain management challenges faced by public schools: An Umzinyathi District, Kwazulu-Natal case study I" by Nkanyiso Langa.

- I understand the purpose and procedures of the study. I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.
- I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.
- If I have any further questions/concerns or queries related to the study, I understand that I may contact the researcher at:
    - **Cellphone Number:** 072 939 9889
    - **E-mail:** 213503352@stu.ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

I hereby provide consent to:

Audio-record my interview YES / NO√

_____ _____

Signature of Participant **Date**

_____ _____

Signature of Witness **Date**

APPENDIX D: INTERVIEW GUIDE

INTERVIEW GUIDE

Date : _____

Company/ Organisation : _____

Person Interviewed (Optional): _____

Capacity :_____

Research Topic: Supply chain management challenges faced by public schools: An Umzinyathi district, Kwazulu-Natal case study

INTRODUCTION

Good morning, thank you so much for taking time out of your busy life to participate in this study. I am pleased that you willing to share your experience, knowledge and activities with me. We are here to discuss what you perceive to be the supply chain management challenges faced by public school in the Umzinyathi district.

This interview should take no more 25 minutes. I refer you to the informed consent which I emailed to prior to conducting this interview and for providing consent to conduct this face to face interview.

May I record our discussion to facilitate recollection? (If yes, start the face to face recording). Despite our discussion being voice recorded, I would like to assure that the discussion will be anonymous and kept confidential. All recordings will be safe until it is transcribed word by word. No personal details of any participants will be mentioned in any on the transcriptions. In other words, there will be no information that allows individual subjects to be linked to specific statement.

The researcher needs to explain the definition of supply chain management, procurement, stakeholders and challenges to each participant.

Supply chain management – is defined as the managing of processes involved in procuring of raw materials and the conversion of these resources into a finished product and the delivering of these finished products to the final consumer or final user.

Supply chain management differs from government, sector-to-sector and industry, sector-to-sector. A government sector to sector focus area could be in the education

sector more on the logistics and the effective movement of goods and services in and out of the department of education. The focus could also be on streamlining the chain through ensuring that teaching materials and other facilities are delivered to learners.

Procurement – is the process that involves procuring of goods and services for a business or an organisation to meets its requirements. This is a process of acquiring the goods and services for an organisation.

Stakeholders – can be defined as a person who has an interest or concern in the organisation at hand. In the context of this study stakeholder comprise of school governing boards, school management teams, teachers, learners, parents and the departmental officials.

Challenges – can be described as something that hinders improvement or the accomplishments of something.

QUESTIONS:

Question 1: Could you please list the supply chain challenges that undermine the quality of education, stakeholders in KwaZulu-Natal face?

Explanation:

This section incorporates all the supply chain challenges faced by the public education system in KwaZulu-Natal.

Probing questions:

With regard to procurement, do you experience any supply chain management challenges? *(Explain if necessary that this incorporates all the procurement challenges, procurement of materials, services and other facilities required by the institution)*

With regard to service delivery, do you experience any supply chain challenges? *(Explain if necessary that this incorporates all the delivery or logistics challenges such as transportation in terms of service delivery by the department of basic education).*

With regard to demand management, do you experience any supply chain challenges? (*Explain if necessary that this incorporates all the demands of the schools such as facilities required by the schools or department of education to obtain the quality of education within the institution*).

In terms of enable, do you experience any supply chain challenges? (*Explain that this incorporates overall issues such as the support of school management team (SMT) or*

management in the processes and activities of the department of education and its overall operation).

Question 2: How do stakeholders manage these supply chain challenges?

Explanation

Explain whether the stakeholders have actions take place in order to eradicate the supply chain challenges**.**

Probing Questions

In terms of managing, how do the stakeholders manage these supply chain challenges?

Question 3: What do you regard as the main challenges in managing/reducing these supply chain challenges?

Explanation

Explain the objects or actions that are regarded as the main challenges in managing or reducing these challenges.

Probing Questions

In terms of managing the main challenges, do you experience any challenges when trying to reduce identified challenges?

Question 4: Do you have any suggestions on how stakeholders in the public education system can better manage or overcome the identified supply chain challenges?

Explanation

Explain any suggestions on how the stakeholders in the public education system can better manage and overcome the identified supply chain challenges.

Probing Questions

In terms of managing or overcoming the identified supply chain challenges, what solutions do you suggest on how these supply chain challenges can be addressed?

Question 5: Do you have any further comments/suggestions?

Thank you very much for your time. It is greatly appreciated.