



# UNIVERSITY OF KWAZULU-NATAL

The implementation of Supply Chain Management principles at the eThekweni  
Municipality: A case of the Department of Water Services

by

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of

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College of Law and Management Studies

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## **DECLARATION**

I, Lukhanyo Mtshingana, declare that:

I. The research reported in this dissertation, except where otherwise stated, is my original research.

II. This thesis has not been submitted for any degree or examination at any other university.

III. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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**Mtshingana Lukhanyo**

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**Date**

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I would like to thank my mother for the support and prayers and also students like Sanele Gumede who have assisted me with my research study.

## **DEDICATION**

This dissertation is dedicated to my mother Nomaphelo Mtshingana who was retrenched from Telkom in the year 2002 when I was 11years old, doing my grade 6 at primary school. My mother supported me until today as I submit my master's in commerce dissertation.

I would also like to dedicate this to my 4-year-old son Lubabalo for his inspiration and for still calling me his father even when I had no financial capabilities to meet his needs.

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## ACRONYMS

CRM	Customer Relationship Management
DSCTS	Develop Supply Chain Technology Strategy
ICT	Information Communication and Technology
IDP	Integrated Development Plans
KZN	KwaZulu-Natal
MFMA	Municipal Finance Management Act
NRW	Non-Revenue Water
PMFA	Public Management Finance Act
SCM	Supply Chain Management
SCMP	Supply Chain Management Process
SCMPs	Supply Chain Management Principles
SCOR	Supply Chain Operations Reference
SCDN	Supply Chain Distribution Network
SCWDN	Supply Chain Water Distribution Network
PRV	Pressure Reducing Valves
WDMPs	Water Demand Management Policies
WWTPS	Water Recycling and Wastewater Treatment Plants

## **ABSTRACT**

The study seeks to investigate how the implementation of Supply Chain Management Principles can improve water provision to residents under the jurisdiction of eThekweni Municipality. The eThekweni Municipality is a category A municipality, this means that it has an exclusive municipal executive with legislative authority in its area. Municipalities are rated based on whether their budgeting and administration processes are able to provide for basic needs of society such as water services (EThekweni municipality, 2015).

Their success can be measured through their ability to promote social and economic development of a community (Constitution of the Republic of South Africa, sec 153:77). In the EThekweni region, there is social unrest amongst a selected number of residents that are dissatisfied with the inequality and sufficient provision of water.

Supply Chain Management is defined as the ability for entities and firms to collaborate in improving effectiveness with operating efficiency through strategic advantage and positioning (Bowersox and Closs, 2002: 1). Drastic shifts have occurred with the shift from focusing on manufacturing towards customer value with less emphasis on costs and producing high quality products. The focus was to provide the correct product, and location required for the customer, while maintaining the appropriate quality at the lowest possible cost (Johnson and Flynn, 2015: 46).

This study employed a qualitative research method. This method is used to analyze data directly in the fieldwork through observations, in-depth, open-ended interviews, and written documents. Qualitative researchers enquire and study real world settings inductively to generate narrative descriptions in the formulation of case studies (Wyk, 2009: 11).

This research study found that employees based at EThekwini Municipality fully understand the SCMPS but are not fully equipped with the implementation towards the provision of water service.

This research study recommended that employees from eThekwini Municipality to be educated and trained about SCMP's. Implementation of road shows and workshops to other stakeholders involved in the value chain with water but not under the Supply Chain Management department.

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## **CHAPTER ONE: INTRODUCTION**

### **1.0 Introduction**

The eThekweni Municipality water services department is responsible for providing fresh, clean and safe water to; homes, businesses, shops, schools, and factories throughout the eThekweni Municipal area (eThekweni municipality “2015”). Before the year 1994 South Africa was not a free and democratic society as it is today, there were huge disparities and inequities with respect to access to services including water services. This proved to be affecting the accessibility to basic and essential services such as water services. The regulations that governed water access and services during the apartheid government only benefited white residents (Constitution of the Republic of South Africa, 1996:11).

EThekweni is the largest City in the KwaZulu-Natal (KZN) province and the third largest in South Africa. It is a sophisticated cosmopolitan city of over 3 442 398 people (EThekweni municipality, 2011). According to Ntuli (2009:1), eThekweni municipality has struggled to deal with its vast area to provide water services to community members efficiently. As per the constitution of 1996, sec 152: it is the obligation of the municipality to provide such services in a conducive, efficient and effective manner to satisfy all residents in the region.

The provision of water in the eThekweni municipality is rated as the number ten in serious problems in the region with poverty, drugs, health, housing and employment leading the list. There is a problem of inadequate supply of water in the municipality with poor communities showing high levels of dissatisfaction with delivery of water. Communities living in informal settlements are the ones that are mostly affected and are vulnerable to health risks (Sutherland and Robbins, 2013:50).

### **1.1 Background and context**

South Africa has three spheres of government namely; national, provincial and local. The study will focus on local government, which is found in all municipalities in the country. The study focuses on the city of Durban in KwaZulu-Natal province. This research is in the field of supply

chain and focuses on the SCMP's within eThekweni Municipality. The researcher chose this topic as an area of interest as it affects the daily livelihood of the people residing within eThekweni municipality and the surrounding areas.

The country South Africa is governed by the constitution of the Republic of South Africa Act no: 08 of 1996. In section 217 of the constitution it is clearly stated that supply chain management plays an integral part in the transformation of the national, provincial and local government structures. Municipalities like the eThekweni municipality are under the local sphere of government, which are obligated to perform their tasks of providing services, bidding for contracts should be in accordance with the constitution. In South Africa, all government transactions, processes should be fair, equitable, transparent, cost effective and competitive as per SCM regulations (1996 constitution of the Republic of South Africa, sec 217:132).

### *1.1.1 Challenges in the eThekweni municipality towards the provision of water services*

Municipalities in South Africa face challenges in the implementation of SCM in their process. These are evident through poor implementation of SCM practices, lack of planning, conflict of interest in tender systems. Municipalities also face challenges in providing quality services through SCM process as most of them lack skills and capacity in the field. The eThekweni municipality is not an island to such problems and faces similar challenges (Fuzile, 2015:4).

Water shortages in EThekweni municipality region have become a serious concern because of the vital importance of water. Water is used for sustenance of the human race, animals, plants, irrigation fields, industries and is essential for the everyday life. The municipality has declared its region of governance towards water provision a status of drought due to the low levels of water supply like in the Hazelmere Dam (Albert, 2015:38).

There has been great water restriction in the areas of the eThekweni region since the September 2014 especially regions in the north. This has caused inadequate water provision to residents in the municipal area with also having a huge impact on the prices of basic food products, which have increased. This is due to the major impact in many sectors of the economy which have lacked productivity from agriculture to manufacturing (Albert, 2015:38).

Water shortages have not only affected the communities but have had a negative impact on business and farmers around the region. Insufficient water provision in agriculture and sugar sectors has led to job losses and stagnate growth in some sectors of the economy. The water shortages are expected to last until the year 2017 and continue if projects to generate and save water have not been developed. The municipality has inequality in the standard of living, which has caused increasing rates for water provision to communities, has led to residents complaining about service delivery of the resource (Albert, 2015:38).

With the rise in South Africa's population mainly due to natural increase and the rise in migration patterns, an approximate figure of 15 000 people move into cities annually. It is evident that the water services department is not adequate in meeting the growing demands. With the current financial constraints facing the municipality, which have led to backlogs, it will take the municipality 30 years to address the problem (eThekweni Municipality, "2015").

The EThekweni municipality also faces a challenge as to how to reduce consumption while meeting the demands of residents as the municipality has become a water scarce area. The EThekweni water sanitation unit argues that the provision of a required level of water services to municipal areas including the rural periphery is not feasible because of technological, financial, environmental, and practical constraints. According to officials from the municipality, peri-urban areas, and the rural periphery raise the most significant challenges due to land ownership falling under the Traditional Authority (Sutherland and Lewis, 2006: 2).

The municipality still commits that there should be equitable water, which is adequately provided in a fair manner to members of the community. Water must also be affordable, to ensure that no one is excluded access to basic services because of cost (eThekweni Water and Sanitation Unit, 2012:2).

It is argued that the need for good and clean water supply and distribution is of utmost importance in the livelihood of the communities. This brings us to the issue of water quality; this suggests that the water provided to the community should be free from adverse substances such as toxins, bacteria and other harmful substances. However, communities within the eThekweni Municipality are affected by unfavourable living conditions that expose citizens to unclean water supplies (eThekweni Water and Sanitation Unit, 2012:3).

The water provided should be good for bathing, cooking, doing laundry. Provision of water services should entail the cartage distance, availability, assurance of supply. It has been observed that in townships like Kwa-Mashu, Umlazi and informal settlements that there are various occurrences of water cuts in the areas. There have been no major water cuts in suburbs like Umhlanga and Westville (eThekweni Water and Sanitation Unit, 2012:4). Municipalities are judged on whether their budgeting and administration processes are able to provide for basic needs of society like water services. Their success can be measured from their ability to promote social and economic development of a community (As for each the Constitution of the Republic of South Africa, sec 153: 77).

### *1.1.2 Implementation of Supply Chain Management Principles towards water provision services*

A study conducted by Mark Edwards showed the importance with Supply Chain Management principles in the supplying of water to a community in the country of Togo. In a region called Amlame, water used for drinking and cooking is accessed from traditional sources like shallow wells, ponds and rivers. A plan was designed to build 400 drilled and functioning wells, which were six of 12 to accommodate a growing population of 128000 people in 350 villages (Edward, 2013:8).

Results were not very good as there were findings that 1578 boreholes were dry, 15 percent had bacterial contamination and 340 without pumps for several years. The difficulties with water provision by the Togo government to villages were caused by lack of Supply Chain Management principles in the value chain. There was no proper communication between the communities, government agencies. The project costs were exhausted before the project could be complete which showed lack of financial coordination (Edward, 2013:8).

The challenges needed to be addressed with the project through Supply Chain Management principles were:

- Strengthen community development knowledge
- Strengthen the skills of the Government field agents
- To establish Village Development Committees
- To establish a pump maintenance system

- To educate communities to use safe drinking water (Edward, 2013:9).

It has been observed that the application of good Supply Chain Management principles can ensure that all the stakeholders in the value chain in the provision of water contribute to the efficiency and execution good governance of the distribution network. This study will focus on how Supply Chain Management principles can play a significant role in providing adequate provision of water.

A study that was conducted by Mike Muller from the University of Witwatersrand, about the crisis of water in municipalities around South Africa, identified “hot spots” in which he singled the eThekweni municipality as the most vulnerable metro as far as water distribution is concerned (Staff Reporter, “2011”). In the EThekweni region, there is social unrest with a rising number of residents complaining about inequality and the insufficient provision of water.

There has always been a crisis in the provision of water services in the municipality. In 2012, a petition from 5000 community members around the region was submitted indicating that the quality of water in the municipality was unhealthy. The petition addressed issues of lack of supply of water in the region in some areas and a motion of no confidence in the process of using recycled water with communities believing water could come from other sources (Kings, “2012”).

Community members raised the issue of water shortages in the petition that they believed were due to lack of infrastructure as the municipality had knowledge that the region faces frequent episodes of drought. The petition further argued on the use of salt water from the sea in calling for its purification, while the municipality was raising response of a possibly tariff increase in Umgeni Water if such project were taken forward. Furthermore, community members raised the issue of demand for water being above supply as to the municipality engaging in projects like building the Spring Grove Dam and also a new dam at the Umkhomazi River which could start producing portable water by 2030 (Carnie, “2014”).

The obstacle faced by the petition organizers with the municipality was a proposal to purify sewages, which had a lot of criticism especially from the Islamic residents. The eThekweni

municipality through its research saw it as a solution to curb the water shortages and increase supply to overcome the ever-increasing demand (Carnie, “2014”). Community members in the region also stressed the point of desalination and wastage of water supply through leakages

### *1.1.3 Public Sector Supply Chain Management with legislative regulations*

The eThekweni municipality like any other form of government structure has to work according to laws and regulations. There are various legal instruments, which deal with the conduct of government departments or municipalities towards provision of basic services to residents in their area of jurisdiction (Constitution of the Republic of South Africa of 1998: 87-89)

The Constitution of the Republic of South Africa of 1996 sec: 127, deals with the basic laws and regulations towards procurement of goods and services. Section 35 then deals with prescribed constitutional values set out as values when delivering service to communities. Administrative processes and regulations outlined by section 33 to have sound and transparent process not going against the law (Fuzile, 2015:10-13).

There are various acts, which municipalities adhere to when delivering services to society.

- Public Finance Management Act 1 of 1999
- Local Government Municipal Act 56 of 2003
- Preferential Procurement Policy Framework Act 5 of 2000
- State Tender Board Act 86 of 1986

Although not all can be mentioned for the purpose of the study but those which can be related to water service delivery (Fuzile, 2015:10). Even though laws and regulations promote good governance in the delivery of service, there are challenges to government officials, which come with legislative procedures.

Municipalities in providing water services might have trouble in bidding for suppliers of the service with increasing demand from the residents because of multiple large documents with paper work increasing time intervals in administrative process. There are large differences in

how Supply Chain Management policy is applied in the private sector compared to the public sector as the other aims for profit maximization as a firm's goal while government entities targeting efficient service delivery (National Treasury, 2015:11).

It takes time for some employees with different qualifications to adapt to the legal instruments provided by supply chain instruments towards providing services to respective communities. How to resolve these policy constraint in the public sector are one of the problems related to issues like water provisions in the eThekweni municipality.

## **1.2 Motivation for the study**

Supply Chain Management speaks about entities, firms collaborating to improve effectiveness with operating efficiency through strategic leverage and positioning. (Bowersox and Closs, 2002: 1). As per the (constitution of 1996, sec 152): it is the obligation of the municipality to provide water services in a conducive, efficient and effective manner to satisfy all residents in the region under the jurisdiction of municipalities (1996 constitution of the Republic of South Africa, sec 152:111). This is also in line with Millennium Development Goals Report 2014 which aimed to make sure that proportion of people without water access for safe drinking should be given or provided with a sustainable access solution to water (United nations, 2014: 1).

However, provision and equity distribution of water services in EThekweni Municipality have been inadequate (Sutherland and Robbins, 2013: 1).

To investigate how Supply Chain Management Principles can lead to improvement in the water delivery services to residents in eThekweni Municipality?

## **1.3 The specific research questions with regard to the provision of water of the study are:**

- Are employees in the department of Supply Chain Management at the eThekweni municipality aware of Supply Chain Management principles?
- To what extent are Supply Chain Management principles applied in the eThekweni Municipality?

- Can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekweni municipality?

#### **1.4 Research Objectives**

The specific research objectives with regard to the provision of water of the study are:

- To ascertain whether employees in the department under Supply Chain Management are aware of Supply Chain Management principles.
- To investigate the extent in which Supply Chain Management principles are applied in the eThekweni municipality
- To assess if the effective application of Supply Chain Management principles can improve service delivery in water at eThekweni municipality

#### **1.5 Problem Statement**

To investigate how Supply Chain Management Principles can lead to improvement in the water delivery services to residents in eThekweni Municipality.

#### **1.6 Main research objective of the study**

To ascertain how Supply Chain Management Principles can lead to improvement in the water delivery services to residents in eThekweni Municipality.

#### **1.7 Research Approach/Methodology**

The Millennium Development Goals Report 2014 aimed to make sure that a proportion of people without water access for safe drinking should be given or provided with a sustainable access

solution to water. (United Nations, 2014:1). However, provision and equity distribution of water services in EThekwini Municipality have been inadequate (Friedrich, Pillay and Buckley, 2009:2). The study then seeks to investigate if the application of effective Supply Chain Management principles will improve service delivery of water services in the eThekwini municipality to its residents.

*Can the formulation and implementation of Supply Chain Management principles lead to improvement in the water service delivery to residents in eThekwini Municipality?*

The research methods used in this study will be qualitative. An interview schedule with a list of questions will be utilised. The interview questions will be directed towards addressing the research questions and answer how objectives of the study will be met. Recordings will be used and then as a researcher will transcribe and use NVIVO for thematic analyses.

#### *1.7.1 Research design*

It is stated that a research design provides a practical overview of central issues involved in the design of social and economic research, covering a theoretical research. A research design is therefore a plan of action for getting from where one is to where they wish to go, where the initial point is the primary set of questions to be answered and the destination is the set of conclusions or answers (Hakim, 2000:2).

Because the study is warranted by the research problem, objectives and questions, a qualitative research design has been chosen and employed. This design is appropriate when the inquirer makes knowledge claims based primarily on constructivist perspectives that reveal multiple meanings of individual experiences that are socially and historically constructed.

The intent here could be to develop a theory or pattern, or advocacy and participatory perspectives, which include political, issue-oriented, collaborative or change-oriented approaches (Yin, 2009:1). The qualitative research design also uses strategies of inquiry such as narratives, phenomenology, ethnographies, grounded theory studies, or case studies. The researcher uses

open-ended questions for respondents and the primary intent of emerging data is to develop themes that help address the research problem (Creswell, 2009: 20).

#### *1.7.2 Target population*

There are 64 workers under the Supply Chain Management department of water services in the eThekweni municipality with 55 general workers who do not have any knowledge about supply chain principles to execute their jobs; their jobs require strength and muscles (eThekweni Municipality, “2016”).

The study seeks to investigate: Can the formulation and implementation of Supply Chain Management principles lead to improvement in the water service delivery to residents in eThekweni Municipality.

#### *1.7.3 Sample size*

The sample of the study is nine employees from the eThekweni municipality. It was the nine individuals purposively selected for the job that they do in the eThekweni municipality, who are perceived to have knowledge of Supply Chain Management principles through their relevant educational qualifications to the field. They are namely: The Supply Chain Management unit manager of water procurement, contract administrators, senior buyers and water procurement verifiers (Sekaran and Bougie, 2010:262).

#### *1.7.4. Sampling strategy*

To collect data from the sample size, purposive sampling, also known as judgmental sampling, was employed, which is a type of non-probability sampling technique. Municipal employees in the selected sample were selected based on their ability to provide knowledge of Supply Chain Management principles in the provision of water services.

#### *1.7.5. Data collection methods*

Data were collected using in-depth semi-structured interviews. Individual interviews in the chosen sample were undertaken with respect to the participants' ability to respond to the presented questions pertaining to the provision of water services using SCMP's.

### *1.7.6 Data quality control*

The study will employ both primary and secondary data. The combination of the research methods will help summarize the available information if it's consistent with the new researched information towards the application of Supply Chain Management principles in water provision. Primary data is information collected from interviews, experiments, surveys, questionnaires, focus groups, measurements and is firsthand information, which is usually expensive (Vosloo, 2014:329).

### **1.8 Data analysis**

The collected data will be transcribed, coded using NVivo and analyzed thematically. Themes will be taken out of the interview responses and categorized into groups which can answer research objectives and question through matrix analysis. Recordings will be done during data collection which will be then transcribed. After being transcribed they will put in NVIVO then themes will be produced which will allow research to be analyzed.

The nine employees which are three senior buyers, three contract administrators and three verifiers are supposedly to have knowledge of Supply Chain Management principles in executing their jobs.

The 55 general workers need not to have any knowledge of supply chain principles to execute their jobs, their jobs require strength and muscles. The study will use the nine municipal employees purposively selected for the job that they do in the eThekweni municipality, Namely: The Supply Chain Management unit manager of water procurement, contract administrators, senior buyers and water procurement verifiers (Sekaran and Bougie, 2010:262)

The sample participants will assist the researcher to get an in-depth response to weather effective application of supply chain principles in water services procurement would improve service delivery of water services in eThekweni municipality.

### **1.9 Limitations of the study**

This study was based on one municipality in Durban. However, the findings of the study cannot be used to generalize on other municipalities within or outside the KwaZulu-Natal province.

## 1.10 Ethical considerations

All ethical issues will be considered in this study. The study proposal is submitted and has been presented to the School of Management, IT and Governance, University of KwaZulu-Natal and the ethical clearance will be applied for, from the research office of University of KwaZulu-Natal.

## 1.11 Key terms and definitions

Certain key terms and definitions utilised in the study are shown below in Table 1-1.

Table 1-1: Key terms and definitions

Key Term	Definition
Supply Chain Management	Supply Chain Management speaks about entities, firms collaborating to improve effectiveness with operating efficiency through strategic advantage and positioning
Supply Chain Management Principles	Supply Chain Management principles can lead to efficiency, effectiveness and lead to positive financial outcome for a firms, government entity supply chain process until returns from the sale of a particular product. There are seven Supply Chain Management principles.
Municipal Finance Management Act	The act provides for the sustainable and secure of management in financial affairs in municipalities with other institutions in the local sphere of government. It does this through establishment of treasury norms and standards.
Supply Chain Operations Reference	It promotes linking business process, performance metrics, practices, skills into one integrated interdepend structure through supply chain principles and regulations.
Supply Chain Water Distribution Network	In simple terms can be a water supply network which is engineered hydrologic with hydraulic components in charge of the water supply.
Supply Chain Distribution Network	It is a distribution network compromising of an interrelated arrangement with people, facilities, and transportation systems. These stakeholders are all concerned with getting a particular product to the manufacture then retailer and finally the customer.
Supply Chain Management Process	The global supply chain forum identifies eight core management process to analyze the importance of Supply Chain Management importance in a firm or government department. They are customer relationship management, customer service relationship management, demand management, manufacturing flow, order fulfilment, supplier relationship management, product development commercialisation and returns management.
Integrated Development Plans	Plan is a tool used to transform local government operations in they jurisdiction in the best interest of society or residents through the provision of services
Water Demand Management Policies	To maximize the water provision service through sustainability, proper governing in the water sector , development of legislations towards water , proper management in water services and providing laws and policies to govern water distribution in a particular society or country.
Non-Revenue Water	This water does not reach the intended customer because it has been

	lost through leaks, theft or meter inaccuracies.
Water Recycling and Wastewater Treatment Plants	Treatment plants are used for the reclaiming of water that has been used from municipal wastewater or sewerage.
Customer Relationship Management	Shows how a business interacts with its own customers

## 1.12 Structure of the Dissertation

Chapter 1: Introduces the dissertation. This chapter provides the background and context of the study. Furthermore, this chapter declares the purpose and provides the overview of this study.

Chapter 2: Gathers literature on the Implementation of the Supply Chain Management Principles in eThekweni Municipality: The case of the Department of Water. The chapter discusses Supply Chain Management systems and water systems with distribution networks within the municipality and in various selected countries. The chapter explains the challenges faced by the EThekweni municipality in its water supply chain distribution networks then the chapter concluded.

Chapter 3: Seeks to get theories of Supply Chain Management from different scholars in the field and relate to water supply and distribution networks. The theories will be used to develop a theoretical framework for the study to answer research objectives. The formulation of a theoretical framework will lead to the discussion and formulation of the conceptual framework for the study. The chapter will then conclude.

Chapter 4: Identified the methodology employed in this research, which was, is qualitative research methodology. It also entailed descriptive statistics, which were qualitative.

Chapter 5: The chapter looks at transcribing the data which was collected from the interviews in the EThekweni municipality. The transcribed data, which will be collected from the interviews conducted at the eThekweni municipality, was later colour coded as per appendix 2. Data reduction through categories was analysed in order to construct themes which could produce thematic responses from the interviewee's. The chapter researched whether there was an implementation of SCMPs in the municipality.

Chapter Six: Discussion of Results per each Objective in the study.

Chapter Seven: Conclusion and Recommendations

The chapter provided summaries of all chapters of the dissertation from one to seven. It also provided recommendations for the study while outlining limitations incurred in the study. A contribution to the study towards supply chain and water service was discussed. Recommendations for future research will be provided then the chapter will provide an overall conclusion to the dissertation.

## **CHAPTER TWO: THE CONCEPT OF SCM IN MUNICIPLA CONTEXT AND SYSTEMS IN WATER DISTRIBUTION NEYWORKS**

### **2.0 Introduction**

The chapter discusses the SCM systems and starts by briefly defining the concept of Supply Chain Management, which has evolved over the past ten years through various researchers in the field. The chapter then looks at the different types of supply chain systems and elements, which make up the system like forecasting, estimates, manufacturing, distribution, sales of finished goods, logistics, inventory management, location and order fulfillment. The chapter will then proceed in outlining the benefits of the systems.

Firstly, though the chapter will look into the public sector current Supply Chain Management situation. The second part of this chapter in literature looks at the water systems and supply chain networks. Supply chain networks in water differ across municipalities, cities, rural areas and countries; it is for this reason that there will a discussion of supply chain networks in water from different countries like China, India and Israel.

The chapter will then focus on the challenges facing the eThekwini municipalities in their systems and distribution networks. In addition, an analysis of the EThekwini municipality water systems and distribution networks when it comes to water is discussed. The last section then will look into the generic environment of supply chain in municipalities by looking at a few municipalities in South Africa and their process to Supply Chain Management. The chapter will then conclude.

### **2.1 The current public sector SCM situation**

The public sector is different to the private sector, which exist purely for-profit maximization, but focuses more on service delivery. The public sector is mainly government, which compromises of entities, enterprises and agencies in charge of delivering public programs with goods, services to their area of jurisdiction. There might be agencies under government or entities, which will aim for profit so that is why it is mow defined as all institution publicly funded by the government in their operations (Dube and Danescu, 2001:3).

The public sector can operate at different levels like international, national, regional and locally. The study focuses on the eThekweni municipality governed by the local sphere of government in South Africa as mentioned in the study earlier (Dube and Danescu, 2001:3).

The public sector is responsible for making sure infrastructure is maintained which includes roads, schools, universities, malls, housing are widely available. It is also responsible for the health care, promoting entrepreneurs, creating job opportunities and providing a safe environment. There are lot of government responsibilities, which are not all be mentioned in the study while also providing waters service is a function of the public sector under the local sphere with electricity (Supply Chain Management review, 2016:1).

Supply Chain Management on the other side involves planning, managing the activities in sourcing, procurement, conversion, with also logistics. There is coordination, collaboration with suppliers, intermediaries and customers. There must be a well efficient working relationship between departments like marketing, logistics, procurement, production and operations management (Amber, 2016:20).

### *2.1.1 Public Sector and SCM*

As mentioned earlier in the study, all institutions under the three spheres of government, which are national, provincial and local, must apply supply chain regulations or principles in the operations as per the constitution of the Republic of South Africa (Fuzile, 2015:10-13). For example according to the Constitution of the Republic of South Africa of 1996 sec: 127, deals with the basic laws and regulations towards procurement of goods and services. Section 35 then deals with prescribed constitutional values set out as values when delivering service to communities. Administrative processes and regulations outlined by section 33 to have sound and transparent process not going against the law (Fuzile, 2015:10-13).

SCM in municipalities over the years has been affected by fraud and corruption. Besides adopting SCM policies and regulations there are a few improving municipalities while other are failing due to implementation of supply chain. In the years 2001 to 2013, only five to nine percent of municipalities received a clean audit. Magazines, newspaper, radios and people in

general have been in a platform for society to express their feelings that they do not get the quality of service from the public sector (Amber, 2016:20).

The officials and authorities responsible with applying SCM management in the public sector through government institutions are not all familiar which hinders public service delivery. Applying government policies through supply chain is a challenge with most policies and regulations misunderstood by officials (Fuzile, 2015:4).

Certain institutions in the public sector may lack certain resource to fully apply Supply Chain Management in the public sector. A shortage in leadership with relevant qualifications in the field to empower and motivate employees to public sector service with SCM. The lack of resource with under skilled staff in need of computers, databases, spreadsheets, internet connections, information to be fully equipped in research and application of Supply Chain Management in their operations (Fuzile, 2015:4).

Policies in place towards procurement in municipalities and other government institutions focus on the decision to buy the item or product. While in Supply Chain Procurement policy focuses on the decision to buy from the start with the pre-tendering process of SCM process until the final purchase and then an analysis of whether wasteful and fruitless expenditure did not arise (Fuzile, 2015:5).

Deficits in the public sector with inefficient service delivery are all a cause of not applying SCM correctly. The inability of the public sector to create relationships with suppliers which causes government departments to be over charged when it comes to price and also being affected by collusive behaviour by business to products provided to the public sector (Fuzile, 2015:5).

Conflict between employees and political office bearers comes with a challenge in the roles and responsibilities, which are not clear for government officials. With unclear responsibilities and roles leads to corruption in the public sector which greatly affects service delivery. The scarcity of well skilled qualified leaders in the public sector is another major challenge, as certain supply chain managers do not fully understand the policies and regulations put forward (Fuzile, 2015:5).

Suppliers are often sceptical to do business with government especially the small businesses with large paper work needed to be filled in with contracts and also procedures and policies to be followed. This then becomes a cost to small business with no capacity and financial strength in certain areas in their administrative processes. There need for long term relationships with suppliers is needed but a challenge of the private sector having a perception that a partnership with the public sector has a room for failure which then causes disinvestments (Fuzile, 2015:5).

## **2.2 Supply Chain Management systems and water service systems**

### *2.2.1 Supply Chain Management systems*

Supply Chain Management speaks about entities, firms collaborating to improve effectiveness with operating efficiency through strategic advantage and positioning. (Bowersox and Closs, 2002: 1). The concept of Supply Chain Management is not new but has evolved in the last few years. There has been a drastically shift from focusing on manufacturing towards customer value with a less emphasis on costs or producing high quality products. The focus is to provide the correct product for the customer, the correct location at the time, which is needed, with appropriate quality at the lowest possible cost (Johnson and Flynn, 2015: 46).

According to the Institute of Management Accountant (“1999”), Supply Chain Management refers to all processes involved in meeting the final customer product needs as normal supply chain definition. What makes it interesting, efficient, and effective is that it involves coordinating the flow of goods from where they originate until consumptions. What is unique is that it integrates internal and external processes and promotes close linkages between stakeholders in the value chain (Institute of Management Accountant, “1999”).

Supply Chain Management systems come in different version across departments of a company or business. There might be information systems, production, logistics, marketing and other departments of a business but a broad supply chain system which leads to development of other systems will be considered. The supply chain systems can be defined in two categories, namely the planning stage and the execution stage (Heizer and Render, 2015: 469).

Supply Chain Management also is a field with technology discipline, which refers to various strategies in co-ordinating activities involved at purchasing, designing, building and selling a product. It is mostly used in information technology as a tool in creating cross-functional inter-enterprise involving more than one organization system called SCM information systems (Johnson and Flynn, 2015:78).

“Section 111 of the Municipal Finance Management Act requires each Municipality and Municipal entity to adopt and implement a Supply Chain Management policy with its systems. In addition, another SCM regulator is the Preferential Procurement Policy Framework Act that requires an organ of the state to determine its preferential procurement policy to implement within the prescribed framework (Fungile, 2015:10).

These policies enable managers to work within prescribed supply chain regulations and systems while providing water service to residents. The SCM systems are in charge of the integration of business process of suppliers, purchasing, distribution with custom logistics to improve the effectiveness of the overall firm’s production and customer service. Even though supply chain systems may differ according to industries and departments, they have three main inputs, which are information, materials, and funds which flow amongst supply chain stakeholders (Heizer and Render, 2015: 471).

Raw materials from respective suppliers are transformed into intermediate products and finished goods are taken through manufacturing facilities of that entity involved. The final product is then shipped to a location of a distribution center or centers depending on the company from there retailers take finished goods for customer purchase. The goal of Supply Chain Management systems is to efficiently manage the flow of information, materials, and funds across the entire supply chain, thereby reducing the cost of supply chain while bringing a firm’s products from concept to market (Johnson and Flynn, 2015: 238)

### 2.2.2 Supply Chain Planning Systems

Planning systems provide information to the supply chain of business to assist in the planning process.

#### Forecasting demand

In supply chain the managers are always trying to make the correct estimates as to how to order inventory, how to make investments decision, how to purchase equipment which will decrease future uncertainty. This is what is called forecasting in the supply chain planning system which chooses certain products then prepares sourcing and manufacturing for those specific goods (Heizer and Render, 2015: 141).

Forecasting is of strategic importance to the supply chain planning systems because it is the only estimate of demand until actual demand is known (Heizer and Render, 2015: 141).

The system requires seven steps of forecasting (Heizer and Render, 2015: 142):

- I. Determine the use of forecasting
- II. Selection of items to be forecasted
- III. Determine the time horizon of the forecast
- IV. Selection of the forecasting model
- V. Gathering of the data required for forecasting
- VI. Making of the forecast
- VII. Validation and implementation of results

#### Estimates of goods and services

Systems in planning also estimate the quantity of goods and services, which are needed for manufacturing in a specific period SCM, can be further seen as a function, which makes sure that goods are delivered to the right place with right quantities at the right time (Johnson and Flynn, 2015: 28). Demand management is a crucial function in SCM to ensure resource needed to fulfil objectives of a business or government entity to deliver on its promises in service delivery at the right place and time with available supply (Soobramanian, 2011:2)

In the strategic plan of a business, resource required must be critically analysed for the value chain from construction in raw materials, conversion process with final product must be quicker and effective. Estimating of goods and services using demand management assist the firm in detecting variances within the value chain while equalling demand with supply of certain product required (Soobramanian, 2011:2).

### Location

Deciding a location for various products based on their type is a crucial component in the planning system (Johnson and Flynn, 2015: 28). It is important when firms decide on locations that productivity is looked as a serious component in decision-making or selection of the place. This expands to knowing the exchange rates of certain location with its currency risks involved were you find some have continuous fluctuations, which can affect sales. An analysis of the costs of the location needs to be considered in the planning stage whether it is tangible or intangible (Heizer and Render, 2015: 367).

### Logistics Management

The fourth step in planning involves identifying the type of transportation mode depending on the specifications within the product delivery process. Logistics involves the management of warehousing for materials where they are handled and stored. It also involves transportation, order processing, materials handling and packaging. There is also lean logistics which is the ability to administer and design systems to a certain location with materials needed for the conversion process to final products for the customer (Bowersox and Cooper, 2002: 31).

There are certain aspects which are taken into consideration in the planning phase which are distance, volume, density, storability, handling, liability and the market for the product. This is an important element in the planning stage in the supply chain as it can take products from point A, to point B at the required time interval. (Bowersox and Cooper, 2002: 356)

### Inventory management

Inventory, levels are needed to be specified for raw materials, intermediate products and the finished goods ready for sale. Inventory refers to the stock the business stores to produce goods and services. It can be risky but varies with the firms' distribution channels looking at elements

like inventory commitment, time duration, depth and width commitment. Managers are expected to plan for inventory in their facilities for customer demand as it is also an asset that should provide return capital invested (Bowersox and Cooper, 2002: 285).

Inventory has to have an integral role in the SCM systems. This could be having information on when to order, and how much to order. This will be achieved through a firm by determining the optimum inventory policy, which deals with its performance and service levels. Service levels are the target performances specified by management. Even though there can be details on when to order and how to order, forecasting for uncertainties becomes very important at this stage (Bowersox and Cooper, 2002: 285).

### Sale of finished goods

The last stage or point in the planning system of a company or government entity would be to determine the quantity, which should be made an order to meet customer demands. This is where success of a business is judged based on the sales which come from the perspective of quality from customers and showing satisfaction through repetitive purchases of the product and few or no goods return for the business to be profitable (Heizer and Render, 2015: 662). The second system in supply chain is the Execution system.

### *2.2.3 Supply Chain Execution Systems*

The second type of system assists the business or government entity by providing information towards the execution of supply chain functions

### Manufacturing

Manufacturing is an important component in supply chain as it can differentiate logistics from the system through its operations. Logistics might apply to activities that are based in a single company, but supply chain encompasses manufacturing and procurement with a broader focus with many suppliers in the execution part of the system (Bowersox and Cooper, 2002: 89).

Manufacturing ensures that the supply of quality products improves the satisfaction of customer needs by making products available at anytime and anywhere. This is achieved by the

manufacturing department of a company or government entity through high standards for quality with compliance of SCM regulations. The manufacturing division must ensure that value is delivered without compromising quality. Manufacturing has evolved with the involvement of technology in its process through modernizing the value chain and reaching optimized investments (Bowersox and Cooper, 2002: 90).

### Distribution

The supply chain cannot work without distribution, it might be roads, railways, oceans across countries, villages, cities with warehouses to store, manufacture then redistribute to retailer until the product reaches the intended customer (Johnson and Flynn, 2015: 324). One of the most critical inputs into distribution is the ability to specialize. Specialization drives economic efficiency were manufacturers, wholesalers and retailers specialize in certain or specific assortments in the execution stage in the Supply Chain Management system (Bowersox and Cooper, 2002: 96).

### Order fulfilment

The third stage in the execution process involves providing information about the specifications of orders being processed for vendors to provide exact delivery dates to customers. Tracking products from various modes of transport to make sure that products are returned or are repaired and serviced. (Beamon, 1999: 275).

### *2.2.4 Benefits of Supply Chain Management*

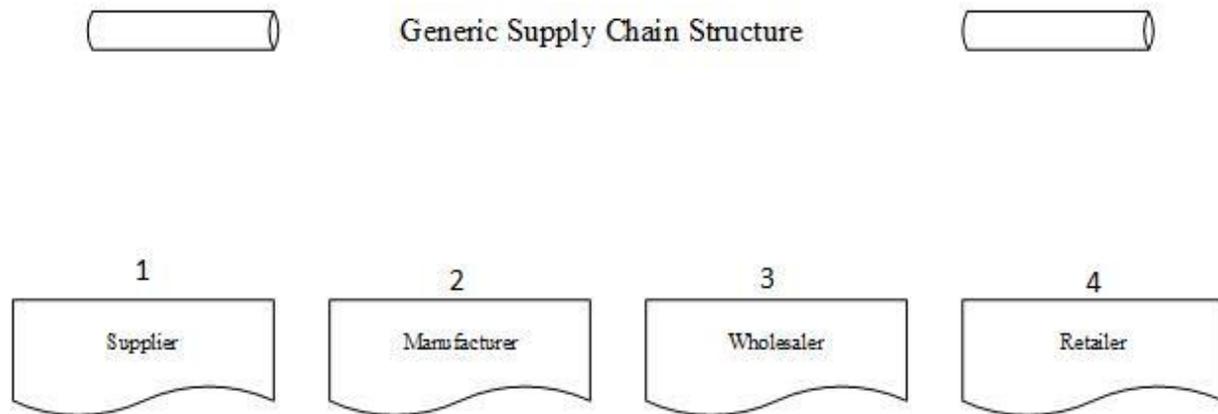
Effective Supply Chain Management can provide the following benefits to an organization.

- SCM can improve the customer service by delivering them the right product at the right time and at the right location, which in turn increases the organization's sales.
- Enable the companies to bring the products to the market at a faster rate. The companies get their payment at an earlier date than those who lack an efficient supply chain.

- SCM lowers the total costs on the value chain, including procuring materials cost, transportation cost, inventor, carrying cost (Johnson and Flynn, 2015: 90).

Figure 2.1, shows the basic simple steps in the supply chain which need to be properly followed in the distribution of water services starting from the supplier which is Umgeni water until the retailer when it is ready for distribution to residents. Umgeni water is the largest supplier of water services to the municipality (EThekwini municipality, “2016”)

**Figure 1. EThekwini Municipality simplified supply chain structure**



Source: Amanda, 2016

The structure shows the municipally generic supply chain. It is a tool that is used in the private sector as an integrated business model that aligns the development, sourcing of technological advances with industrialization which has been a method for the eThekwini municipality.

The model promotes the development of SMME’s in townships, which can then be supported to grow linkages with the international market in the provision and procurement of goods and services (Amanda, 2016).

This generic structure of supply chain provides a relation between the private sector and municipality in provision of jobs, investments and goods and services to residents in their area of jurisdiction (Amanda, 2016).

### 2.3 Water supply chain networks

Water supply chain networks differ from country to country, city to city as you might have different projects for meeting basic needs. The study focuses on the eThekweni municipality implementing Supply Chain Management principles towards providing adequate water to residents cannot focus on certain networks of water distribution.

Plastic grey systems cannot be suitable as they consist of a filter, storage tank and submersible pump and chlorine unit which can only be used to water a garden, lawn or bathing suitable for a household of four to six people. In addition, water well system cannot all of them be strong evidence to support water supply chain networks, which are using supply chain regulation by a municipality as they usually support one home or a community (Muller, 2015).

A focus on various supply chain networks in water used by other countries is a good start.

**Water supply chain network in China:** The Chinese water supply chain network in water has three main components, which are the water treatment of plants, water distribution and Water Recycling and Wastewater Treatment Plants. The country China saw that out of 4000-water treatment plants the quality of water did not meet the standard of the country's population. A project was initiated in the year 2011 to year 2015 to increase capacity in the value chain of water distribution by investing in infrastructure for a large water treatment plant (Frey and Gu, 2012:9).

The second component of the value chain in the water distribution network is the Water distribution part. China uses a strategy different to other government entities in its distribution network and even different to the eThekweni municipality. It starts by encouraging foreign investment in the water urban treatment plants where they invest and earn minority stake in the distribution network (Frey and Gu, 2012:9). In the small and medium cities of the country, the foreign investors are required to at least build and operate water supply and drainage systems with water pipes networks, which shows a good relationship between the private sector and the public sector (Frey and Gu, 2012:10).

The rapid investment in distribution networks has largely assisted in the ever-increasing population of the country. The large investments have not completely removed the NRW issue where water is distributed at no required form of payment for the service (Xiaoman and Geng, 2015:5774) The huge investments to increase the capacity of water distribution value chain is to reduce the leaking systems which are old and require lifecycle expenditure. Meters are not properly installed and there is large misappropriation of water which can be solved through larger and efficient distribution networks (Frey and Gu, 2012:10).

The third component is the water recycling and wastewater treatment plants that were mentioned before of the eThekweni municipality residents against the process at point in time especially the Islamic residents. The country China though has invested technology and investments in the projects of the water recycling and wastewater treatment plants, (WWTPS). The investments in WWTPs have reduced the demand drastically in the cities with more residents getting water services at satisfactory level through the supply chain recycling processes of the item (Frey and Gu, 2012:10).

**Water supply chain network in India:** The country of India also has as supply chain water network designed according to the challenges faced by citizens as the EThekweni municipality. The country consumes 1.7 trillion of liters of water per day while still having to use eight three percent in agriculture. A further ten percent is used by industries while four percent is for domestic use and three percent goes to the power sector (Mariwala, 2013:1).

Few of the issues, which have affected water provision in the country, has been ground water resource. Ground water resource were poorly developed, consumers used water at a far greater rate than replenished. Poor vision, planning, execution and investment have been poor in the country. New value chain was developed in the country, which starts with Water resource management- water treatment- water distribution-water use management- water recycle- safe discharge and water replenishment (Mariwala, 2013:13).

The supply chain network starts with the water resource management making sure that assessments of quality checks have been conducted. In the value chain there is a need for investment so that they can be proper efficient water treatment plants with water distribution

network needing financial positive reforms to finance stakeholders to achieve stated objectives. The country India has found out that for the smooth distribution of water service through the supply chain there must be training of local talent about SCMR to water services (Mariwala, 2013:16).

Through the distribution network of water, there must be a focus on decision influencers on local channels of other Service Providers who can assist better provide the service. Customer satisfaction becomes a critical goal for water use management as it will also lead to a need to capacity and technology through infrastructure for water recycling. Research and development has been a major focus for the country through youth engineers to make sure the value chain has good output of the service when it comes to safe discharge and water replenishment (Mariwala, 2013:13).

**Water supply chain network in Israel:** The country has always had issues with water shortages through its establishment in 1948 through scarcity of the resource. In addition to scarcity is a similar situation with India and China which is an increasing population coupled with extensive industrial growth and economic development. Climate change has been of major concern in the country with an issue of drought similar to the municipal region of the EThekwini municipality. (Ziade, 2016:1).

The SC water distribution network started with the strategic planning phase to provide water service to offset the challenge of scarcity of the resources. This started with having new water production technologies and treatment processes to deal with climate change, drought that affected the availability of the resources. New projects were built to increase additional water suppliers to decrease the extreme degree of replenishment of natural source like plans to desalinate (Ziade, 2016:3).

The second step was to improve the country's water value chain through water demand management policies. This came with different pricing methods across sectors in the country to properly provide for the residents. Agricultural industry users were required to pay less than industrial users who also paid less than household did. Higher rates of water were paid due to the

rate of consumption in a sector while thirdly prices differed amongst regions in ways that were not always consistent with logistical costs (Ziade, 2016:3).

Water demand management in water policies showed development in the water sector to provide service to meet the ever-growing population. The water policies were developed in a way that water supply management to more balanced policy that integrates water demand. This policy involved water saving process in the value chain, recycling plants and water pricing. This led to an emphasis on resource mobilization and alternative water production where resource became regulated by natural groundwater reservoirs in the value chain (Ziade, 2016:6).

There was a desalination project through investments to increase capacity of seawater plants. Residents in the eThekweni municipality did raise the solution of seawater but with fewer investments, it became not feasible. New technology in the value chain of Israel reduced energy costs and increased mass production to allow high quality drinking water to be produced at low costs (Ziade, 2016:7).

A new project of dams was designed in the county's value chain for treated wastewater, reuse to meet the varying demand. Older plants were expanded and upgraded to meet different sector demands in all communities (Ziade, 2016:7). This was done in order for the sewage water which was treated to be used in certain sectors of the community not for drinking and the water take from the sea was then processed for drinking.

### *2.3.1. Challenges of S.C.M implementation in the provision of goods and services by the eThekweni municipality*

Government in South Africa uses SCM as one of the key mechanisms in enabling national, provincial and local spheres to implement policy. One of the problems faced by the government especially municipalities is the misunderstanding and undervaluation of SCM through not understanding its strategic importance. One of the key areas affecting most municipalities and provincial with national spheres of government is procurement phase. Usually suppliers charge extremely high price while providing poor quality standard of goods and services for government departments (Fuzile, 2015:1).

### *2.3.1.1 Supply Chain Management Regulations*

The EThekwini municipalities face similar challenges when it comes to the provision of goods and services to residents of jurisdiction through SCM policy. The EThekwini municipality has struggled to equip supply chain employees with SCM regulations towards the provision of goods and services. This has been a result of the procurement not being clearly understood as it comes with strict legislations as to avoid wasteful expenditure while reducing conflict of interest and unfair treatment towards service providers (EThekwini municipality, “2015”).

This impedes the provision of goods and services towards recommended lead times as the process becomes time consuming while government through national treasury double checks wrong doings before allocating budgets. This then delays certain goods and services to reach communities around the region in time when needed. In addition, supply chain managers find SCMP confusing and cumbersome, which reduces proper implementation, this then, causes poor delivery of goods and services.

Supply Chain managers with municipal managers face a challenge when it comes to providing adequate controls, procedures for handling bidding, appointment of bid committee. Usually you find committees established with members not aligned with policy requirements with insufficient motivation when there is deviation from policy. This then provides challenges in the value chain towards provision of goods and services because it basically affects, distribution channels, production and product offering to residents.

### *2.3.1.2 Lack of skills, knowledge and capacity*

The EThekwini municipality has seen a need to improve skills and knowledge of employees as evident through competency assessments and regular reporting and staff to be evaluated.

Employees attend training programs and workshops to equip them with supply chain process when it comes to the provision of goods and services. The lack of services delivery towards water services has been attributed by lack of capacity to provide through applying SCMP's by employees (Economic developed and growth in (EThekwini, 2011: 23).

### *2.1.1.3 Lack of supplier management relationships.*

An important concept in SCM is supplier chain management relationships (Amber, 2016:26).

The municipality has underestimated the importance of this field in the implementation of

SCMP's and when there is a decrease in corruption through clean audits, they sometimes regard this a signal of good relations. The municipality has struggled to foster long term strategic supplier relations with suppliers in the past which has led to poor service delivery in goods and services. It has also been a victim of being over priced by various suppliers (Albert, 2015:41).

Municipalities through SCM policy must select proper contractors or suppliers in the procurement of goods and services while also having the ability to dispose goods no longer needed. The municipal managers must ensure that strict adherence to SCM policy through submission of quarterly reports and annual reviews (eThekweni municipality "2015").

### ***2.3.2 EThekweni's Water Supply System and distribution networks***

The eThekweni municipality uses supplied portable water that comes from eleven treatment plants. Umgeni Waters, Hazelmere are the main plants for water supplies for the municipality but there are six dams. All plants are showing considerable low levels at the water dams (Albert, 2015:38).

A major challenge to the water system and the distribution network was the Hazelmere Dam that was no longer able to supply water, as only fifteen percent was useable. Residents close to this dam have been affected by these low levels of water, which have led to the municipality employing water restrictions to these areas (Albert, 2015:39).

The municipality has a strategy in the form of an alternative water supply to lessen the load on Hazelmere dam. The municipality successfully installed pressure-reducing valves. In addition to the PRV used to reduce water pressure and losses the municipality has introduced restrictor washers which have placed to approximately 20 000 consumers to reduce demand. The municipality is also aware of the economic and social impact of the drought for its residents under the jurisdiction (EThekweni municipality, 2012: 5).

Poor rainfall has put immense pressure on water system with supply dropping from ninety-nine percent to ninety-four percent in Umgeni Waters. There have been significant delays in the Spring Grove and Hazelmere projects, which were to be designed to provide more water through minimizing losses and increasing the supply. For supply in the region to meet its expected

demand, the current water demand needs to be maintained at approximately 910M1/day because of the failure of the water system (Ethekwini municipality, 2012: 7).

The Lower Tugela bulk water infrastructure project was an investment by the province to increase more capacity in water supplier by April 2016. There were delays in the project but there has not been great progress in water supply. One of the problems the water system and its distribution networks has been the ageing infrastructure, burst pipes, water pressure, vandalism, illegal water connections, theft infrastructure, unreported leaks and growth in. Water access and water borne disease have also been a major negative effect on residents in communities in the municipal area (Albert, 2015:39).

The municipality has adopted an objective towards reducing Non-Revenue Water. NRW is a process where water is produced and lost which leads to water shortages in the municipal area before it reaches the customer through the distribution network. These water losses can be due to leaks or theft and metering inaccuracies. This reduces revenue collected from water services, which then has a negative impact on the provision to community members due to projects of supply not completed in time (Albert, 2015:39).

The municipality to protect the fluent operation of its systems and distribution networks has launched programs like the Citizen Voice. Community members are involved in decision-making while also providing a solution to problems with damaged water systems and distribution networks (Albert, 2015:39). With all these challenges facing the municipality towards water provision, it has developed what is called smart systems.

The eThekwini municipal area is facing an ever-increasing population and is affected by the issue of climate change, which then causes residents and businesses to suffer from water shortages. Smart systems were designed to reduce costs and provide safe drinking water by increasing reliability in water suppliers (Performance Management System Framework, 2008: 24).

Smart water system is made possible by three components, which are as follows; the scarcity of water, riskiness of water, and the underpricing of water services.

There have been investments in smart water system through investment in technology to preserve the water supply at the same time reducing water costs by the municipality. These systems are possible through Information Communication and Technology, which does not come cheap (Albert, 2015:41).

Smart systems in water provision need seven ways in the implementation process.

- Mapping and monitoring the physical infrastructure
- Accurately measuring water consumption
- Monitoring drinking water quality
- Present, perfect and predict condition
- Make better use of diffuse and distributed non-traditional water resources
- Prepare better for storms
- Harness the energy and nutrient resources in water and wastewater (Albert, 2015:38).

The ICT assists in capturing the full potential of water services while contributing to economic development through its financial attractiveness from business as they usually use large amounts of the city's water supply (Economic developed and growth in EThekwini, 2011: 19). Having the smart system can also assist the municipality to reduce leaks, theft and invest in projects of infrastructure, which can assist in increasing the water supply in the municipal area (Economic developed and growth in EThekwini, 2011: 20).

The Accounting officer in the eThekwini municipality must make sure that process towards the provision of any service that Supply Chain Management policy is followed and for the study followed in the provision of water services to residents. The systems and procedures developed towards water provision and distribution networks must be in line with SCM regulations (EThekwini Municipality, 2016).

## **2.4 Generic Review of Supply Chain Management in the municipal environment**

SCM management is new in the public sector especially in South Africa. It was adopted in the year 2001 with the review of the joint assessment review with the World Bank through the office of the national treasury. In government institutions like municipalities, there was a lack of accountability, transparency in the procurement policy. A growing need for SCM was evident (Ambe, 2016:20).

A document with regulations, procedures for accounting officers was developed to guide the process in administration for entities in government institutions. It was always going to be a challenge in applying SCM in the municipal environment as most of the literature, which exist, was found in private sector transactions. The field has gained much attention in the municipal are with regards to attracting concepts like quality, delivery, speed and value for money (Ambe, 2016:20).

#### *2.4.1 Status of municipalities and practices in South Africa*

Municipalities in South Africa are divided into different categories, as for example the eThekweni municipality as a focus area for the study is a metropolitan (EThekweni municipality, 2012: 5). The municipalities are dived into four district and nineteen local municipalities. SCM practises in municipalities are an obligation of the South African Constitution, compliance with regulations is the responsibility are determined by auditor's general office when he or she reports (Ambe, 2016:24).

According to the Constitution of the Republic of South Africa of 1996, there are three categories of municipalities. Category, A municipality make up the metropolitan, category B making the district and category C being the local. There are 278 municipalities in the country with 226 being local municipalities, 44 being local and 8 being metropolitan (Constitution of the Republic of South Africa of 1996:89).

Compliance with Supply Chain Management is based on weather employees, councillors; state officials are given awards on the side out of regulations. Contracts, which are declared inadequate but are processed, can show that there is no SCM compliance with also providing awards to close family and friends. Lack of control in the municipality by accounting officers

with uncompetitive procurement processes can be a sign of no compliance with SCM regulations in a municipality (Ambe, 2016:25).

To implement fairness, transparency, equity and accountability in municipalities, there are certain regulations provided by SCM process to subject certain officials to legislation. The key acts for any municipality are:

- Municipal Systems Act 32 of 2000.
- Preferential Procurement Policy Framework Act 5 of 2000.
- Municipal Finance Management Act 56 of 2003 (MFMA).
- Preferential Procurement Regulations 2011.
- Supply Chain Management: A Guide for Accounting Officers of Municipalities and Municipal (Fuzile, 2015:9)

In the municipal context of South Africa SCM deals mainly with financial management technique, which exists to regulate there, way funds are handled in the procurement of goods and services. It also makes sure that service delivery is responsive to the needs of society without corruption dominating transactions, hampering with the process. In the municipal environment of South Africa; a lot of municipality have failed to comply with SCM regulations. This has been corruption with few individuals benefiting financially at the expense of service delivery. In some instance, officials ignore SCM regulations with families getting an advantage with their associates when it comes to jobs and tendering processes (Ambe, 2016:25).

Municipalities in South Africa have an obligation as per section 165 of the MFMA to have an audit, which is internal to check the efficiency and effectiveness with economic use of SCM to achieve the stated goals and objectives. There should also be compliance with the external auditor, which examine the reports from the mayor. The audit assist to eliminate, corruption, nepotism from office bearers like political, accounting officers as to not affect other stakeholders which are suppliers and community members (Motuba, 2014:26).

#### *2.4.2 Municipal SCM challenges*

Municipalities in general face similar challenges when it comes to SCM. The major challenge is the need for human capital development associated with socioeconomic growth when it comes to understanding Supply Chain Management. The need for long-term quality service delivery is always not possible in most cases because of corruption and inefficiency (Motuba, 2014:26).

Globalization has been another factor for municipalities to deal with when comes to implementing SCM. The world has become small with the global economy being inter linked when it comes to the procurement and delivery of goods and service. Technology has been an outstanding factor, which has come with globalization. Technology has become a primary importance for SCM strategy (Motuba, 2014:24).

Officials should understand how to implement technology as it can cause damages when it's not properly applied. Technology enables information to circulate easy with communication in the value chain with cost decreasing. The challenge facing municipalities is the lack of human capital towards technology understanding (Ambe, 2016:25).

Officials in municipalities still lack compliance and accountability. The public has been furious with SCM officials in municipalities who have engaged in corruption but still work in government and just change departments within. Municipalities not having proper organizational structures with relevant skills, knowledge and capacity to fully implement SCM functions has been a cause for the lack of service delivery and corruption (Motuba, 2014:25).

Not having the proper skills and knowledge causes policies not to be understood. SCM policies are cumbersome with officials with relevant qualifications finding it hard to understand some regulations and procedures. Communities are always in strikes because there are not informed of changes in policy and their involvement is sometimes undermined because some officials do not even know that they form part of decision making in the value chain (Ambe, 2016:25).

Municipalities have struggled to create supplier relationships, which is an important element in SCM. This has led to suppliers over charging officials and colluding as suppliers towards

municipalities, which has had a negative impact on service delivery. Strong ethical leadership has been a growing factor which has been undermined by public officials. (Ambe, 2016:27).

## **2.5 Conclusion**

The chapter started by analyzing the current situation of the public sector with applying SCM, it further went to look at systems which were divided into two components being the planning and the execution. A definition of supply chain concept and how it has involved was discussed. The chapter then investigated the elements, which make up supply chain systems like forecasting, estimates of goods and services, manufacturing, distribution, sales of finished goods, logistics, inventory management, location and order fulfilment.

The chapter then proceeded by outlining the benefits of the supply chain systems. The second part of the chapter investigated literature of the water systems and supply chain networks. It was stipulated that Supply chain networks in water differ across municipalities, cities, rural areas and countries and it was for that reason there was a discussion on various countries like China, India and Israel. Network of relationships within a firm or government entity are interdependent units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information.

This process then transfers to the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction.

An outline of the challenges faced by the EThekweni municipalities in their systems and distribution networks. The chapter then concluded by looking at the challenges faced by municipalities in general in applying SCM. The next chapter, which is chapter three looks at the theoretical and conceptual framework of the study.

## CHAPTER THREE: THEORETICAL FRAMEWORK OF THE STUDY

### 3.0 Introduction

A theoretical framework is concerned with involving the theory of a subject or area of study rather than its practical application. The literature review in this study will be in the form of ‘tell-a-story’. The literature will seek to investigate the importance of using the principles of SCM in the eThekweni municipality in the provision of water services (Vincent and Anfara, 2013:5). A conceptual framework is an analytical tool with many variations, assumptions, principles and a context, which is designed to formulate a distinction and organize various ideas in the conceptual framework to create a broad concept (Vincent and Anfara, 2013:6).

The chapter will look at different theories under Supply Chain Management and critically analyze how they relate to water supply with its distribution networks. Water suppliers and their distribution networks vary across cities and countries according to conditions facing them with water challenges in those specific areas. Scholar information from academics, which relates to studies from different cities and countries on water supply distribution networks, will be used.

The study addresses the following theories: Supply Chain Management principles theory , (Anderson and Brits 1997:3), The Supply Chain Management process theory, ( Croxton, 2001:1) Porter’s Value Chain theory, (Porter, 1985:31), Supply Chain Management Analysis theory using: SCOR Model ( Heizer and Render, 2014:487) with the last being Linking corporate strategy policy and Supply Chain Management theory (Hofmann, 2010: 257).

Theories developed in this chapter were constructed from variables in literature that were selected as important themes in the study towards finding theories of SCM which relate to water distribution networks. These themes or variables were leakages of water, investment projects, and population growth with increasing demand, policies and completion.

These variables led to the theories of SCMPs, which is central to the study, the Supply Chain Management process theory with its components will be discussed.

The second part of the chapter will proceed by choosing theories, which will build up the theoretical framework for the study to address the research objectives. The chapter will then conclude.

### **3.1 Theories of SCM and how they relate to water supply**

#### *3.1.1 Supply Chain Management principles theory*

According to Anderson and Brits (1997:3) Supply Chain Management principles can lead to efficiency, effectiveness and lead to positive financial outcome for a firm, government entity supply chain process until returns from the sale of a particular product. There are seven Supply Chain Management principles which are briefly discussed below and how they relate to water systems and distribution networks as the first theory.

#### Segment customer based on needs

Segmentation in its simplest form means grouping individuals of an industry who are possible customers, through product and then providing services to them by reducing average costs while increasing profitability. Market segmentation is the process of dividing a broad consumer or business market, normally consisting of existing and potential customers, into sub-groups of consumers based on some type of shared characteristics. The process of segmenting customer involves dividing a broad consumer based on some shared characteristics to allow the company to keep existing and potential customers. This is done to specifically achieve its objectives, through a development portfolio of service tailored to various segments (Anderson and Britt, 1997: 3).

Water supply is segmented based on low income, medium income and high-income earners towards its provision of the service through the distribution network. This is done in water supply system through selection of priority areas by examining payment affordability across residents. Building capacity follows based on the segment. The demand for water services can be assessed using techniques such as willingness to pay surveys and other. The involvement of other stakeholders can be used in the value chain like inviting the private sector if you are government and non-profit organization (Sanson and Franceys, 2004: 14).

### Customize the logistics network to service requirements and profitability of customer segments

This speaks to the reduction of costs in a company, government or organizations through production with certain goods, service ordered by end user. This process requires reducing the value chain to independent distribution network for that good or service. For the study, water is the service (Anderson and Britt, 1997: 3).

The country Peru in South America has a farm called Ica Home in a town of Monsanto, which is the largest vegetable seed manufacturing plant. It faces a challenge of water scarcity for residents as it is based in the Ica Valley desert. Government had to choose between residents and farm workers responsible for water provision area of jurisdiction as it represents half the firm's global production (Letmathe and Cai, 2009:77).

With a minimum rainfall of only 3mm annually, the government has customized the logistics network and has prohibited any new wells to be drilled in the area to preserve water for the farms production. The farm implemented strategies in the distribution network through government assistance by building a Reverse Osmosis plant. This allowed reduction of water withdrawals including purifying water, which has been already used (Letmathe and Cai, 2009:77).

### Listen to market signals and plan accordingly

A growing challenge to water provision, which has been dominant in the study, has been the ever-increasing population which makes it difficult to meet the ever-increasing demand for water services with the available supply. Listen to market signals and planning accordingly speaks to the strategies involved in forecasting, predicting and planning to accurately meet demand with supply (Anderson and Britt, 1997: 4).

The process of forecasting becomes an important aspect in supply chain systems as mentioned before in the study for estimating demand until actual demand is known (Heizer and Render, 2015: 141). WDMPs are used in supply chain water distribution networks to come up with water saving process in the value chain. Resource mobilization with alternative water production, which became regulated in the country of Israel through natural groundwater reservoirs. This assisted in meeting demand for the high demand due to population growth (Ziade, 2016:6).

### Differentiate products closer to customers

A company called Unilever, which is a global consumer goods firm, has assisted in the city by using the SCMPs of differentiating a product close to substitutes. To reduce the amount of municipal water the company uses a substitute source of water through rainwater harvesting. It does this through a 22 000m cubed roof and condensate recovery process. It then recycles the processed water in the factory through greywater produced in the company (2030 Water resource groups, “2009”).

### Source strategically

Sourcing strategy needs an understanding of a company’s, government’s, non-profit organizations business strategy, the resources that are needed to deliver the intended strategy. Also market forces that are unique to risks within the organization associated with implementing specific approaches, they can be single or multiple sourcing strategy for that particular organization (Anderson and Britt, 1997:4 ).

Close and improved relationships are required amongst stakeholders in the production of a certain good or service. The stakeholders could be suppliers, buyers, manufactures and retailers. (Stock and Boyer, 2009: 700). The city of India Rajasthan failed to reduce wastage of water due to infrastructural development being slow. It could not maintain cleanliness of the lakes with companies needing large water usage as it started expanding (Letmathe and Cai, 2009:51).

A partnership by the company Hindustan Zinc and the local government of the city was established. This was the first public and private relationship in the form of being partner’s build the first ever-huge Wastewater Treatment Plant. The plant had wastewater reuse for agriculture while it also incorporated the same method for cooling water. Wastewater recycling for internal use and public private partnership funding to assist with future projects of water and maintenance of systems (Letmathe and Cai, 2009:51).

### Develop supply chain technology strategy

Developing DSCTS, goes with understanding that the value chain towards the provision of a certain products must be done through technological advancement for cost reduction, efficiency and innovation to accommodate the ever-changing environment (Johsonn and Flynn, 2015: 76).

Every person across the globe has once or many times used a shower but there is cold water. This then requires a waiting interval for the water to be hot.: This might seem light, but if everyone every day is having a waiting interval with running cold water before it turns hot, water gallons are being lost. Richard Ogedodeton came with a solution through research technology. (Triple Pundit,"2015").

An eco-friendly shower system was developed which can produce water-desired temperature in a small interval of 30 seconds to reduce water wastage. This research shows the effect of technological advancement through the water supply distribution network assisted communities in the United Kingdom. This research can also assist in government municipalities in providing adequate service to residents through technological advancements (Triple Pundit,"2015").

#### Adopt Channel spanning Measures

Regular checks of the water supply chain system if it's still go well according to the intended design for meeting community needs. Obstacles found in the value chain, which hinder service delivery of water, should be corrected immediately. Advancement in technology, infrastructure to increase continuous ongoing capacity to meet demands of residents for water services. In SCMP's applying such methods is called, to adopting channel-spanning measures. (Anderson and Britt, 1997:10)

#### *3.1.2 The Supply Chain Management process theory*

According to Croxton, (2001:1) global supply chain forum identifies eight core management processes to analyze the importance of Supply Chain Management importance in a firm or government department (Stadtler and Kilger, 2015:36 ). The eight core management principles are discussed below briefly and how they relate to water supply and distribution networks.

A brief explanation will be on those which greatly affect the distribution network in water service especially those which will assist in the public sector like the EThekwini municipality.

They are customer relationship management, customer service relationship management, demand management, manufacturing flow, order fulfilment, supplier relationship management, product development commercialisation and returns management. Other components, which were covered in Supply Chain Management principle theory, will be omitted to avoid repetition.

### Customer relationship management

Customer Relationship Management shows how a business interacts with its customers. Even though it is usually regarded as a data capturing system of information for the customer, it goes to involve technology to increase intelligence needed to provide improved support to customers through service satisfaction. A need to satisfy customers but also a need to find new customers is also important for revenue increases (Kumar, 2010: 1).

The customer was not always given much emphasis in the past when it belonged to the public denominated sector with products such as water. Developing countries have put this emphasis of customer relationship management to their respective water and sanitation department when designing their supply chain networks of water provision. There are rural, townships and urban residents where they get water from numerous different sources through various networks, which you find more efficient, and some not efficient towards the service (Coates and Kayaga, 2001:5).

It is for these competing suppliers through distribution networks to provide water to meet the demand of residents that customer relationship management became important in water services.

### Customer service management

In its simplest form the term customer, service relationship refers to any assistance or advice provided by business to the customer of products (Muhammad and Mohammad, 2012:7). Ongoing engagement with customers by listening to them is one of the key elements in the water sector in the country of Scotland value chain. Needs of the customer towards water service provision are identified by suppliers, through building capacity for supply excellence, meeting consumer demand (Tayburn, 2013:19).

Customer service management was achieved through extensive consumer research program me targeted at speaking with individual's getting to know what they would prefer in the water service and where they are not satisfied with our distribution amongst residents. Positive results have shown through a reduction in water wastage and drinking water in the country has is regarded as superior quality through consumer perception (Tayburn, 2013:19).

## Manufacturing flow

Manufacturing flow management is a form of SCMP that incorporates the distribution of products through plants and manufactures. These products are then delivered to suppliers by further distributing through retailers and finally reach the end user, which is the customer. Its core purpose is to achieve manufacturing flexibility at the lowest cost as possible to assist the planning and execution stages of the supply chain system (Goldsby and Dastugue, 2003:33)

Magaliesburg a small town situated below the Witwatersrand mountain range in Gauteng, South Africa has a water supply chain distribution network designed from the manufacturing flow management process (Malagies water, “2015”). The water comes from two rivers which are the Crocodile and Pienaar rivers. After the rainfall has filled the rivers the water flows into the dams owned by the Department of Water and Sanitation (Malagies water, “2015”).

Consumers make the third flow in water treatment plants at a stage water is ready for manufacturing, business use, and consumption. Water is distributed to industries, municipalities, mines and agricultural farms. Municipalities. Municipalities have their own reservoirs to redistribute water to residents through distribution channels in jurisdiction. Capacity is then built through reticulation infrastructure and services (Malagies water, “2015”).

### *3.1.3 Porter's Value Chain theory*

According to Porter, (1985:31) the value chain are the activities an organization performs while linking them with the overall firm's competitiveness. (Porter, 1985: 31). Machinery, equipment, money and people must be put into a system in which they will work together to deliver a specific product based on the needs of the customer. The theory advocates for integration through stakeholders in the value chain working together through interdependent system to better satisfy the customer at the lowest possible cost.

The theory usually called the five Porter's theory is encompasses five elements for its success, which are inbound logistics, operations, outbound logistics, marketing and sales. It also evolves to support activities for theory for it to stand with its components which are: procurement, technology development, human resource and infrastructure (Porter, 1985: 32).

Supply chain distribution network is not sustainable due to aging municipal infrastructure in most municipalities. Bottled water has been driven through this outcome to take over the market due to increased perception of safety in consumption, contributor to health-related issues and other factors. A new distribution water network was built by Walmart Company (Galberth and Vincent, 2013:2).

The company needed inbound logistics for the delivery of the product and outbound logistics for the product to reach customers in its supply chain. The company employed qualified employees at a larger scale to the operations of the company and increased their marketing program in an effort of increasing revenue through sales applying the five-Porter theory (Galberth and Vincent, 2013:2).

There are some elements not covered by Porter theory in the supplying changing environment with fast growing economy. Walmart as a business used elements of five Porter's theory. The supporting activities, which are procurement, technology, human resource and infrastructure, tasked to be innovative through coming with new bottled quality products of the years (Galberth and Vincent, 2013:5).

#### *3.1.4 Supply Chain Management Analysis theory using: SCOR Model*

The supply chain operations model referred to as the SCOR is one of the leading frameworks in analyzing the organization effectiveness towards achieving its strategic overall objectives (Hudson, "2004"). It promotes linking business process, performance metrics, practices, skills into one integrated interdependent structure through supply chain principles and regulations. The SCOR model incorporates five elements of its own as an analysis theory which are: Planning (supply and demand), sourcing (purchasing activities), make (production activities), deliver (distribution) and return (Heizer and Render: 487).

The water distribution network, which supply water in the United Kingdom, has adopted similar components of the SCOR model to see if there is productivity in the value chain. One important objective in the water sector is innovation. Innovation in the sector involves adapting infrastructure to climate change and demand which is a planning step. There is also a great emphasis on treatment of plants and water waste management techniques by the country in its water supply network (Bernanrd, 2012:9).

The country also has contractors who are financially stable and can handle the cost involved in the supply chain of water when it comes to distribution and increasing revenue to develop further project through increasing infrastructural capacity (Bernanrd, 2012:10).

### *3.1.5 Linking corporate strategy policy and Supply Chain Management theory*

Corporate strategy in supply chain refers to the process of evaluating costs and benefits of a particular firm while considering trade-offs needed to be performed. It looks at trade-offs on operational process of the organization and how they benefit the firm. Linking it with supply chain means planning a strategy based on the supply chain instruments and not deviating from the objectives of the firm (Hofmann, 2010: 257).

At EThekwini municipality, the distribution network for providing water to residents must align municipal strategy with Supply Chain Management. The policy of Supply Chain Management must be consistent with the municipal finance management act in its provision of water service to residents. The policy or strategy of the firm must be inclined with supply chain regulations when delivering water services to residents from infrastructural projects, procurement, and maintenance and investments projects for water (EThekwini Municipality, “2012”).

## **3.2 Selection of theories which will build a theoretical framework to answer research objectives through the conceptual framework**

The case aims to analyze whether the lack of provision of water services might be due to the omission of the SCMPs. The delegation of the municipality under the MFMA clearly stipulates that officials when carrying out powers and duties must carry out the SCMPs. It is the requirement of the municipality under the MFMA no.56 of 2003 to adhere prescribed Supply

Chain Management policy when carrying tasks of providing goods and service. It goes to say the municipal entity must be cost-effective, equitable, transparent and fair when it complies with regulatory framework of the for municipal Supply Chain Management (Government Gazette, 2004: 112).

The theoretical framework will be the SCMP and will be supported by a second theory, which is the SCOR model to analyze the processes of the municipality towards water provision while answering the research objectives of the study. The third theoretical framework of the study will be linking the cooperate strategy with supply chain. Since it is, a local government sphere there where be linking of the supply chain policies with the strategic plan of the EThekwini municipality towards water provision to residents in its jurisdiction.

The study will seek to solve the problem statement of the study through the theoretical framework chosen which analyzing weather the application of sound SCMPs can lead to the improvement of water services in the eThekwini municipality. The theoretical framework in the study will also seek to answer the research objectives of the study.

*3.2.1 Implementation of SCMPs in EThekwini municipality*

The eThekwini municipality should employ the SCMPs in its operations where all stakeholders work together to increase service delivery in the provision of water services to community members. The municipality cannot fully apply all SCMPs; some will vary in level of implementation. Not all the content from the SCMPs can be fully applied, as this is also a government structure under the local sphere, which is not a profit-making firm but an institution, which aims at providing services while knowing the importance of revenue (Stock and Boyer, 2009:690).

**Figure 2 below shows the principles:**

**Figure 2**

<b>Relationship Between Supply Chain Principles and Financial outcomes</b>	<b>Revenue Growth</b>	<b>Asset Utilization</b>	<b>Cost Reduction</b>
1. Segment customer based on needs	•	❖	❖

2. Customize logistics network	❖	●	❖
3. Listen to market signals and plan accordingly	○	●	❖
4. Differentiate products closer to customers	○	❖	●
5. Source strategically	○	❖	●
6. Develop supply chain technology	❖	●	❖
7. Adopt channel-spanning measures	●	●	●

- **High**
- ❖ **Medium**
- **Low**

Source: Anderson and Britt, 1997

The mayor as the head must implement Supply Chain Management principles in operations of the municipality. The Municipality for the study is a metropolitan category A; this means it has exclusive municipal executive legislative authority in its area. A background analysis to the past, present issues which caused a major crisis in the provision of equal service to residents. An application of SCMPs Supply Chain Management principles can be encourage in government structures like the municipality since there is a perception in society that the public sector is incompetent in providing services to society (EThekwini municipality, "2015").

#### Segmentation of customers based on the services

This is used to segment a target market which will be profitable to a particular firm and not to waste resources. The eThekwini municipality can segment the communities who are worst off from the provision of water services so that when they compile the IDP they start with them in budgeting. This will enable the municipality to provide water services to those communities in need of the services (Anderson and Britt, 1997: 3).

The municipality must also make sure that segmentation provides revenue which is collected for to better provided services to residents. Previously disadvantaged communities under the Apartheid Era like residents living in informal settlements could be a starting point for the municipality. Urban areas with agreed tariffs to collect revenue on water systems should also be a priority as the population in those areas is in the corporate world as they are upper class and are mostly in the labor force.

### Customize logistics network

Municipalities are not profit-making firms but can still customize their logistics network towards the provision of water services to reduce costs. The EThekwini municipality lost 25% of revenue in water loss from 2012 to 2014 (Anderson and Britt, 1997:3). The municipality must have a single logistic network, which will be focused on the provision of water to residents to fight the backlog of 25% in water services. This does not mean that there are no other logistics networks in the municipality but simply mean the product water should have its own distribution network independent from other services delivered to residents in order to be sufficient Anderson and Britt, 1997:4).

### Listening to market signals and aligning demand planning accordingly

Making sure that supply chain is consistency with forecasting accuracy and optimal resource location to all stakeholders involved in the provision of water services to residents. The eThekwini municipality must be able to conduct studies on how many residents suffer from insufficient water services. This will assist in matching available supply with anticipated demand with also procurement activities and see if there is a need to increase capacity through infrastructural developmental projects like dams, drainage systems and treatment plants. It can match its supply and procurement activities with the anticipated demand. (Anderson and Britt, 1997:3).

The EThekwini municipality in March of 2016 announced through the Supply Chain Management unit that it was going to reduce consumption of water by 15% what some might like labelling it as water shedding. This came as the result of the municipality failing to deliver water services in accordance resident needs in the region while facing increasing costs in the process (Rondganger, “2016”) The first part of the water restrictions was to inform residents to expect water interruptions on Mondays and Wednesday which was called Group A.

The second group which was B, residents could expect interruptions on Tuesdays and Thursdays while Group C emphasized that the Central Business District (CBD) will witness interruptions at

night. This shows that the municipality has failed to listen to market signals and align demand with supply in the provision of water services in the municipality (Rondganger, “2016” ).

#### Differentiate products closer to customers

This speaks about differentiating products closer to the customer and speed, conversion, across the supply chain. The eThekweni municipality can adopt especially the speed and conversion in Supply Chain Management. A solution might be getting multiple suppliers that will compete on price and services while removing monopolistic tendencies (Anderson and Britt, 1997:4). The Municipality at this stage purchases its water from Umgeni water that acts in a monopolistic arrangement unlike having many distributors or suppliers of water to look at. (EThekweni municipality, “2015”).

#### Source strategically

The eThekweni Municipality has to create relationships with the suppliers of water services, whether the water is from the streams or dams. The national government of South Africa purchases some of its water from Lesotho (EThekweni municipality, 2015”). Creating relationships will strengthen future ties with suppliers and can open room for price negotiations in hard times of economic downturns. The theory also expresses the importance of shorter lead times, which can be beneficial for the residents of the municipality when it comes to water services, which are established by buyer/seller relationships (Bardi and Robert, 2009: 107).

One important element though is the coming together of the customer being the resident and the supplier which is the EThekweni municipality in order to educate each other on the payment system for water service delivery. This is where the leadership in the municipality has to have skills off making residents understand increases. There might be an increase in payment rates for water and electricity which are reasonable to build projects which will assist the community in service delivery and the department in revenue collection ( Bardi and Robert, 2009:108).

This could decrease the issue of protests and illegal connections as all stakeholders in the value chain are involved in the rate systems proposed and why they are proposed

Improved Confidence in the supply chain of the municipality can increase the adequate provision of water services; Martin Christopher bases this on the theory on Mitigating Supply Chain risk through improved confidence. Complexity in the supply chain with lack of information, uncertainty, distribution and logistics networks can all cause chaos and risk in the service delivery of the municipality (Christopher and Lee 2004:388).

To increase confidence in the supply chain of the municipality there must be evidence of visibility, which will enhance transparency, and sharing of information amongst components or departments in the supply chain. That would need control measures to detect something is wrong in order to restore confidence (Christopher and Lee 2004:388). This process can also increase knowledge of Supply Chain Management amongst employees in the departments of supply chain so that each role player knows its responsibility in the value chain.

This means for a company to be effective and efficient all these separate departments must work together with strong relations between buyers and suppliers to agree on a reasonable price, which is beneficial to both partners. The supplier must provide products that can be distributed by transportation modes with its costs and must be quality for the customer (Bowersox and Cooper, 2002:329)

The municipality must fully implement Supply Chain Management principles that can help build relationships with the private sector. Municipalities should apply principles like creating relationships with suppliers so that the private sector understands the purchasing power of government towards provision of water services. This will eliminate risk and extra cost as information will be shared freely on what is available and not present (Fuzile, 2015: 4 ).

#### Develop supply chain technology strategy

Technology based on strategies in the supply of water services in the municipality is needed because in adopting market signals and aligning demand with water provision which was discussed in the third principle, an issue of water cuts by the municipality was introduced. The municipality can use meter technology, a device installed on the meter, reduces the flow rate of water. Water wastage is then reduced (Rondganger, “2016”).

The small device does not affect pressure but recognises if a water tap has been opened for prolonged times periods making the meter to refill pipes at a slower rate. The municipality must have innovative water approved systems, which will provide services adequately in shorter lead times with low cost in the supply chain process (Rondganger, “2016”).

#### Adopt channel-spanning measures

The last principles looked at the broad supply chain processes starting by analyzing if principle one to seven have fully been applied. The EThekwini municipality should look at the overall supply chain. The starting point which is forecasting demand for the service towards going to the supplier of water services. It must go beyond that by looking into the different approved systems in different areas and how they provide water services (Anderson and Britt, 1997: 4).

The municipality should also look at the stages where loss of water has been significant and look at the payment systems in place that they provide revenue for the municipality. Basically, the implementation of the last principle by the municipality will give an over view of the whole Supply Chain Management processes towards the provision of water service (Anderson and Britt, 1997:5).

#### *3.2.2 Improving service delivery using SCOR model*

To analyze the effectiveness and efficiency in water distribution to residents, the EThekwini municipality can use a SCOR model. The supply chain operations reference can be used to measure reorganize and improve the implementation of SCMPs in process within the municipality. The municipality can perform the application of the model by looking into five elements, which are planning, sourcing, make, delivery and returns (Heizer and Render 488).

With a fast-growing economy comparable to Johannesburg, the city is greatly affected by the scarcity in water. Residents, universities and companies relate a fast-growing city economy to growing demand for water. An inadequate water provision causes serious implication on the city’s governance (eThekwini municipality, “2012”).

Sourcing on how the municipality create relationships with other stakeholders like suppliers will need be discussed as it was mentioned in the implementation of SCMPs by the eThekweni municipality to better deliver water service in **3.2.1** in bullet point number 5.

### Planning

The eThekweni municipality can plan for the provision of water service to residents using supply chain principles through the planning stage. It can do this through considering the value chain of water by looking at elements of planning which are: forecasting, estimates of goods and services, location, logistics management and sale of finished goods (Heizer and Render, 2015: 469).

**Forecasting:** Managers of the water department under Supply Chain Management must make correct estimates as how to order the resource from the suppliers. Managers should make investments decision on how to raise funds for infrastructural projects like, dams and water treatment plants to meet demand from residents. By analyzing demand, getting community members involved in decision making towards meeting resident's needs when it comes to water services (Heizer and Render, 2015: 141).

**Estimates of goods and services:** In the planning stage, the municipality needs to estimate the quantity of water, needed for manufacturing in order to be processed for portable safe drinking by residents in the municipal area. Demand management must be used to estimate the demand of residents in the jurisdiction under the municipality to meet it with available supply of the water service (Butler and Memo, 2006:1).

Estimating of water service required using demand management assist the municipality in detecting variances within the value chain while equalling demand with supply of certain product required (Butler and Memo, 2006:1).

**Location:** Managers in Supply Chain Management with its goals of improving water service delivery to residents must locate resource according to the various challenges faced by communities. Building of new plants, new dams and knowing the environmentally factors both

positive and negative of those projects to nature and people can be achieved (Johnson and Flynn, 2015: 28).

#### Logistics Management:

Transport managers are given the task to arrange water distribution from one point to various areas. Managers should make sure that water is transported at the required level to the required destinations without wastage, delays and extra cost incurred. Managers in the municipality also should consider the storage capacity of the resource and how it is handled before processing (Bowersox and Cooper, 2002: 355).

**Sale of finished goods:** The initial goal of the supply chain process is to finally deliver the required product to customers. The municipality should determine which quantity residents need and how to deliver to various communities. This is how Supply Chain Management systems can be judged by the municipality based on the satisfaction or perceived quality of the water service and access of the resource by residents (Heizer and Render, 2015: 662).

#### Make

Another component of the SCOR model is the make section usually known as the production activities. The production activities of the eThekweni municipality can include desalination of salt and sea water if it chose to adopt such a route, which it does not currently use. Managers can make sure drinking water, waste treatment; hydraulic infrastructural activities are producing efficient results towards water services. (Tedagua, “2016”)

Production activities can assist the municipality to analyze where the inadequate provision of water service comes from which will assist in deriving strategies to eradicate problems.

#### Deliver

Without out delivery the supply chain would be an impossible and time-consuming task with ever-increasing costs. Distribution not only speaks about the customer getting the end product which is water in the study but goes into the value chain on how the water is extracted from the ground, dams, rivers and how it is processed. Transportation modes relevant to water with the

value chain from where it is processed for safe drinking until the communities receive the resource are of major importance (Bowersox and Cooper, 2002: 331).

Delivery also speaks to recycled water from plants being delivered to manufacturing facilities by the municipality with the objective of meeting new existing demand in communities.

### Returns

The metropolitan municipality is not the same as a profit organization but under the local sphere of government in South Africa. It exists for service delivery as prescribed the South African constitution as already mentioned in the study. The municipality will need revue to engage infrastructural projects, technology advancement and employment of skilled labor force in water department (Constitution of the Republic of South Africa, 1996: 87).

This then leads to the importance of returns by the municipality. The municipality needs to have a clear design, control and operational system to be able to maximize value creation by providing satisfactory service with revenue collected. It can adopt pricing to the market strategy based on the ability of residents to pay tariffs or raise funds from other private sponsors as usually the residents who need water more are those who cannot afford to pay (Heizer and Render, 2015: 488)

#### *3.3.3 Aligning supply chain policy with water service strategic objectives*

The strategic plan of the eThekweni municipality when it comes to water clearly stipulates in the IDP that it aim to eliminate all challenges faced in order to better satisfy residents with the resource in adequate manners (EThekweni municipality, 2012:8). This is in line with Millennium Development Goals Report2014, which aimed to make sure that the proportion of people without water access for safe drinking should be given or provided with a sustainable access solution to water (United nations, “2014”).

Preamble of the EThekweni municipality states that: “Section 111 of the Municipal Finance Management Act requires each Municipality and Municipal entity to adopt and implement a Supply Chain Management policy, which gives effect to the requirements of the Act. In addition,

the Preferential Procurement Policy Framework Act requires an Organ of State to determine its Preferential Procurement Policy and to implement it within the framework prescribed (“EThekwini Municipality”, 2016).

When the municipality provides water services to resident it must align its process with already approved stipulated policies. The eThekwini Municipality must further commit to combating fraud, corruption, favoritism and irregular practices in Supply Chain Management with regards to the provision of water services and those caught must be legally punished by the law.

Although the study seeks to look into the implementation of SCMP’S in the municipality in the provision of water services, an analysis of the municipality operations as a whole is required. The local government Municipal Systems Act (No.32) of 2000 stipulates that local municipalities within their structures must prepare Integrated Development Plans (EThekwini Municipality, 2012).

The Integrated Development Plan is a tool used to transform local government operations in they jurisdiction in the best interest of society or residents through the provision of services. The municipal manager through the delegation of the EThekwini municipal council is tasked to prepare the IDP. “The Municipal Finance Management Act (No. 56 of 2003) secures sound and sustainable management of the municipal financial affairs of the municipality and other institutions in the local spheres of government” (EThekwini Municipality, 2012).

This means that the municipality in the IDP must budget for solutions when it comes to water service delivery in the region through investment projects and no wasteful fruitless expenditures in resources. Policy ensures that equitable water provision which must be easily accessible to all residents. There must be water borne sewerage available to all households in the region with a flushing toilet. There must be a semi-pressure roof tank water supply to all households which will provide the required level of water needed by the household (EThekwini municipality, 2012).

Also Supply Chain Management principles must work with policies outside Supply Chain Management when it comes to water provision which are the South African legislation. The

EThekweni municipality must align its water service polices with the Water Services Act Regulations to Water Services Authority. A few regulations will be stipulated.

- A Water Services Authority must, within four months after the end of each Financial Year, undertake a water service audit.
- The water services authority must meet the quantity of water provided to each determined supply zone to the area of its jurisdiction.
- The water services authority must make sure that every month there is a determination of the quantity of water not accounted for. This is achieved through comparing the measured quantity of water to each supply zone with the total measured quantity provided to all user connections within the area.
- The monthly analysis must be done until the year-end where now the quantity of water supplied must be determined but not discharged to sewage treatment plants by comparing the measured quantity of water provided to all user connections.
- There must be measure taken by the municipality to take reasonable measures to reduce quantity of unaccounted water.
- The municipality in its systems must make sure a leak is fixed within 48 hours, the water service authority must have a consumer service to which such incidents are reported (Water service Act no:108, 1997:4).

### **3.4 Conclusion**

The chapter gave theories of SC, which were discussed, and how they related to water supply and distribution networks. The implementation of SCMP'S in the literature showed how this theory could be used to improve water service delivery in the municipality, which as the researcher agrees. The SCORE model can be used to evaluate the effectiveness and efficiency of water distribution through the theory of SCMP is used.

The researcher also discussed the third theory to build a framework was aligning cooperate strategy with supply chain a supporting theory to theoretical framework which was discussed in detail.

## **CHAPTER FOUR: RESEARCH METHODOLOGY**

### **4.0 Introduction**

The chapter will discuss the research methodology that was used to conduct the study by starting with the research design of the study. The research methodology that was used in this study incorporated the qualitative research approach, a research strategy, a population and sampling strategy, and the description of the sample. This chapter also discusses the location of the study, data collection methods, data analysis, reliability and validity, research schedule, ethical considerations, and limitations.

### **4.1. Research design**

It is stated that a research design provides a practical overview of central issues involved in the design of social and economic research, covering a theoretical research. A research design is therefore a plan of action for getting from where one is to where they wish to go, where the initial point is the primary set of questions to be answered and the destination is the set of conclusions or answers (Hakim, 2000:2).

Because the study is warranted by the research problem, objectives and questions, a qualitative research design has been chosen and employed. This design is appropriate when the inquirer makes knowledge claims based primarily on constructivist perspectives that reveal multiple meanings of individual experiences that are socially and historically constructed.

The intent here could be to develop a theory or pattern, or advocacy and participatory perspectives, which include political, issue-oriented, collaborative or change-oriented approaches (Yin, 2009:1). The qualitative research design also uses strategies of inquiry such as narratives, phenomenology, ethnographies, grounded theory studies, or case studies. The researcher uses open-ended questions for respondents and the primary intent of emerging data is to develop themes that help address the research problem (Creswell, 2009: 20).

#### *4.1.1 Target population*

The target population can be defined as any group that is the subject of research interest. It can also be the opinions, views of the target population of a study as a larger pool of cases or elements, such as people, businesses, commercials, and animals (Sekaran and Bougie, 2010:262)

The municipality has 64 workers under the department of SCM in water services. There are 55 workers who have no knowledge about SCMP'S when executing their jobs. Their jobs require strength and muscles (EThekwini Municipality, "2016"). The study seeks to investigate: Can the formulation and implementation of SCMP'S lead to improvement in the water service delivery to residents in municipal area.

### **4.2 Research Approach/Methodology**

Methodology refers to the analysis of the principles, rules and postulates employed by a discipline. It shows a plan on how the research will be conducted and how questions will be answered in the study (Kothari, 1985:7). This study will employ qualitative research method. Qualitative research is a method used to analyze data directly in the fieldwork through observations, in-depth, open-ended interviews, and written documents. Qualitative researchers enquire and studying real-world settings inductively to generate narrative descriptions in the formulation of case studies (Wyk, 2009: 11).

#### *4.2.1 Sample size*

The study selected a sample of nine employees in the total population of sixty-four in the municipality chosen. The sample was selected through taking those employees with relevant qualifications, expertise and experiences in the field of SCM. Nine employees were divided into three senior buyers, three senior contract administrators and three senior verifiers under.

The sample is representative of the employees under the department of SCM unit for water services in the municipality. These employees are who are responsible for the implementation of supply chain process in the municipality when providing water services to residents.

#### *4.2.2 Sampling strategy*

Sampling is basically the selection of specific research participants from an entire population, which is done in different ways according to the type of study being conducted. Sampling involves decisions about which people, settings, events, behaviours, and/or social processes to observe Maferethane (2012:15). To collect data from the sample size, purposive sampling, also known as judgmental sampling, was employed, which is a type of non-probability sampling technique. Municipal employees in the selected sample were selected based on their ability to provide knowledge of Supply Chain Management principles in the provision of water services Mack (2005:5).

Purposeful sampling means researchers select participants who have similar experiences with regards to the central topic at hand for any study (Creswell (2014:112).

#### *4.2.3. Data collection methods*

Secondary data was collected in the study by conducting a literature review on the implementation of SCMP's by the eThekweni municipality in the provision of water services to residents. In-depth semi-structured interviews were used to collect the data. Individual interviews in the chosen sample were undertaken with respect to the participants' ability to respond to the presented questions pertaining to the provision of water services using SCMP's.

The literature review provided primary data collected made possible through interviews conducted by the researcher. The chosen nine sample of the study which had three senior buyers, three senior contract administrators and three senior verifiers was interviewed with audio recordings being made for documentation.

##### *4.2.3.1. Interviews*

Interviews are used to get reliable and valid information from a respondent or respondents through face-to-face conversation or telephonically, with regards to a specific topic that is required for research purposes. The interviews can be classified as either in-depth interviews, focus groups, semi- structured questionnaires and structured relevant to the purpose of the study at hand with a topic with certain sample chosen (Thornhill (2009:674).

Qualitative research interviews seek to obtain data that describe meanings of central themes in the life world of the subjects. The main task during interviewing is to understand the meaning of interviewee responses, which amounts to letting the interviewees lead the dialogue in some respects (Valenzuela, 2009:2).

For this study, In-depth semi-structured interview questions were designed for eThekweni municipality for employees under the department of SCM unit under water services. Questions were related to the implementation of SCMP'S, other were about weather employees were fully equipped with SCMP'S with some investigating the extent in which SCMP'S were applied. Participants were ensured ethical consideration by explaining to them the content of the interview and study and their rights during the process of being interviewed. Appendix 1 shows the interview schedule.

#### *4.2.4. Justification of the research approach*

The qualitative research was chosen for the study because of its form of interpretive inquiry in nature. The researcher can be able to hear, see, and understand the information through speech, tone, facial expression and attitudes expressed by respondents. The qualitative research approach enables scrutiny of the topic, which cannot be possible in quantitative method. The researcher (Creswell, 2009:176).

The research has an advantage in this approach with a huge pool of options in opportunities with exploring diverse issues within the area of focus in a study (Creswell, 2009:176).

#### *4.2.5 Data quality control*

Data quality control refers to how the researcher can ensure that the data-gathering instruments used measure what they are supposed to measure and measure in a consistent manner: reliability and validity, respectively (Vosloo, 2014:329).

#### Reliability and Data Selection

The research can be seen to be relevant through reliability and validity of methods and techniques used for data collection. Reliability is defined as the dependability or a positive relationship between two or more parties that has trust and predictability. It can be further

defined in statistical terms as a repeated measure which can have indicators which can yield similar results (Vosloo, 2014:30).

The credibility of the data was checked using the techniques of persistent observation (recurring observations of respondents during and between interviews, and differences and similarities in the responses of respondents in similar categories); peer debriefing (presenting analyses and conceptual abstractions of the data to other expert qualitative researchers to explore inquirer biases and to clarify the meanings and the basis for interpretations); and member checks (presenting the analysis of the data to respondents for their confirmation and clarity with some of the components of the responses).

The study employed both primary and secondary data. The combination of the research methods will have helped summarized the available information if consistent with the new researched information towards the application of SCMP's in water services. Primary data is information collected from interviews, experiments, surveys, questionnaires, focus groups, measurements and is firsthand information, which is usually expensive.

The EThekweni municipality is metropolitan government structure under the local sphere, which has a lot of information already collected on water provision services to the community. The study will use a mixed method approach of qualitative and secondary data.

#### *4.2.6 Data analysis*

The collected data was transcribed, coded using NVivo and analyzed thematically. Themes were taken out of the interview responses and categorized into groups which can answer research objectives and question through matrix analysis. Recordings were done during data collection, which then transcribed. After being transcribed they were put in NVIVO then themes were produced which allowed the research to be analyzed.

The nine employees, which are; three senior buyers, three contract administrators and three verifiers are supposedly to have knowledge of Supply Chain Management principles in executing their jobs.

The other fifty-five are general workers who need not to have any knowledge of supply chain principles to execute their jobs; their jobs require strength and muscles. The study will use the nine municipal employees purposively selected for the job that they do in the eThekweni municipality, namely: Three contract administrators, three senior buyers and three verifiers (Sekaran and Bougie, 2010:262)

The respondents assisted the researcher to get an in-depth response to application of supply chain principles in water services. This was done to analyze if there was an improvement in water service provision to all residents in jurisdiction.

#### Interview data analysis stages

##### *4.2.6.1 Transcription*

The study used the qualitative research method which involves some transcription of the collected data. The data comprised of recorded interviews and handwritten field notes. It is usually not appropriate to write up summary notes from a tape recording, as unless the words are transcribed verbatim, the researcher is likely to bias the transcription by only including those sections that seem relevant or interesting to them (Lacey & Luff, 2009:5).

The collection of data was done through face-to-face interviews, guided by an interview schedule, which made it possible to collect data according to the research objections and answer some research questions. Telephonic interviews were avoided because this would make it difficult to interpret attitudes, facial expressions and sometimes misinterpret individual's attitudes towards the matters (Sekaran and Bougie, 2010:186).

##### *4.2.6.2 Stages of coding data*

The study used a coding analytical process of rearranging and reducing data, which begins by selecting coding units, such as words, sentences. Paragraphs and themes were used to explain the qualitative data analysis begins with coding the data, dividing the text into small units (phrases, sentences, and paragraphs), and assigning a label to each unit the labels can come from the exact words of the participants, in a term composed by the researcher. (Creswell and Clark, 2007: 131).

Coding, as the core feature of qualitative data analysis, is seen as a process of grouping evidence and labelling ideas so that they reflect increasingly broader perspectives the stages of coding include open, axial and selective coding (Creswell and Clark, 2007: 131).

#### *4.2.6.3 Colour coding*

Another coding system used in qualitative data was colour coding. Here, highlighters and felt tip pens are used in the process, using different colours for each code or category. The advantage of this method is that the text does not need to be cut and be removed from the original section, so text units remain in context. For relatively straightforward and pragmatic analyses, this may be the preferred method (Lacey & Luff, 2009:6).

In this study, a table was designed to align the codes that were assigned to each participant with their responses to the questions that were presented to them. In addition, colour coding was applied to highlight those responses that seemed like one another. This process was done repeatedly to ensure that all the responses to each question by each respondent were highlighted to compare similarities in the content. This process of colour coding is done to find common themes in the participants' responses.

#### *4.2.6.4 Categories and themes*

The organisation of data included the grouping of codes into themes or categories. Additionally, data were also organised using interrelated categories and be abstracted and reduced to smaller set of themes. This was done through designing matrices, which were useful in the process of data reduction and organising.

#### *4.2.6.5 Matrix analysis*

In qualitative data analysis, a matrix involves the crossing of two or more main dimensions to see how they interact. "Matrix analysis as an ancillary strategy can aid in assessing the trustworthiness of a qualitative study" (Averill, 2002:856). Matrices can be valuable agents in the search for relationships between and among categories of data or phenomena of interest, in examining how categories relate to particular theoretical concepts, which can be group rituals, kinship patterns, perceived authority, and in the search for tentative propositions linking categories of information" (Lambert and Loiselle, 2008: 231).

On the other hand, Descriptive matrices allow the researcher to display categorised data in individual cells, just to observe what appears. outline the process by explaining that data that are generally entered individual matrix cells reflect paraphrased, synthesised, or quoted content from participant responses. The authors also posited that matrices streamline the process of simultaneously and systematically noting similarities, differences, and trends in responses across groups of informants (Doody and Noonan, 2013:30)

In this study the matrix analysis was done through coding and categorising data according to their similarities and or the extent of their differences. The matrices in this study were also defined by the reflection of quoted content from the participants' responses. The primary reason for adopting the matrix analysis as a data analysis method is to ascertain an effective data reduction process while achieving trustworthiness of the study. Matrix analyses were used to analyse both interview and focus group data (Elo and Kyngäs, 2008:111).

#### **4.3 Ethical considerations**

All ethical issues will be considered in this study. The study proposal is submitted and has been presented to the School of Management, IT and Governance, University of KwaZulu-Natal and the ethical clearance will be applied for, from the research office of University of KwaZulu-Natal.

#### **4.4 Limitations of the study**

This study was being based on one municipality in Durban. However, the findings of the study cannot be used to generalize on other municipalities within or outside the KwaZulu-Natal province.

#### **4.5 Conclusion**

This chapter discussed the research design and methodology, which was done in the study. It looked at the target population chosen, sample, sampling strategy and the data collection methods, which were chosen by the researcher. Data analysis was discussed through the chapter and how it was used in the study through transcribing.

The stages of data collection analysis were looked at which were; coding, colour coding, matrix analyses and categories with themes. The study chose the qualitative research method in

investigating the implementation of SCMP's in the eThekweni municipality. The justification for the study and limitations of the study were outlined. The next chapter will focus on data analysis and presentation of the data collected.

## CHAPTER FIVE: DATA ANALYSIS AND PRESENTATION OF RESULTS

### 5.1. Introduction

This chapter will focus on the analysis of data collected at the eThekweni municipality. The sample was 3 senior buyers, 3 contract administrators and 3 verifiers which totaled to nine employees under the department of Supply Chain Management in water services. The supply chain department in the municipality under water services had 55 employees. A selection of three seniors buyers, 3 contract administrators and 3 verifiers which became a sample of 9 employees.

This was because the 45 other employees in the municipality are general workers and have no information or relevant qualification on Supply Chain Management. The study seeks to answer: How the formulation and implementation of SCMP'S can lead to improvement in the water services delivery to residents in eThekweni Municipality. SCM in the municipality can not only focus on water but should consider other role players involved like procurement, maintenance, policy that lead to the provision of the services (Stock and Boyer, 2009:691).

A presentation of the transcription in interviews conducted in the municipality follows with a section, aligning interview questions, research questions and objectives with responses. A section of aligning the theoretical framework with respondents from the interviews is discussed. The last section performs color-coding which will enable data to produce in a reduced format through matrix analysis with categories then themes will be constructed out of the reduced data.

### Aligning the Theoretical Framework with Research objectives and Research Questions

<b>Supply Chain Management principles</b>	<b>Score model</b>	<b>Linking corporate strategy with SCMP's</b>
To ascertain whether employees in the department under Supply Chain Management are aware of Supply Chain Management principles.	To assess if the effective application of Supply Chain Management principles can improve service delivery in water at eThekweni municipality.	To investigate the extent in which Supply Chain Management principles are applied in the eThekweni municipality

Are employees in the department of Supply Chain Management at the eThekwini municipality aware of Supply Chain Management principles?	Can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekwini municipality?	To what extent are Supply Chain Management principles applied in the eThekwini Municipality?
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## 5.2 The Context of the eThekwini municipality

The eThekwini municipality is a category A, municipality that means it has exclusive municipal executive with legislative authority in its area (EThekwini municipality, “2015”). Municipalities are judged on whether their budgeting and administration processes can provide for basic needs of society like water services. Their success can be measured from their ability to promote social and economic development of a community (As for each the Constitution of the Republic of South Africa, sec 153:77). In the EThekwini region, there is social unrest with some residents complaining about inequality and sufficient provision of water.

The municipality is a metropolitan, which was established in the year 2000, which includes the city Durban with surrounding towns. It is also part of the 11 districts in the province of KZN with a population approximately 3, 442, 3562 with most people in majority speaking Zulu. It was one of the municipalities in South Africa which was formed from independent local councils and tribal land.

## 5.3 Aligning the Theoretical Framework with Research objectives and Research Questions

The theoretical framework of the study was developed to answer the research objectives of the study with its research questions. The theoretical framework was developed from theories in Supply Chain Management which were discussed in the literature were variables and themes were produced to develop it.

This assisted in the study to develop recommendations as to the municipality as a whole and division of SCM in water services. The theoretical framework was to look at reason of the inadequate water service distribution to residents and whether it was due to lack of implementation of SCMP’s when carrying out operations.

#### **5.4 Aligning Interview Questions, objectives and research questions with Responses**

The central question to the study is how can the implementation of sound Supply Chain Management principles in the eThekweni municipality contribute to the distribution of water services to residents under its jurisdiction? It was of great importance to ensure that there was alignment between the research questions, research objectives, conceptual framework and research tools used, which will be discussed in this chapter. The interview questions were constructed to be resources in responding to the research questions, and consequently to fulfil the research objectives. Appendix 2 shows a tabulated link of the interview questions aligned with the research questions and objectives, while Appendix 3 shows the alignment of the Theoretical framework with the interview questions

This section discusses the major themes that emerged from an analysis of the study. These arose from the interview responses of the participants, which were grouped together to formulate a comprehensive picture of their combined experiences in the workplace. The participants were interviewed with questions regarding the implementation of Supply Chain Management principles in the eThekweni municipality to better provide residents with water services. Thorough data reduction processes some major themes emerged, amongst which were: Supply Chain Management regulations, knowledge on Supply Chain Management principles, supplier Relations, preferential procurement policy framework act, training programs and educational workshops and budgetary process.

#### **5.5 Emerging themes for the study**

The matrices raise questions of how then there are challenges with the distribution of water services if such procedures, processes, regulations and laws are followed in the municipality. The themes, which follow, are drafted from the data reduced in the above matrixes and categories from table 5-1, 5-2 and 5-3, which look deeper into the investigations of the researcher.

Theme 1: Supply Chain Management regulations

The municipality is aware with the staff at the municipality that when carrying out services in the provision of water service they must compile with Supply Chain Management regulations (EThekweni Municipality, 2012). As per the constitution of the Republic of South Africa of 1996: Municipalities in the country must adhere the SCM policies prescribed which supports SCM officials, guides accounting officers in carrying out authority in the provision of goods and services to residents.

Matrix 5-1 shows the construction of this theme, while indicating the sources of the theme and the investigators’ perspectives.

<b>Matrix 5-1: Supply Chain Management regulations</b>		
<b>Thematic Responses</b>		
<b>Senior buyer</b>	<b>Senior contract administrator</b>	<b>Senior verifier</b>
There are programs to educate employees on Supply Chain Management(B1,V2)	Staff are fully aware that they should adhere to supply chain regulators (CA1, B3)	Everything in the department is done under Supply Chain Management regulations (CA3,CA2)

It shows from research collected at this stage that most employees are aware of the supply chain man agent regulations. There are no proper measures being identified if they really do apply these Supply Chain Management regulations rather than just being aware of them.

**Theme 2: Expertise on SCMP’S**

It was thing to be informed of supply chain principles and to have knowledge about them which will enable employees to implement them in the provision of water services to residents.

<b>Matrix 5-2: Expertise on Supply Chain Management principles</b>		
<b>Thematic Response</b>		
<b>Senior buyer</b>	<b>Senior contract administrator</b>	<b>Senior verifier</b>
The employees are aware of Supply Chain Management principles in the eThekweni municipality(B3)	Employees apply Supply Chain Management principles as per supply chain regulations(CA1,CA3)	Principles are practice across departments, and processes from water are the same with under supply chain. (V1, V2)

As per responses from interviews collected, there is information about Supply Chain Management principle as a concept and it is badly treated also as a synonym with Supply Chain Management and supply chain regulations. There is information but no clear knowledge as to how they are used by some officials in the provision of water services to residents.

### Theme 3: Supplier Relations

The traditional supply chains were concerned with the process of oversighting of materials, information, and finance as they move in a value chain from supplier to manufacture then wholesaler, passing retailers then to the end customer (Chen and Paulraj, 2004). Great details into integrating the value chain in modern supply chain and the first step is creating close relationships with suppliers as a buyer like the municipality which has Umgeni waters (Christopher, 2004).

But their other suppliers needed in water services who provide tanks, pipes, taps and other material needed to provide water services to residents.

<b>Matrix 5-3 : Supplier Relations</b>		
<b>Thematic Response</b>		
<b>SENIOR BUYER</b>	<b>SENIOR CONTRACT ADMINISTRATOR</b>	<b>SENIOR VERIFIER</b>
Positive supplier relations increase service delivery in water services( B3,B1)	Not all suppliers understand Supply Chain Management regulations and principles (CA2)	Supplier relations reduce costs and longer lead times( V3, V1)

Theme three has stipulated and showed evidence that positive supplier relations increase service delivery. Supplier and buyer relations increase revenue for the municipality in the sense that costs are reduced through shorter lead times to service delivery. The challenge faced by the municipality which is that not all employees are equipped with the provision of water services in the municipality.

Theme 4: Preferential Procurement Policy Framework Act No. 05 of 2000.

According to the constitution of the Republic of South Africa of 1996: Under the minister of finance supervision the municipalities must adhere to the regulations of the Procumbent Preferential Policy Framework Act No. 05 of 2000. It is the first theme which speaks to the procurement regulations needed to be followed by officials in the provision of water services to residents.

<b>Matrix 5-4: Preferential Procurement Policy Framework Act No. 05 2000</b>		
<b>Thematic Response</b>		
<b>SENIOR BUYER</b>	<b>SENIOR CONTRACT ADMINISTRATOR</b>	<b>SENIOR VERIFIER</b>
The Supply Chain Management are aware of the Supply Chain Management principles and policies and adhere to the preferential procurement policy framework act(B3)	For any contracts in the provision of water services it must adhere to the office of the CFO which guides the department through the PPPF(CA3)	The employees get pamphlets with guidelines on how to carry the provision of water services or other services to residents according to the law (V3).

This indicates that the concept of preferential procurement policy framework is known to employees in the eThekweni municipality and are aware that it needs application for water provision. It is also quite clear that the employees still confuse Supply Chain Management principles, supply chain regulators PPPF and treat them as synonyms.

Theme 5: Training programs and Educational workshops

Training and equipping staff of the eThekweni municipalities are responsibilities given to supply chain managers (Juta, 1996). The eThekweni municipalities have conducted a lot of training to both internal and external stakeholders who are heavily involved in the distribution of water services to residents in the municipal area.

<b>Matrix 5-5: Training programs and educational workshops on Supply Chain Management principles</b>		
<b>Thematic Response</b>		
<b>SENIOR BUYER</b>	<b>SENIOR CONTRACT</b>	<b>SENIOR VERIFIER</b>

	<b>ADMINISTRATOR</b>	
There are systems in place to educate stakeholders (B1, B3).	There workshops and policies which promote educational programs (CA1, CA2)	We have internal and external training and workshops ( V2).

Although such programs are carried out it is not clear how they assist in meeting the end user of the water services. It is clear they have procurement policies, guidelines to deliver these services when they order stock in the forms of pipes, infrastructural development through dams and other projects. What is not clear is how Supply Chain Management principles after all process have been followed make sure that the end customer which is the resident gets the required level of water service at a satisfactory level?

Theme 6: Budgetary process

Budgets of the municipality are an obligation from the constitution and are under the office of the CFO. Even the PPF requires a budget from government departments before it provide financial obligations to them (Juta, 1996). Supply Chain Management speaks of cost reduction strategies through just in times principles, material requirement planning which make sure revenue is increased through efficient processes in the value chain (Anderson and Britt, 1997).

The eThekwini municipality including the department of Supply Chain Management needs a budget to better provide water services to residents and to continuously improve their service delivery ( EThekwini municipality, 2012)

The matrix 5-6 looks at the perspective analyzed from the research buy the eThekwini municipality employees which were interview on how the budgetary process influence the provision of water service and how are they in line with Supply Chain Management principles.

<b>Matrix 5-6: Budgetary process</b>		
<b>Thematic Response</b>		
<b>SENIOR BUYER</b>	<b>SENIOR CONTRACT ADMINISTRATOR</b>	<b>SENIOR VERIFIER</b>

There is transparency and accountability (B2)	Governed as per the Municipal financial management act ( CA2,CA3)	Improving service delivery through following budgetary process( V2)
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Matrix 5-6: It does not speak how budgetary preparations have been compiled to reduce the backlog of water services to other communities. The employees do not tackle the issue of infrastructural projects which need to be developed like dams to counter the issue of droughts in the municipal area. Also, there is no clear indication of infrastructural development for water systems in informal settlements and townships there are found in urban areas of the municipal area.

### 5.6. Data Presentation and Analysis

Qualitative research techniques generate a mass of words through interviews, focus groups or observational data, which needs to be described and summarised. The main question should require a researcher to seek relationships between various themes that have been identified, or to relate behaviour or ideas to biographical characteristics of respondents such as age or gender (Lacey & Luff, 2009:6).

Lietz and Zayas (2010:191) argue that “qualitative content analysis is a valuable alternative to more traditional quantitative content analysis, when the researcher is working in an interpretive paradigm and that the goal is to identify important themes or categories within a body of content, and to provide a rich description of the social reality created by those themes and categories as they are lived out in a particular setting”. Through careful data preparation, coding, and interpretation, the results of qualitative content analysis can support the development of new theories and models, as well as validate existing theories and provide thick descriptions of settings or phenomena.

For this research study, a combination of content, thematic and matrix analyses were utilised. All the interviews were audio taped and transcribed. Transcriptions of the interviews were analysed using the constant comparative method, and the data analysis was iterative with data collection. The data were analysed as it was collected through the process of coding. Interviews were coded

by conceptualising fundamental configurations in the data. The initial data analysis was guided further, with a focused data collection, leading to further conceptualisation of the data and refinement of the coding schemes. As part of the analysis, similarities and differences about the compiled codes were grouped together to form categories. Thematic notes were written throughout the coding process to track conceptual decisions and ideas as they occurred

The following data reduction strategy enabled researcher to select from the categories variables which were identified to produce themes from the interviews conducted to get thematic responses for analysis of the data.

It is a constitutional mandate from the constitution of the Republic of South Africa that municipalities should provide water service to areas of their jurisdiction around the country. It then means that the eThekweni municipality is also obligated with such law (Juta, 1996). Service delivery has been a major challenge in the municipal area and data collected from the employees under the Supply Chain Management unit have been presented in the below table for analysis as 5-1:

*5.6.1. Service delivery of water services to residents in the municipal area*

The inadequate provision of water provision to residents in equal quantity and quality standards has been a major cry by communities towards satisfactory service deliver in eThekweni municipality.

**Matrix 5-1: Service delivery of water services to residents in the municipal area**

<b>Service delivery of water services</b>	<b>Senior buyer</b>	<b>Senior contract administrator</b>	<b>Senior verifier</b>
Water provision to communities	There are systems and projects in place to better provide water service to residents in the municipal area(B1)	The Supply Chain Management is centralized, in terms of public procurement, supply chain must be within the office of the CFO, how do we do it with water, remember water does not only deal with water it deals also with enablers that ensure, water is a product you consume but goes via a logistics. You must have people in transportation, mechanical part of water is not us, but we source a strategic contract administrator to select buyers to keep pipes, valves, the municipality is big,	Proper policies under Supply Chain Management should be followed to better provide services to communities in the municipal area(V2)

		you cannot have one person, we have a pool of water individuals under water department under us to make sure efficiency and effectiveness is achieved. Supply chain department division we provide education (CA3).	
Relationships between external and internal stakeholders	Lack of information or misunderstanding between the municipality and the suppliers can cause service delivery delays. It might happen that a pipe has burst, and community needs water but the problem will be getting three quotes for the tender, so it does sometimes but sometimes slows the process of water through delays (B1).	Educational forums for suppliers and the municipality are performed and encouraged to increase relationships and understanding the process of aligning demand with supply(CA2,CA3) We meet monthly with our supplier's weather they are external or internal. (CA1). Training programs in the municipality, educational workshops are done to have the same knowledge we together with suppliers. We interact with suppliers internal and external to promote close linkages (CA2).	Principles of Supply Chain Management are practiced across departments, and processes from water are the same with under supply chain. (V1). The supply chain unit has meetings with other departments and align with them, what do they want? While we also tell them what they want in order to better provide water services to residents (V2).
Integrating all stakeholders in the value chain of water services provision	The municipalities have a pool of suppliers to choose from in the provision of water service to avoid backlogs and irregularities, suppliers are told to give at least three quotes(B1). With internal departments the municipality works with the finance department to make sure invoice are paid as soon as possible and now suppliers are happy because we pay the on time (B3).	Service providers in the municipality are also invited for training and workshops (CA3,CA2).	The department can borrow contracts from other departments within the municipality to speed up the process of water provision to residents (V1).

The table in matrix 5-1: Shows that in the first element, which is water provision to communities, stipulates that for better service of water services to communities there must be a proper application of Supply Chain Managements. The water department must integrate with other stakeholders involved in the provision of water services like procurement, transportation, staff

and other departments. Relationships with both internal and external stakeholders in the provision of water service are encouraged with also educational workshops to educate different departments and suppliers on SCMP's.

Matrix 5-2: It focuses on the implementation of Supply Chain Management principles by the municipality in provision of water services to residents. Supply Chain Management principles are very important as to the municipality, which has already had a segmented or rather target population to provide services to residents in its municipal area in terms of water (Sidism, 2013).

*5.6.2. Implementation of Supply Chain Management principles*

**Matrix 5-2: Implementation of SCMP's**

<b>Implementation of Supply Chain Management principles</b>	<b>Senior buyer</b>	<b>Senior contract administrator</b>	<b>Senior verifier</b>
Aligning demand and supply in providing water service	A supplier selected according to polices will enable it to a job based on the requirements in time and is going to make sure everything is done according to the tender description, supplier will perform according to the description or mandate that has been given too (B3)	There is compliance with supply chain regulations in the municipality (CA3,	If Supply Chain Management principles then water services will be adequately provided through equaling supply to demand (V3,
Revenue and losses	Supply chain department under the eThekweni municipality face a challenge of corruption and ethics so these policies are also important in guiding supply chain professionals to make sure everything they is within ethics and conduct ( B3,CA1 Supply chain principles are effective in the sense that in 2016 the municipality got a clean audit (B2)	Because of the Supply Chain Management principles, there is no irregular expenditure which is evident through clean audits the municipality received (CA3, Irregular expenditures are look at and regulators on records are done. (CA1,	It controls everything when it comes in budgetary processes (V1, The department of SCM in water services must laise with financial department to see financial statements. Tenders cannot be granted if there is no assurance of financial consent. (CA2

Matrix 5-2: It places emphasis on the applying SCMP's to meet ever-increasing demand in the municipal area through having the required supply. The application of SCMP's has produced clean audits in terms of finance and there has been no report of fruitless and wasteful expenditures in terms of water provision to communities.

Matrix 5-3: The supreme law of the Republic of South Africa which is the Constitution, Act 108 of 1996, to which the regulations and accounting officers in the municipality are to adhere to policies prescribed in the document when carrying out of duties and authorities (Juta, 1996).

*5.6.3. Constitutional obligations towards water provision by eThekweni municipality to communities.*

The South African constitution as mentioned earlier in the study clearly stipulates the SCM regulations and functions towards provided services to communities. Is the municipality fulfilling its constitutional obligation to residents towards providing water services?

**Matrix 5-3: Constitutional obligations towards water provision by eThekweni municipality to communities**

<b>Constitutional obligations Water services</b>	<b>Senior buyer</b>	<b>Senior contract administrator</b>	<b>Senior verifier</b>
Policies	Through the preferential procurement act which guides us whenever we are going to select a supplier and aware of the Triple BEE which is one of the policy which guides us in selecting a supplier (B3).	All departments are governed by the municipal financial management act and also adhere to the public financial management act when carrying out duties ( CA2, CA3)	Every process is done according to Supply Chain Management principles (V1).
Responsibilities of officials in the eThekweni municipality	Senior management makes sure that staff members in the supply chain division report as to how they completed a task under supply chain principles (B3, On the procurement side especially Signing powers are granted to certain individuals according to the law of Supply Chain Management, it shows that it is practiced (B1).	A guide offered to the accounting officer by national treasury that indicate to effect segregation of duties to effect accountability which is section 30 of the PFMA, that there are procedures offered by the municipality to ensure adherence too (CA3, CA1).	Guidelines and procedures are provided on how to better provide water services. (V3).
Planning and Performance	The policies of Supply	Poor planning towards	Training programs and

measures	Chain Management department have improved the supply chain as whole because they have somehow improved lowering the corruption in the department and most of the professionals are scared getting involved in corruption they have improved the conduct (B3).	provision of water services and Irregular expenditure cannot be attributed to supply chain, once you have a poor planning or a design that does not lead to customer satisfaction (CA3). The Integrated development plan for the municipality is drafted while the head of Supply Chain Management is present (CA3).	workshops are done internally and external about Supply Chain Management (V2, CA3).
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As per matrix 5-3: The municipality must adhere to policies like MFMA, PPF and PFMA when providing water services to residents in the municipal area. All departments in the municipality adhere to these policies and have proven to reduce corruption in the municipal area.

## 5.7 Conclusion

This chapter transcribed the data that was collected for the interviews. The transcribed the data which was collected from the interviews conducted at the eThekweni municipality which were later colour coded as per appendix 2. Data reduction through categories was analysed to construct themes which could produce thematic responses from the interviewee's.

It was then seen that employees in the municipality are aware of Supply Chain Management principles and regulations of the constitution with acts like PMFA, MFMA in carrying duties for accounting officers. What was found was that there was no clear understanding of how these Supply Chain Management principles do are increase the distribution of water service in a practical manner than the theoretical way of understanding they have too.

## CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

### 6.1. Introduction

This chapter provides conclusions and providing recommendations to the study. The chapter provides summaries of each chapter and then provides an overall conclusion of the study before recommendations of the study are discussed. The chapter though starts by a discussion of results as per objective of the study. The information, which was investigated in the interviews with employees in eThekweni municipality, will be used.

Limitations to the study are provided with also recommendations for future research before the chapter provides contribution of the study toward SCM towards water services. The chapter then concludes.

### 6.2. Discussion of results as per research objective of the study

These are results obtained in the data collection also aligned with the views of literature in the study.

*6.2.1 To ascertain whether employees in the department under Supply Chain Management are aware of SCMP's.*

Supply Chain Management principles are supposed to be applied in the municipality as per the regulation of the South African constitution. Every employee is aware that there are certain SCMPs to be applied to every job done in the municipality. A rising issue with employees is differentiating between supply chain as a field and its components. There is no distinction between supply chain principles, supply chain, supply chain process and strategies towards water services.

Not all employees in the department of Supply Chain Management are aware and fully equipped with Supply Chain Management principles. However, there are guidelines on how to adhere to supply chain principles through policies like the preferential procurement act, municipal financial management act and public financial management act. A need has arisen in the municipality to educate employees on Supply Chain Management through workshops and road shows (B3,V1,V3).

Employees know the basics of SCMP'S and that every job towards the provision for water service evaluated, monitored by officials. There is knowledge that employees must comply with SCM regulations through constitutional mandate in the provision of water services. Certain employees comply with SCMP's and some do not because they lack adequate, sufficient knowledge on the field. (B3, CA1, V2)

#### *6.2.2 To investigate the extent in which Supply Chain Management principles are applied in the eThekweni municipality*

All departments governed by the MFMA apply Supply Chain Management principles through constitutional mandates, which speak about meeting residents needs in water provision while promoting equity, fairness, transparency and accountability. There only thing employees understand in Supply Chain Management principles is them for following procedures and guidelines from senior management. There is now knowledge to some of how SCMPs affect out through productivity to meet demand at the lowest cost in the value chain of water provision to residents (B3, CA2).

Employees do not have key performance indicators to see positive outcomes and take everything on policy as a component of SCMPs. They do not provide sufficient information as to what extent principles are applied but believe by following regulations, schedules and rules they are fully applying SCMPs in the provision of water service by the municipality to residents. (B2, V2, V3).

The Supply Chain Management department has missed one important aspect of the Supply Chain Management principles, which is also creating relationships with community members. Interaction by the department has been focused on the municipality creating relationships with suppliers but provide little interaction with the community members who need the services of water provision to them.

To align demand and supply the municipality has to segment residents on who is better off and who is worse off in the provision of water services.

*6.2.3 To assess if the effective application of Supply Chain Management principles can improve service delivery in water at eThekweni municipality.*

The municipality does engage in continuous projects to improve systems, which can better provide water services through monitoring and evaluation. A confirmation that Supply Chain Management regulations are adhered too is needed to measure the extent of the effective SCMPs on water service provision to residents (B1, CA1).

The department must not only focus on providing procedures to employees but focus more on what they have been doing more by doing road shows and workshops. They must also motivate employees through incentives for employees to conduct studies on SCMPs to better understand them.

Supply chain principles are used in the effective provision of water service by the municipality. Aligning demand with supply starts from procurement policies, which select supplies which will provide water service according to the supply chain principles. “One has to look at the suppliers they are using as the municipality, it needs to learn the environment and clearly forecast demand for water services. This assist in the pricing strategy and maintenance of the price for contract period which lasts for two years which some suppliers do not understand (CA2, B3).

### **6.3 Chapter Summaries**

A summary of each study will assist the researcher in providing overall conclusion of the study to build the recommendations according to data collected, findings and literature.

#### *6.3.1 Chapter one summary*

The chapter introduced the study and explained why the eThekweni municipality was responsible for providing fresh, clean and safe water to homes, businesses, shops, schools, and factories throughout the municipal area (EThekweni municipality “2015”). The chapter also clarified why it was a constitutional obligation for the municipality to provide water services to residents and also introduced why there was a serious concern if the distribution capabilities in the region of the resource.

The chapter also gave the problem statement of the study: The study seeks to answer: The formulation and application of sound Supply Chain Management principles or guidelines lead to

the improvement in the delivery of water services in the eThekweni Municipality. The chapter then investigated the motivation of the study: Can the formulation and application of sound Supply Chain Management principles or guidelines lead to the improvement in the delivery of water services in the eThekweni Municipality?

The chapter outlined research objectives and questions. The chapter declared that the qualitative approach was chosen as a methodology method to collect data through an interview schedule. The structure of the dissertation was given in then chapter concluded.

### *6.3.2 Chapter two summary*

Chapter two gave definition of the term SCM according to past literature and modern. The chapter looked supply chain systems, which involved a categorization of the planning and the execution categories. An explanation of water systems was discussed based on the different systems across countries and cities supply chains around the world. The chapter also investigated the independent challenges, which faced the eThekweni municipality in providing water services based on water distribution networks and supply chain systems. The chapter then concluded.

### *6.3.3 Chapter three summary*

The chapter gave theories of in SC which were the discussed and how they related to water supply and distribution networks. It highlights theories of the implementation of SCMPs, Porter's value chain, Aligning cooperate strategy with supply chains, SCOR model theory and Supply Chain Management process theory.

Based on the variables or themes which were selected in the literature the three theories to build theoretical framework and answer research objectives were SCMPs, SCOR model theory and the supporting theory being Aligning cooperate strategy of the municipality with supply chain. The theoretical framework was used to build a conceptual framework, which answered research objectives. The chapter then concluded.

### *6.3.4. Chapter four summary*

The chapter discussed the methods that were going to be used in the study in collecting data. An explanation of transcribing and the stages towards data collection were briefly discussed coding,

color coding, matrix analyses and categories with themes. The research method was chosen which was the qualitative approach while limitation to the study was given. This chapter discussed the methods, which were used in collecting data. Transcribing was looked at explained together with following stages towards data collection analyses is which included, coding, colour coding, matrix analyses and categories with themes.

The study has elements of only qualitative research as research method in investigating the municipality. Data Analysis and presentation of the results will be done in the following chapter in which is the fifth in the study. A reason for the study to for being done was discussed and the research questions with objectives added a form of another justification for such an investigation.

Limitation of the study was stated as for the instance that the study will be on one municipality in Durban in the eThekweni municipality. It was explained that ethical considerations were maintained. The next chapter will focus data analysis and presentation of the data collected.

#### *6.3.5. Chapter five summary*

The chapter explained the employed qualitative research method, Data Analysis and presentation of the results. The organisation of data was included by grouping of categories and coding to which enabled the constructing of themes. In qualitative data analysis was done in the study with a matrix which involved through crossing of two or more main dimensions to see how they interact.

This was done to look at the implementation of Supply Chain Management principles by the municipality towards water provision to residents. Limitation of the study were also stated as for the instance that the study will on one municipality in Durban called the eThekweni municipality. Furthermore ethical considerations were maintained. The chapter then concluded.

### **6.4 Limitations of the study**

The municipality witnessed understaffing this year of 2017 in the water service department under Supply Chain Management in the eThekweni municipality. This resulted in the data being collected in interviews to be done to three contract administrators, two senior buyers, one junior buyer and three verifiers.

The limitations to the study was not getting all three senior buyers but getting and then used a junior buyer instead as the study required three senior buyers from each department to make a sample of nine. The three departments were senior buyers, senior contract administrator and senior verifiers. The gatekeepers letter provided a delay to the study in terms of data collection.

## **6.5 Overall conclusion of the study**

Chapter 1 introduced the study through explaining the concept of Supply Chain Management and giving a brief background of the municipality and its challenges. It gave the problem statement, motivation for the study, research objectives with research question and the structure of the dissertation.

Chapter 2 investigated supply chain systems and water distribution networks with benefits.

The chapter looked at water challenges in the eThekweni and challenges in their distribution networks. It further discussed the public sector with SCM and also the municipal environment as a whole with SCM. Chapter 3 looked at Supply Chain Management theories and how they related to water supply. The chapter then discussed relevant theories of Supply Chain Management built from the literature, which were: SCMPs, Supply Chain Management process theory, Porter's value chain theory, SCOR model and linking corporate strategy policy and supply chain theory.

The chapter then went to build a theoretical framework from theories and it was Implementation of SCMPs in the EThekweni municipality with improving service delivery using SCOR model.

The supporting theoretical framework was aligning supply chain policy with water service strategic objectives. There theoretical framework was used to answer and respond to research objectives of the study. The chapter then concluded.

Chapter 4 investigated the research design of the study, the target population of the study while stipulating the research the methodology to be qualitative while using an interview schedule for collecting data. The chapter then proceeded to data quality control, data analysis, transcription, then stages of coding; color coding, categorizing data into themes and then used a matrix analysis was performed for analysis. Ethical consideration of the study was confirmed with limitations to the study.

Chapter 5 looked into the data collected from interviews, which was transcribed, and the research method chosen for the study, which was in-depth semi structured interviews. The data reduction strategies were employed in this study through analysis of data with emerging themes for the study were explained with some aspect directed to the appendix section. The chapter looked at matrix analysis as a tool of analyzing data. The chapter then concluded.

## **6.6 Recommendations of the study based on findings and literature**

Findings of the study will lay down the foundations for the eThekweni municipality in solving challenges of water provision to their area of jurisdiction and the application of SCMP'S in operations.

### *6.6.1 Findings*

The main purpose of the study was to investigate the implementation of SCMP'S in there eThekweni municipality as it was discovered there was inadequate provision of water services to residents. The municipality had struggled to provide water services equally to all communities in an efficient manner with some better off than others. In-depth semi structured interviews were scheduled, and interviews were performed to the sample of nine employees in the eThekweni municipality under the department of water service SCM unit.

This was done to investigate whether supply chain principles were fully applied in operations of the municipality in provision of water services to residents. The interviews were conducted in the month of April 2017. The data showed that there was a confusion between SCM and SCMP'S. A minimum understanding of SCMP is within the interviewed employees but was evident from responses. The interviewed personnel acknowledged that they were not familiar with some terminology and policies of SCM which made it difficult to apply the SCMP's. This was evident from the data analysed.

The concept of Supply Chain Management has not been clearly separated from SCMP'S, constitutional obligations by the South African Constitution. Employees think that SCM is about placing rules and regulations and do not understanding the effect it has on water services to

communities. There were other elements, which affected the municipality like corruption, conflict of interest and understanding the role of communities in SCM.

The literature revealed that there is still a gap between the SCM processes in the public sector as compared to the private sector, which is also evident with municipalities. Employees who were interviewed were resistant to answer question related to senior management, which showed fear of victimization. Majority of employees did not understand how SCMP'S can improve service delivery in water services and only saw SCM as method of making sure that procedures, regulations and policies are adhered to so keep their jobs.

### *6.6.2 Recommendations of the study*

The recommendations are based on the literature, findings and assist in answering the research objectives and questions of the study.

#### *6.6.2.1 Training and educational programs on SCM*

The eThekweni municipality division under supply management of water services should educate and train employees furthermore as there is evidence that there are workshops and programs. The different divisions, departments outside SC unit must also get basics of Supply Chain Management to understand SCMP'S and their roles in the value chain of water services to residents.

The municipality must have vendors with project developers to better understand the SCM process with different departments with form part of the value chain in water distribution services to residents. Visits must be done to communities who receive water services from the municipality to educate them on SCMP'S and how they can assist in improving water distribution networks with adequate efficiency of the resource needed.

Employees who are involved in ground work like fixing pipes, installing meters to have basic knowledge; it could be understanding reducing costs strategies, lead times or reducing wastage.

#### *6.6.2.2 Aligning strategic planning with SCM*

The strategic objectives of the municipality through the planning stage within the IDP must be checked if they have achieved SCM policy objectives. If there is no compliance, then the municipality should check at challenges causing that and redress the problem. Annual review of SCM policy should not be reviewed solely for fulfilling constitutional obligations as for years the municipal area has been faced with the challenge of being a drought area. From the study, it is evident that not major projects like many new dams have been possible with the municipality finding it difficult to convert seawater into portable water.

Both officials and suppliers in the municipality for better distribution of water services to residents must understand supply chain management policy. This will enable the municipality to eliminate irregularities through supply chain process. Internal control systems integrated with SCM policy must be developed to ensure fair, cost effective, competitive, transparent and equitable process when it comes to water distribution to residents in the area of jurisdiction.

Planning through SCM can allow the municipality to detect non-performance by suppliers through water distribution, while also identifying non-compliance with SCM regulations, which can reduce fraud activities while increasing service delivery.

The municipality must then make sure that solution sin the annual review of SCM are stated and put into practical sense. Planning, budgeting in the municipality must clearly align with SCM in the provision of water services to residents. Employees must be able to align polices of the municipality with Supply Chain Management in the provision of water services

#### *6.6.2.3 Communication and involvement of all stakeholders*

Communities must be consulted on projects, which will better service and have input so that resources are not wasted in investments projects not needed. Departments in the municipality must understand the role of SCMPs in their independent workstations like, finance, marketing, engineering as to integrate process to better increase service deliver in water provision. The

supply chain unit must create long term relationships with suppliers involved in the distribution of water services so that it prevents collusion by suppliers to overcharge when pricing.

The municipality must create awareness about SCMP'S into the different stakeholders involved in the value chain of providing water services to residents. All role players in the municipality must understand their roles towards the implementation of SCMP'S towards water provision.

#### *6.6.2.4 Implementation of SCMP's*

SCMP'S can only be fully applied when there is first a compliance with legislative process and SCM policy. The municipality must ensure stricter SCM internal controls to achieve objectives of policy through continuous monitoring with legislative compliance. Senior officials in the SC unit must ensure that staff are well educated on procedures, policies and regulation of SCM towards water provision service to residents.

The municipality must ensure that legislative requirements are fulfilled through adherence to policies in SCM. SCM policy must be reviewed on annually basis to ensure the prescribed policy is still practice within the legal frameworks like MFMA. After this has been achieved, the principles of SCM can be greatly applied in accordance to water service delivery to residents as discussed in literature.

When all role players are aware of SCM then SCMP'S can operate through segmentation of groups, which are worse off in the provision of water services. The municipality must be able to listen to market signals when all role plyers are aware of SCM to align demand with supply for water services through their process. The municipality must use SCMP'S to create long term relationship with suppliers as to customize the logistic network to avoid high cost and wastage in the provision of water services to communities.

The municipality must perform regular checks as to see weather demand has been met by supply in water provision and this must not be done in the SCM policy review at the end of the year but at monthly basis.

Supply chain management principles can be used as a tool by municipality to eradicate challenges faced when it comes to water distribution. Implementing SCMP's can improve policy obligations to be met to prevent conflicts of interest, unfair treatment of suppliers and wasteful expenditures. Employees in the EThekwini municipality have expressed difficulties, frustrations with SCM regulations through it being time consuming with government audits requiring strict adherence with SCM policy while face with a challenge of water distribution to residents.

#### *6.6.2.5 Raising funds*

Getting funds from government needs high qualified employees in SCM, the municipality must be able to have officials who can source grants, loans from various sources to assist in the provision of water services. Skilled employees are needed by the municipality as to deal with the challenges of sourcing funds. Municipalities in general including the eThekwini municipality through its slow development when it comes to developing waste treatment plants and dams being built for water storage is evident that its struggles to source funds. The problem not have skilled workers is that there are procurement procedural controls in SCM from government to be finalized before granting of loans.

If a qualified skilled workforce in SCM can be able to raise funds for the municipality towards provision of water services to residents. The municipality must raise funds and enter into certain projects with the private sector and not only depend on government and water tariffs for revenue while being able not to charge the poor. Investments from the private sector can assist the municipality into raising funds for its projects directed to the provision of water services to residents.

#### *6.6.2.6 Evaluate and Improve*

The municipality in water provision to residents must continuously evaluate and improve. It must be known which communities do not have adequate sufficient water, which business, university. Service delivery must always be improved and evaluated to reduce unnecessary costs and wastage. The liter provided a SCORE model which can be used as SCM process as an analytical for service delivery in water service.

The SCORE model promotes linkages between an institution, process, performance metrics, skills into a single interdepend structure through SCMP'S and regulations. Evaluation of the

municipality can be managed through an analysis of weather planning objectives have been achieved in a month or year. This could be done through looking at factors like sourcing, production activities, distribution of the water services and revenue collection as although it is not a major aim in the local sphere of government.

Improvement in water provision can be any factor, which provides a solution to water shortages from some communities. Infrastructure needs to be improved in terms of more dams as the eThekweni region is a scarce area. There must be improvement in research and development to come with technologies, which can reduce water wastage and costs in production stage by the municipality.

The municipality must have strong ethical with professional conduct. Municipal managers should make sure that ethics and professionalism are linked to SCM practices as to assists internal with external auditors where there are problems especially in tender documents, which become difficult to verify. Municipal managers and employees should be aware of procurement irregularities with business deals outside the working environment while not prescribing to SCM regulations.

### **6.7 Recommendation for future research**

Employees outside the department of Supply Chain Management need to be aware of these principles. There seems to be a huge gap with employees in the supply chain department in the form of senior buyers, contract administrators and verifiers with actual the workers on the ground who interact with communities on a weekly basis.

It raises concerns if leaks, areas with no water systems and tanks are reported on time and weather some are reported. It might be the municipalities because of tender process under supply regulations like issue of three quotes before approval of a certain procurement of an input towards the provision of water service to residents in the municipal areas. This can be looked at in the future as an independent study.

The municipality as evident in literature has struggled with large projects to have dams with capacity for water storage. As from findings in literature it still see's water from the sea as expensive to convert to potable water. The municipality must buy tanks or subsidize them for households and make it sure; every household has a tank in this drought area. This will allow

huge gallons of water to be saved when there is rain and also stored in dams, which will assist in decreasing the burden of water provision to the municipality. There, can be a lot of water used for use, which is received from the rain.

### **6.8 Contribution of the study towards supply chain and water services**

In the fast-moving economies in the world and in South Africa through trade, globalization with an ever changing business environment companies saw the need for Supply Chain Management. It has provided efficiency in the private sector through eliminating waste and shortening lead time also creating productive production which enables the equilibrium between demand and supply when satisfying customers.

The study looks to provide solutions which are motivated or encompasses the principles of Supply Chain Management in the operations of the municipality to better provide water and electricity to the residents at eThekweni municipality. The need to accomplish and understand the new concept of integrated supply management, which promotes independence amongst functions and departments, will be established.

### **6.9 Conclusion**

A discussion of results in the study as per objectives was done with also summaries of chapter from one to five was done. The chapter provided limitations of the study with overall conclusion. The chapter then provided recommendations for the study as per findings, which were also discussed in the chapter. It was argued that not all employees in the eThekweni municipalities are not equipped with the principles of SCM towards the water provisions services to residents.

There effective application of SCMP'S exists in the municipality through supply chain regulations but whether they are properly implemented to better provide services is not clearly stated. Recommendations were provided to the study as great deal of educating and training was proposed on officials with SCM. The implementation of SCM principles with evaluation and improvement was also needed to be improved by the municipalities.

It was recommended that the strategic plan of the municipality must be aligned with SCM policy as to remove the gap of incompetence. To achieve this recommendation there was a need for greater communication and involvement of stakeholders in process when providing water services to residents.

There was recommendation for future research provided with contribution of the study towards Supply Chain Management and water services. The chapter then concluded with an overall conclusion.

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## **Appendix 1: Interview Questions**

- 1.** Are employees in the department of Supply Chain Management in the eThekweni municipality aware and fully equipped about Supply Chain Management principles?
- 2.** Are supply chain principles applied in the eThekweni municipality, if they are to what extent these principles are applied in the eThekweni municipality ?
- 3.** At what levels do employees in the Supply Chain Management Unit of eThekweni Municipality understand the importance of SCM principles?
- 4.** How can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekweni municipality?
- 5.** Are employees in the SCMU fully capacitated to implement SCM principles for water supply purposes?
- 6.** To what extent are SCM principles applied at eThekweni Municipality?
- 7.** What has the SCMU done to integrate SCM principles into water service delivery processes?
- 8.** How can the SCMU of eThekweni Municipality use SCM principles to improve SCM processes?
- 9.** How effective, efficient and economic are SCM principles of eThekweni Municipality?
- 10.** How can SCM principles improve Supply Chain Management processes at eThekweni Municipality?
- 11.** To what extent has the municipal SCMU ensured the relationship between SCM principles and financial outcomes?
- 12.** What has the SCMU of eThekweni done to align SCM principles with municipal policy frameworks?
- 13.** How do Municipal SCM processes improve close linkages between stakeholders in the value chain?

## Appendix 2: Aligning Interview Questions with Responses

1. Are employees in the department of Supply Chain Management in the eThekweni municipality aware and fully equipped about Supply Chain Management principle?		
B	CA	V
<p>Yes (B1).</p> <p>Yes (B2).</p>	<p>Yes, (CA1).</p> <p>Yes (CA2).</p>	<p>Yes I think they do (SV1)</p> <p>Yes I would say and most of them are and know what supply chain is all about but some do not know but then we do training , we have internal and external training each and every year people are taken to different fields to understand Supply Chain Management better (V2).</p>
<p>Yes the Supply Chain Management are aware of the Supply Chain Management principles and policies through the preferential procurement act which guides us whenever we are going to select a supplier and aware of the Triple BEE which is one of the policy which guides us in selecting a supplier. They also got suitable qualifications, which help them to implement every policy that is being needed whenever we do our job (B3).</p>	<p>Yes (CA3).</p>	<p>I think they are because when we started working at the department we actually given pamphlets for our principles and guidelines and feature with what actually supply chain does for the community and eThekweni municipality as well (V3).</p>

2. Are supply chain principles applied in the eThekweni municipality, if they are to what extent these principles are applied in the eThekweni municipality?		
B	CA	V
<p>There are procurements site of goods and services (B1). Everything is transparent and there is accountability (B2) They are applied because when we have done the implementation we have to report to the management as to what has been done and what</p>	<p>Applied because the staff are fully aware and there is compliance with supply chain regulation and we provide workshops and training (CA1). All there departments, whatever , we are governed by the MFMA , we just follow guidelines.(CA2). To the extent of... number 1,</p>	<p>I see them being followed (V1). Yes, I would say everything that we do as this department we are applying our principles, examples we try to follow all the procedures , you cannot buy this stapler for example without following procedure people must quote and there must be adverts then people but (V2). Some people do, you find that as we are</p>

<p>policy has been followed and in that extent in each tender has been awarded we to the board or management to report on what basis we have applied the policies (B3).</p>	<p>your constitutional mandate when studied speaks about transparency, fairness, equity and cost competitive which is the first pillar. Number two in term of chapter 11 of our Public Financial Management Act which give effect to the procurement of goods and services that is also an extent to which one of the principles are applied. Number 3, a guide offered to the accounting officer by national treasury that indicate to effect segregation of duties to effect accountability which is section 30of the PFMA , that there are procedures offered by the municipality to ensure adherence too. We also provide training with any service provider available(CA3).</p>	<p>given guidelines and ways on how to perform with the rules there are people who will follow rule and others will not , rules are followed when there is supervisor most of the time (V3).</p>
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<b>3. How can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekweni municipality?</b>		
B	CA	V
<p>By working on continuously, improving systems, which can better, provide water services. Some projects have pass phased 1 which are designed to better improve service delivery in the municipal area (B1). All officials involved these principles correctly then obviously it will lead to effective supply chain process and if they fill everything correctly (B2).</p> <p>Okay they can improve service delivery in the sense that lets say a supplier has been, is going to render a service in water department has been selected in using the policies, so that supplier is going to do the job that as required in time and is going to make sure everything is done according to the tender description , for</p>	<p>Compiling with supply chain regulators and government regulators. (CA1). One has to look at the suppliers they use , we need to learn the business and they need to know the market in terms of high demand and they must be able to know the pricing strategy , maintain the price for a contract period not for one year we need to tell them how the price mechanism operates like the contract price period is 2 years not 1 year. Suppliers do not understand Supply Chain Management. Sometimes we are forced to buy out of contracts (CA2). The Supply Chain Management is centralized , remember before you go ahead Lukhanyo , in terms of public procurement , supply chain must be within the office of the CFO , how do we do it with water, remember water does not only deal with water it deals with , they are</p>	<p>They can be clean water (V1). Just to answer in general because I am not on water, I would think it would improve processes because people want to buy without procedures but there is section 36 to use if something is to be bought, we are trying to provide better service delivery to the community(V2). Like I said they are followed , honestly my opinion if everyone would follow the principles it will help the service delivery for our municipality as I speak now we have the thing like water crisis and one thing I know we do have things like water tanks go to areas even though its not under my department , we work 24 hours, they could really improve our service delivery objectives in the municipality (V3).</p>

<p>example there were will be no nepotism and favors so whenever there is are no favors then supplier will perform according to the description or mandate that has been given too (B3).</p>	<p>also enablers that ensure , water is, can you look at me , water is an end product you consume but goes via a logistics, you must have people , transportation, mechanical part of water is not us but we source a strategic contract administrator to select buyers to keep pipes, valves, the municipality is big, you cannot have one person, we have a pool of water individuals under water department under us to make sure efficiency and effectiveness is achieved. Supply chain department division we provide education (CA3).</p>	
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**4. At what levels do employees in the Supply Chain Management Unit of eThekweni Municipality understand the importance of SCM principles?**

B	CA	V
<p>Some understand but some do not understand especially in pricing policies of goods and services (B1).            Individuals in the department on whatever we do we need to know the policies and procedures required to do the job. <b>We are fully aware of procedures that need to be followed according to the law, so it is very important. At the end of the day, you have to account for everything you do (B2).</b></p> <p>How do we understand? I repeat the question: As I have said earlier in the other question at some point you have to report on how you follow guidelines, we know they are very important because at the end of the day we have to report whenever the work is done and when we report you have to make show and explain in every detail what you have done and not done, eventually automatically you know you are supposed to know them so they are important because we are mandate, I mean we work around them (B3).</p>	<p><b>At the highest level, we meet with management on a weekly basis to see if we comply with regulations. (CA1).</b>            Everybody understands the importance of the Supply Chain Management principles; they must understand what they are doing in the entire process. (CA2)  <b>You see, in terms of Supply Chain Management is to accelerate service delivery based on time, cost and value to the community. That</b> essence of service delivery that people must understand Supply Chain Management that we need to bring services to people we serve (CA3).</p>	<p>Very important (V1).  <b>I think they understand because everybody is doing everything according to the laws of the eThekweni municipality they what they like.(V2)</b>  <b>With the staff you find some see its important, we work with pipes with things which will improve service delivery fore people , I think they understand the importance, its few who do not see the importance because our staff know what to give supplies (V3).</b></p>

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<b>5.Are employees in the SCMU fully capacitated to implement SCM principles for water supply purposes?</b>		
B	CA	V
<p>Yes, Info system used to educate staff on Supply Chain Management via e-mail. (B1).</p> <p>Yes (B2)</p> <p>Yes, they are aware for example when you go to our offices you see a chart which list all policies which to follow within our department so every time you see the chart you are reminded to follow guidelines when doing our job every day (B3).</p> <p>Already have answered that Lukhanyo! Next question mfondini! (CA3)</p>	<p>Yes, they are (CA1).</p> <p>They do we have in house training programs. (CA2)</p>	<p>Every process is done according to Supply Chain Management principles (V1).</p> <p>Yes , I think they can and there are supposed to be doing it because procedure are there to guide them as to speed the service delivery(V2).</p> <p>With our department in the store we are a normal store is that people from outside come require what they need for water service delivery input so we understand that we must be very equipped with whatever is needed (V3).</p>

<b>6.To what extent are SCM principles applied at eThekweni Municipality?</b>		
B	CA	V
<p>Yes, especially on the procurement side. Signing powers are granted to certain individuals according to the law of Supply Chain Management, it shows that it is practiced (B1).</p> <p>By conducting workshops and training (B2).</p> <p>Number 5 answer had covered the six question: Yes, they are aware for example when you go to our offices you see a chart which list all policies which to follow within our department so every time you see the chart you are reminded to follow guidelines when doing our job every day(B3).</p>	<p>To the highest level, to the extent that we go 70% local content. (CA1).</p> <p>Briefing session are done were technical aspects of contracts are done to make sure suppliers no what they have and how to compile and what is needed of them. If they do not comply they are not chose, we as a department make sure they understand the technicalities of Supply Chain Management. (CA2).</p> <p>Yes as per the PFMA , as per the constitutional mandates( CA3).</p>	<p>Same answer as above, Is not the same question? (V1).</p> <p>To every extent (V2).</p> <p>Already covered above (V3).</p>

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7. What has the SCMU done to integrate SCM principles into water service delivery processes?		
B	CA	V
<p>On the side of tenders , we have kept relationships strong with reliable suppliers (B1).</p> <p>Conducting some workshops just to keep ahead (B2).</p>	<p>We do workshops and road shows (CA1).</p> <p>Every department has a supply chain (CA2).</p> <p>I think the question will require a person with the department itself as I had said I am not under water (B3).</p> <p>Lukhanyo if you look at the inception of supply chain we try to have a category management were we will categorize water, remember water is not in terms of commercial aspect , its not by right or law , it is something we must issue for free but let alone of the commercialization of certain things , in a true sense people are not paying for water but are paying a levy for us to get revenue to pay people , by law water should be free but because of enabling things and enablers to crucial make sure water is available , it involves cost , are you with me.</p> <p>We look at it to that extent</p>	<p>It is not my field (V1).</p> <p>You came to the right office, we usually we call them and tell them there are people of supply chain and there are programs like Masakhane were we call internal and external players and communities. Tomorro we go to Durban chamber to help educate and through distributing broachers like I will give you as we give buyers and suppliers for you to see (V2).</p> <p>I think it does because you find out, I think it does in the sense that with us for everything we need to have for service delivery we have other departments to supply us, we do have stock out if companies with tenders delay or suppliers do not keep to the time frame (V3).</p>

	(CA3).	
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<b>8. How can the SCMU of eThekweni Municipality use SCM principles to improve SCM processes?</b>		
B	CA	V
<p>I do not know (B1). I feel like the question has already been answered on top (B2). You know n supply chain we are faced with a challenge of corruption and ethics so these policies are also important in guiding supply chain professionals to make sure everything they is within ethics and conduct, I think these policy have improved the supply chain department as whole because they have somehow improved lowering the corruption in the department and most of the professionals are scared getting involved in corruption they have improved the conduct (B3).</p>	<p>By having awareness and information from other departments (CA1). Training and educational programs (CA2). By following guidelines and procedures of Supply Chain Management (CA3).</p>	<p>Communicating with junior staff (V1). This one is more or else as the above, I have answered (V2). I think, they can if every person who works in the municipality all do they job and not be lazy while others are working, I think it would work if everyone do their part (V3).</p>

<b>9. How effective, efficient and economic are SCM principles of eThekweni Municipality?</b>		
B	CA	V
<p>Yes, I would say we get 9 out of 10 (B1). Yes, each day we do implement all those principles (B2). When I was about to read the interview 9 he said in whispering and hand gesture, last 3, running late showing me the clock the decided to skip to number 11,12 and 13 (B3).</p>	<p>We are very effective and efficient and I can rate us 10 out of 10 (CA1). Already answered that (CA2). In the sense, the municipality is not making irregular expenditure which are evident through clean audits (CA3).</p>	<p>It controls everything when it comes to processes including budgetary process (V1). They are efficient (V2). I do not have answer for that, I do not have answer for that , .....“laughing and smiling”, Senior management will know that (V3).</p>

<b>10. How can SCM principles improve Supply Chain Management processes at eThekwini Municipality?</b>		
B	CA	V1
<p>We have close to 36 supplies as we avoid irregularities, we tell them to give us 3 quotes at least. It might happen that a pipe has burst and community needs water but the problem will be getting three quotes for the tender so it does sometimes but sometimes slows the process of water through delays (B1).</p> <p>Yes, goes hand in hand (B2).</p> <p>Skipped as explained above in question 9. (B3)</p>	<p>Already answered that. (CA1) They just do, if they are followed. (CA2) In every aspect I have just explained in the above questions (CA3)</p>	<p>May, Yes or Not it just depends (V1.) No answer (V2). Already covered from the above (V3).</p>

<b>11. To what extent has the municipal SCMU ensured the relationship between SCM principles and financial outcomes?</b>		
B	CA	V
<p>It is not my field, senior management can answer or finance people (B1). Yes, very effective 2016 we received a clean audit so yes we implement correctly (B2).</p> <p>I think they are positive as earlier questions I answered that through reports you manage to see or experience , I have done one report so far and from there I experienced positive feedback and in the previous month there were lots of improper expenditures from my department or municipality when I was not there but now through implementation of these policies we have seen most of the expenditure are within the budgets and in the department we use a policy of lowering the lowest supply and every expenditure is</p>	<p>Irregular expenditures are look at and regulators on records are done. (CA1) Liaising with financial departments is done to see financial statements. Tenders cannot be granted if the is no assurance of financial consent. (CA2) Irregular expenditure cannot be attributed to supply chain , once you have a poor planning or a design that does not customer satisfaction, we strive to be the best and send people for training to try and make them understand about the value for money , you cannot have value for money when you have poor planning,. We are geared towards the correct direction. (CA3)</p>	<p>I think so, principle are practice across departments, and processes from water are the same with under supply chain. (V1).</p> <p>Yes, people understand more because last year we got a clean audit (V2).</p> <p>Not my field, you can contact the managers (V3).</p>

within the budgets, expenditures now are not so high, so financial budgets have improved in terms of savings.(B3).		
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<b>12. What has the SCMU of eThekweni done to align SCM principles with municipal policy frameworks?</b>		
B	CA	V
<p><b>Yes, it has but mostly by e-mail (B1).</b></p> <p>Definitely yes (B2).</p> <p>Yes, they have tried to integrate it but not sure have been there for a short period of time, but what I have seen they have tried a lot to integrate it because our offices are so close to the finance offices so I think they try to bond us with the finance guy and whenever there is a challenge we are able to raise it faster but as I have said I am not sure how they integrate (B3).</p>	<p>We meet with the head of SIPs (Strategic Integrated Projects) (CA1).</p> <p>DTI , there must be 70 percent of the product produced must be locally (CA2).</p> <p><b>The IDP is drafted while the head of Supply Chain Management is present (CA3).</b></p>	<p>They just relate (V1).</p> <p><b>Usually we have meetings with other departments and align with them, what do they want? While we also tell them what we want (V2).</b></p> <p>I think my observation I think they have but as much as we have goals, some do happen and some do not happen (V3).</p>

<b>13. How do Municipal SCM processes improve close linkages between stakeholders in the value chain?</b>
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B	CA	V
<p>Same answer as the above one (B1).  Yes, they do (B2).  We our suppliers there is something we have done I think it was two months ago were before we used to issue tenders to the general now we have tried to choose from a panel but now for example the fruit industry we have four suppliers so that they know whenever there is a tender or emergence they make sure they supply fruits and verges in that way the relationships is trust and commitment because they know they are within the panel unlike before when everyone could get and some suppliers would not quote but these ones quote because they know they are within the panel. Some supplier would think they will not get the tender.  With internal departments as I have said we are working with the finance department to make sure invoice are paid as soon as possible and now suppliers are happy because we pay the on time (B3).</p>	<p>We meet monthly with our supplier's weather they are external or internal. (CA1).  Training programs in the municipality, educational workshops are done to have the same knowledge we together with suppliers. We interact with suppliers internal and external to promote close linkages.(CA2)  Remember Lukhanyo every department submits the procurement plan which will be derived to produce their budgets, that is the linkage, there is no department that must operate without a procurement plan which stipulates the future needs is needed. (CA3)</p>	<p>We have because if we do not have contracts we can borrow them from others (V1).  Usually we do workshops, sometimes we send e-mails or we just give pamphlets. (V2).  Store does not operate on its own people, you can ask the people who order for us, like Connie, they are buyers same place you went to interview at the department in town, buyers are actually the ones (V3).</p>

## 2.1Aligning Research Questions, Objectives with interview questions

Research Questions	Research Objectives	Interview Questions
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<p>Are employees in the department of Supply Chain Management in the eThekweni municipality aware and fully equipped about Supply Chain Management principles?</p>	<p>To ascertain whether employees in the department of Supply Chain Management are aware and fully equipped about Supply Chain Management principles.</p>	<p>1. Are employees in the department of Supply Chain Management in the eThekweni municipality aware and fully equipped about Supply Chain Management principles?</p> <p>4. At what levels do employees in the Supply Chain Management Unit of eThekweni Municipality understand the importance of SCM principles?</p> <p>11. To what extent has the municipal SCMU ensured the relationship between SCM principles and financial outcomes?</p> <p>13. How do Municipal SCM processes improve close linkages between stakeholders in the value chain?</p>
<p>Are supply chain principles applied in the eThekweni municipality, if they are, to what extent are these principles applied in the eThekweni municipality?</p>	<p>To determine whether supply chain principles are applied in the eThekweni municipality and if so, to what extent which to which they are applied in the eThekweni municipality</p>	<p>2. Are supply chain principles applied in the eThekweni municipality, if they are to what extent these principles are applied in the eThekweni municipality ?</p> <p>6. To what extent are Supply Chain Management principles applied in the eThekweni municipality?</p> <p>8. How can the SCMU of eThekweni Municipality use SCM principles to improve SCM processes?</p> <p>9. How effective, efficient and economic are SCM principles of eThekweni Municipality?</p> <p>10. How can SCM principles improve Supply Chain Management processes at eThekweni Municipality?</p> <p>12. What has the SCMU of eThekweni done to align SCM principles with municipal policy frameworks?</p>
<p>How can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekweni municipality?</p>	<p>To assess if the effective application of Supply Chain Management principles can improve the service delivery of water in the eThekweni municipality</p>	<p>3. How can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekweni municipality?</p> <p>5. Are employees in the SCMU fully capacitated to implement SCM principles for water supply purposes?</p> <p>7. What has the SCMU done to integrate SCM principles into water service delivery processes?</p>

### Appendix 3: Aligning the Theoretical Framework with Interview Questions

Supply Chain Management principles	Score model	Linking corporate strategy with SCMP's
How can the effective application of Supply Chain Management principles improve the service delivery of water in the eThekwini municipality?	Are employees in the department of Supply Chain Management in the eThekwini municipality aware and fully equipped about Supply Chain Management principles?	How can SCM principles improve Supply Chain Management processes at eThekwini Municipality?
What has the SCMU done to integrate SCM principles into water service delivery processes?	How can the SCMU of eThekwini Municipality use SCM principles to improve SCM processes?	How effective, efficient and economic are SCM principles of eThekwini Municipality? To what extent are Supply Chain Management principles applied in the eThekwini municipality?
	Are supply chain principles applied in the eThekwini municipality, if they are to what extent these principles are applied in the eThekwini municipality ?	Are employees in the SCMU fully capacitated to implement SCM principles for water supply purposes?

<p>To what extent has the municipal SCMU ensured the relationship between SCM principles and financial outcomes?</p>		
<p>What has the SCMU of eThekweni done to align SCM principles with municipal policy frameworks?</p>		
<p>At what levels do employees in the Supply Chain Management Unit of eThekweni Municipality understand the importance of SCM principles?</p>		

## Appendix 4: Ethical Consent



19 January 2017

**Mr Lukhanyo Mtshingana (210553589)**  
**School of Management, IT & Governance**  
**Westville Campus**

Dear Mr Mtshingana,

**Protocol reference number: HSS/0006/017M**

**Project title: The implementation of the Supply Chain Management principles in eThekweni Municipality: A case of the Department of Water**

### **Full Approval – Expedited Application**

In response to your application received on 03 January 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and **FULL APPROVAL** was granted for the protocol.

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

**PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.**

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

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

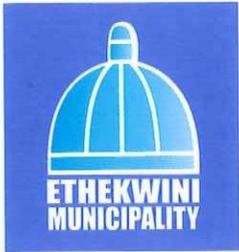
Yours faithfully

A handwritten signature in black ink, appearing to read 'Shenuka Singh'.

.....  
**Dr Shenuka Singh (Chair)**

/ms

Cc Supervisor: Dr Maxwell Phiri  
Cc Academic Leader Research: Professor Brian McArthur  
Cc School Administrator: Ms Angela Pearce



## ETHEKWINI MUNICIPAL ACADEMY

Shell House  
221 Anton Lembede Street, Durban , 4001  
Tel: 031 311 3192, Fax: 031 311 3292  
[www.durban.gov.za](http://www.durban.gov.za)

28 July 2016

ATT: Lukhanyo Mtshingana

### **RE: AUTHORITY TO DO RESEARCH IN THE ETHEKWINI MUNICIPALITY**

Your letter dated 27 July 2016 requesting to do research on Master's degree entitled:  
**"The Application of Supply Chain Management Principles to effective provision of Water services in the eThekweni Municipality"** Administration Honours has reference.

You are hereby informed that you are granted authority to do research as requested. You are reminded of the ethics which have to be prioritized when engaging our employees on this research. Please contact the relevant units for all other logistics.

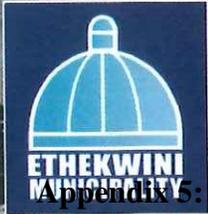
Regards

Date.....

---

Dr M.B. Ngubane

Head: EThekweni Municipal Academy



## Appendix 5: Gatekeeper Permission



Pod 1, Second Floor, Intuthuko Junction, 750 Mary Thiphe Street, Umkhumbane, Cato Manor, Durban 4001.  
Tel: 031 322 4513, Fax: 031 261 3405, Fax to email: 086 265 7160, Email: [mile@durban.gov.za](mailto:mile@durban.gov.za), Website: [www.mile.org.za](http://www.mile.org.za)

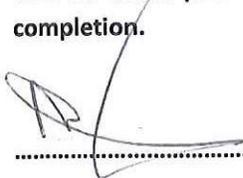
For attention:  
Chair of Ethics Committee  
School of Management, Information Technology and Governance  
University of Kwazulu - Natal  
4001

27 July 2016

**RE: LETTER OF SUPPORT TO STUDENT LUKHANYO MTSHINGANA , STUDENT NUMBER 210553589 - GRANTING PERMISSION TO USE ETHEKWINI MUNICIPALITY AS A CASE STUDY**

The Head: supply Chain Management as well as the Head: eThekweni Municipal Academy (EMA) have considered a request from student **LUKHANYO MTSHINGANA** to use eThekweni Municipality as a research study site leading to the awarding of the Masters degree entitled: **" The Application of Supply Chain Management Principles to effective provision of Water services in the eThekweni Municipality "**

We wish to inform you of the acceptance of his request and hereby assure him of our utmost co-operation towards achieving his academic goals; the outcome which we believe will help our municipality in the long run. **In return, we stipulate as conditional that LUKHANYO MTSHINGANA contacts the Municipal Institute of Learning ( MILE) so that he could present the results and recommendations of his study to a select group of city officials on completion.**

 2016-07-28

Andre Petersen  
Head: Supply Chain Management  
eThekweni Municipality



Dr M. Ngubane  
eThekweni Municipal Academy  
eThekweni Municipality

## Appendix 6: Consent Form

**UNIVERSITY OF KWAZULU-NATAL**  
**School of Management, IT and Governance**

Dear Respondent,

**Research Project**

**Researcher:** [insert name] (Telephone number: [insert]) (Email: [Insert])

**Supervisor:** [insert name] (Telephone number: [insert office number]) (Email: [Insert])

**Research Office:** Humanities & Social Sciences Research Ethics Administration, Govan Mbeki Building, Westville Campus, Tel: + 27 (0)31 260 8350, Email: [hssreclms@ukzn.ac.za](mailto:hssreclms@ukzn.ac.za)

I, Mtshingana Lukhanyo from the College of Law and Management at the University of KwaZulu-Natal with a student number of 210553589. I am under the School of Management, Information Technology and Governance and currently in my second year of my master's in supply chain management.

The title of the study: The Implementation of the Supply Chain Management Principles in eThekweni Municipality: A case of the Department of Water

The aim of this study is to: Can the formulation and Application of sound Supply Chain Management principles or guidelines lead to the improvement in the delivery of water services in the eThekweni Municipality?

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this research project. Confidentiality and anonymity of records will be maintained by the researcher and School Management, Information Technology and Governance, UKZN.

All collected data will be used solely for research purposes and will be destroyed after 5 years.  
This study has not yet been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee

Sincerely

Researcher's signature \_\_\_\_\_ Date \_\_\_\_\_

· *This page is to be retained by participant*

**UNIVERSITY OF KWAZULU-NATAL**  
**School of Management, IT and Governance**

**Research Project**

**Researcher:** [insert name] (Telephone number: [insert]) (Email: [Insert])

**Supervisor:** [insert name] (Telephone number: [insert office number]) (Email: [Insert])

· Research Office: **Humanities & Social Sciences Research Ethics Administration,**  
**Govan Mbeki Building, Westville Campus, Tel: 27 31 2604557, Email:**

**HSSREC@ukzn.ac.za**

**CONSENT**

·  
· I \_\_\_\_\_ (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

· Additional consent, where applicable

· I hereby provide consent to:

· Audio-record my interview / focus group discussion YES / NO

· Video-record my interview / focus group discussion YES / NO

· Use of my photographs for research purposes YES / NO

·

·

· \_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

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· *This page is to be retained by researcher*

