



An Investigation into a viable Service Delivery system in relation to Water and
Sanitation in Ugu District Municipality

By

Khethiwe P. Dlamini-Tshazi

Student no:19851548

A Thesis Submitted in Fulfilment of the Requirements for the Degree: Doctor of
Philosophy in Leadership and Complexity Studies
in the Faculty of Management Sciences at the
DURBAN UNIVERSITY OF TECHNOLOGY

Supervisor: Dr. Stan Hardman

Date: October 2021

ABSTRACT

Water needs permeate all aspects of human existence and activities, and water is fundamental and irreplaceable to humans. However, developing effective water and sanitation governance arrangements is of increasing concern. Although a general conceptualisation of governance exists, there is little guidance on a governance system's operational and evaluative components. Therefore, fundamental challenges to improving water governance are identified and investigated in the study. The research focus is on holistic governance issues concerning water and sanitation provision to households and businesses, with special reference to the Ugu District Municipality (UDM) in the KwaZulu-Natal province, South Africa. Governance is analysed based on interconnectedness of structures and system components to achieve organisational results. A qualitative method, combined with systems thinking methodologies, namely a Viable Systems Model (VSM) is used, as well as Soft systems methodology (SSM). Semi-structured interviews to targeted municipal officials and focus groups of ward councillors were used to gather information, share perceptions, experiences, concerns, and perspectives in water and sanitation service delivery. Interview results are an indicator of the generation and applicability of VSM to service delivery issues at UDM and provided empirical evidence when VSM gaps were identified. VSM data consisted of an initial comprehensive system map, comparing various manifestations of the organisation within their environment. The analysis demonstrated municipal challenges as a combination of soft and hard issues, including leadership oversight, fragmentation of structures, lack of information coordination and shortages of resources. VSM also fosters an in-depth understanding of the UDM as a system, supporting its suitability, although the ability to implement suggested improvements was not confirmed. The study emphasises the necessity for a holistic approach and heeding of soft issues when providing water and sanitation. The study contribution includes VSM application to strengthen governance in water service authorities, highlighting VSM strengths and shortfalls in the applied context, and presents derived methodological lessons, which broaden the knowledge of employing VSM and support its application in practice.

DECLARATION

I, Khethiwe Dlamini-Tshazi declare that:

- i. The research reported in this dissertation/thesis, except where otherwise indicated, 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.
- iv. This thesis does not contain other persons' writing, unless specifically acknowledged as being sources from other researchers. Where other written sources have been quoted, then;
 - a. Their words have been re-written but the general information attributed to them has been referenced;
 - b. Where their exact words have been used, their writing has been placed inside quotation marks, and referenced.
- v. This thesis does not contain text, graphics or tables copied and pasted from the Internet unless specifically acknowledged, and the source being detailed in the dissertation/thesis and in the References sections.

Signed:

Khethiwe Dlamini-Tshazi

Student Number: 19851548

Date: October 2021

ACKNOWLEDGMENTS

I owe my gratitude to all those individuals who have made this dissertation possible.

Firstly, I would like to thank Dr Stan Hardman. I could not have asked for a better supervisor. His thorough comments and criticisms not only improved this dissertation, but also how I conducted the research.

Many thanks to all local government staff and politicians who agreed to be interviewed. The end-product would have been far less informative and far less interesting without their thoughtful and open responses, to sometimes sensitive questions. Although they cannot be identified, some of the interviewees went above and beyond what I anticipated. They not only took extra time to explain the complexities of the service area they work in, but also went out of their way to introduce me to colleagues to track down relevant documents.

I would also like to acknowledge the financial support that I received from the UDM, this certainly made life as a PhD student a little easier. Finally, I want to thank my family (in-laws included) for their support, encouragement, and understanding. Most of all, I thank my husband Nceba, for his unwavering support.

TABLE OF CONTENTS

ABSTRACT.....	ii
DECLARATION	iii
ACKNOWLEDGMENTS	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	xiii
LIST OF FIGURES	xiv
LIST OF SCREENSHOTS AND PHOTOGRAPHS.....	xiv
LIST OF ACRONYMS.....	xv
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Overview of the study.....	1
1.2 Background and research problem	8
1.3 Research objectives.....	11
1.4 Systems Thinking in evaluating Local Government	12
1.5 Research approach.....	13
1.6 Scope and delimitations of the research	14
1.7 Organisation of the dissertation	15
CHAPTER TWO.....	17
PROBLEM ANALYSIS AND THEORETICAL FOUNDATIONS.....	17
2.1 Introduction	17
2.1.1 Basic water system.....	18
2.2 Systems map	19
2.3 Global paradigms of water management	21
2.3.1 Global water systems	22
2.3.2 Water scarcity.....	22

2.3.3	Water quality.....	23
2.3.4	Access to drinking water and sanitation.....	24
2.3.5	Climate change.....	24
2.3.6	Water-Energy-Food Nexus.....	25
2.3.7	Dishonesty in the water sector.....	26
2.4	Political analysis.....	27
2.4.1	Decentralisation.....	29
2.5	Environmental analysis.....	30
2.5.1	Hydrology.....	32
2.5.2	Water Availability in South Africa.....	33
2.5.3	Groundwater.....	34
2.5.4	Water pollution.....	35
2.5.5	Blue and Green Drops Assessments.....	36
2.6	Technological analysis.....	36
2.6.1	Water recycling.....	37
2.6.2	Desalination of Sea Water.....	38
2.6.3	Water infrastructure.....	39
2.6.4	Poor infrastructure.....	40
2.6.5	Pressure management.....	41
2.6.6	Water Demand Management.....	42
2.7	Legal analysis of water.....	43
2.7.1	The right to water.....	43
2.8	Social analysis aspect of water.....	45
2.8.1	Women in water.....	47
2.8.2	The role of consumers in Water Demand Management.....	48
2.9	Economies of water.....	49

2.10	Uses of water	51
2.10.1	Consumption and utility	52
2.10.2	Agricultural and industrial water use	53
2.10.3	Household water use	53
2.10.4	Leisure water use	54
2.10.5	Environmental water use	54
2.11	Water and competing or conflicting needs	55
2.12	Water governance	57
2.12.1	Challenges in water governance	59
2.13	Conclusion	60
CHAPTER THREE		61
CONTEXTUALISING MUNICIPALITIES AS WATER SERVICE ORGANISATIONS		61
3.1	Introduction	61
3.2	Background of municipal structures	63
3.2.1	The Scope of water supply services	66
3.2.2	Municipal revenues.....	67
3.2.3	Municipal funding.....	69
3.2.4	Financial health of the municipality	70
3.3	Governance in context	71
3.3.1	National Government.....	73
3.3.2	Provincial Government	77
3.3.3	Local Government and or Water Services Authorities	78
3.3.4	Water Boards.....	79
3.4	Social integration of water use	79
3.5	Institutional arrangements.....	82
3.6	Challenges of institutional arrangements	82

3.7	Integrated Water Resource Management	85
3.7.1	Implementation of IWMR in Municipalities	86
3.7.2	Limitations of IWRM.....	87
3.8	Municipal Water and Sanitation Service Plans.....	90
3.8.1	Integrated Development Planning	90
3.8.2	Service Delivery and Budget Implementation Plan	92
3.8.3	Service Delivery Improvement Plan.....	93
3.8.4	Quality of service delivery in municipalities.....	94
3.8.5	Partnerships as an alternate service delivery approach	96
3.9	Citizen’s Charter	97
3.10	Batho Pele Principles.....	99
3.11	Water efficiency	101
3.12	Effectiveness of Water Management	102
3.12.1	Tariff policy	103
3.12.2	Indigent policy.....	104
3.12.3	Water tariff structure	106
3.13	Monitoring of the Municipality	107
3.14	King IV Report on Corporate Governance	109
3.15	Causes of poor municipal performance	111
3.16	Intervention made to Local Government.....	113
3.16.1	Financial intervention.....	115
3.16.2	Other programmes of intervention	116
3.16.3	Back-to-Basics Programme (2014-Current) intervention	117
3.17	Ethics.....	118
3.18	Leadership and management	119
3.19	Relationships between politicians and officials	123

3.20	Conclusion	124
CHAPTER FOUR		126
RESEARCH METHODOLOGY		126
4.1	Introduction	126
4.2	Research framework	128
4.3	Context for application	128
4.4	The participants	129
4.5	Application of Viable Systems Methodology	131
4.6	Application of Soft Systems Methodology	132
4.7	Research instrument and data collection	133
4.8	Secondary data	136
4.9	Data analysis	136
4.10	Data analysis and interpretation	137
4.11	Triangulation and authenticity	139
4.12	Ethical considerations	139
4.13	Conclusion	140
CHAPTER FIVE		142
RESEARCH FINDINGS AND DISCUSSION		142
5.1	Introduction	142
5.2	Empirical evidence of current scenario at Ugu District Municipality ..	142
5.2.1	UDM Water Resources	142
5.2.2	Groundwater programme	143
5.2.3	Relevance of UDM in the study	143
5.2.4	Access to water	145
5.2.5	Quality of water	149
5.2.6	Blue and Green Drop Status	150
5.2.7	Reliability of water	153

5.2.8 Pricing, subsidies and tariffs	160
5.2.9 Efficiency and effectiveness of the UDM	162
5.2.10 Water Conservation/ No Drop Assessment	163
5.3 Viability status of service delivery at the UDM	163
5.3.1 Explaining VSM	164
5.3.2 A Viable System or municipality	167
5.3.3 Organisational environment.....	178
5.3.4 Environment that characterises the UDM	180
5.4 Interview results for service quality of Water and Sanitation provision	
184	
5.4.1 Purpose of Ugu District Municipality	184
5.4.2 Mission of the Municipality.....	184
5.4.3 Irrelevant Municipal Departments / Non-core functions	185
5.4.4 Culture at the UDM.....	186
5.4.5 Decision-making at the UDM	188
5.4.6 Transparency and the BPP.....	190
5.5 Conclusion	191
CHAPTER SIX	194
APPLICATION OF A VIABLE SYSTEMS MODEL.....	194
6.1 Introduction	194
6.2 Municipal environment	196
6.2.1 Stakeholder groupings with levels of water and sanitation provision	
.....	196
6.2.2 Institutional arrangements and regulations	198
6.2.3 Water as a natural resource	200
6.2.4 Political factors	201
6.3 Operational Units – S1	202

6.3.1	Municipal structure.....	203
6.3.2	Municipal accountability.....	204
6.3.3	Irrelevant municipal components.....	205
6.4	Squiggly line – C3: Operational linkages and relationships.....	206
6.5	Coordination: S2.....	209
6.6	Diagnosis of System 3 or control.....	210
6.6.1	Treasury.....	210
6.6.2	Performance Management.....	211
6.7	UDM officials’ perception of the state of Governance.....	213
6.8	Diagnosis of Human Resources.....	215
6.9	Diagnosis of Supply Chain Management Unit.....	215
6.10	Resource provision and bargaining in operational units: Channel 2 216	
6.11	Communication between S1 and S3 called C3.....	217
6.12	Intelligence: S4.....	218
6.13	Normative Management – S5.....	222
6.14	Summary of gaps identified.....	224
6.15	Fragmentation of Information Systems.....	225
6.16	Conclusion.....	227
CHAPTER SEVEN.....		228
RECOMMENDATIONS AND CONCLUSIONS.....		228
7.1	Introduction.....	228
7.2	Requisite variety.....	228
7.2.1	Municipal water charges.....	230
7.3	Recommendations to adopt a recursive structure and flexibility in the Municipality.....	231
7.3.1	Autonomy versus Control.....	232

7.3.2 Additional non-core function	235
7.4 Recommendations to adopt strategic leadership	236
7.4.1 Leadership role	240
7.4.2 Ethical leadership	240
7.5 Information transmission in the municipality.....	243
7.6 Channel 1, 2, 3, 4, 5, 6.....	246
7.7 Recommendation to train the audit function team on VSM	246
7.8 Limitations of VSM in this study	246
7.9 Conclusion	247
REFERENCES	250
APPENDIX 1 – RESEARCH ETHICS CLEARANCE LETTER	305
APPENDIX 2 – REQUEST FOR PERMISSION LETTER.....	306
APPENDIX 3 – LETTER OF INFORMATION AND CONSENT	307
APPENDIX 4 – QUESTIONNAIRE FOR UGU EMPLOYEES.....	309
APPENDIX 5 – QUESTIONNAIRE FOR NON UGU EMPLOYEES.....	320
APPENDIX 6 – TURNITIN REPORT	327
APPENDIX 7 – EDITOR’S REPORT	328

LIST OF TABLES

Table 2.1:	Proportional water use per main economic sector	52
Table 5.1:	The Neurophysiological Basis of the Viability Status Model..	16564
Table 6.1:	Water Service delivery protests at UDM - August 2020-March 2021	158
Table 6.2:	Overview of municipal operational units.....	199

LIST OF FIGURES

Figure 1.1: Municipal Water Services Distribution and Challenges	7
Figure 2.1: Water System Framework.....	20
Figure 2.2: Rainfall Pattern for South Africa (1961-1990)	33
Figure 3.1: Water Value Chain.....	63
Figure 3.2: Overview of municipal governance framework.....	74
Figure 4.1: Viable Systems Methodology	127
Figure 5.1: Ugu District Water Backlog Eradication	146
Figure 5.2: Ugu District Water Supply Map	147

LIST OF SCREENSHOTS AND PHOTOGRAPHS

Photos 5.1-4:	Dirty water as reported by UGU water users	151
Photos 5.5-6:	Dirty water for UGU water users' laundry and drinking	152
Photos 5.7-10:	UGU water users posts on UGU and Hibiscus Seconds Facebook complaints pages	154-155
Photos 5.11-20:	Water users protests on social media with regard to water leaks	158
Photo 6.1:	Water protesters barricaded the N2 on South Coast and torched vehicles.....	74

LIST OF ACRONYMS

AG	Auditor-General
ANC	African National Congress
AGSA	Auditor General of South Africa
BPP	Batho Pele Principles
CFO	Chief Financial Officer
CMA	Catchment Management Area
CoGTA	Department of Cooperative Governance and Traditional Affairs
DBSA	Development Bank of Southern Africa
DEAT	Department of Environmental Affairs and Tourism
DG	Director-General
DoE	Department of Education
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWaS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
FBWP	Free Basic Water Policy
DPR	Direct Potable Reuse
4IR	Fourth industrial revolution
GHG	Greenhouse Gas
GM	General Manager
HR	Human Resources
IDP	Integrated Development Plan
IPR	Indirect Potable Reuse
IWRM	Integrated Water Resource Management
IT	Information Technology
KZN	KwaZulu-Natal
LED	Local Economic Development
LGTAS	Local Government Turnaround Strategy
MANCO	Management committee
MDG	Millennium Development Goals
MEC	Member of the Executive Council

MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MM	Municipal Manager
MSCOA	Municipal Standard Chart of Accounts
NGO	Non-Governmental Organisation
NWA	National Water Act
OECD	Organization for Economic Cooperation and Development
PM	Performance Management
PMU	Project Management Unit
pppd	per person per day
PPP	Private Public Partnership
PSR	Public Service Regulations
RBIG	Regional Bulk Infrastructure Grant
RDP	Regional Development Programme
RWI	Regional Water Institution
SA	South Africa
SADC	Southern African Development Community
SALGA	South African Local Government Association
SAMWU	South African Municipal Workers' Union
SCM	Supply Chain Management
SDBIP	Service Delivery and Budget Implementation Plan
SDC	Service Delivery Charter
SDG	Sustainable Development Goals
SDIP	Service Delivery Improvement Plan
SDP	Service Delivery Planning
SFWS	Strategic Framework for Water Services
SMP	Sanitation Master Plan
SOE	State Owned Entities
SSM	Soft Systems Methodology
TCTA	Trans Caledon Tunnel Authority
UDM	Ugu District Municipality
UN	United Nations

USDG	Urban Settlements Development Grant
VIPs	Ventilated Improved Pit Latrines
VSM	Viable Systems Methodology
WaS	Water and Sanitation
WB	Water Board
WHO	World Health Organization
WISA	Water Institute of Southern Africa
WMP	Water Master Plan
WRC	Water Research Commission
WSA	Water Service Authority
WSDP	Water Services Development Plan
WSIG	Water Services Infrastructure Grant
WSP	Water Services Provider
WUAs	Water Use Authorities
WWTP	Waste Water Treatment Plants

CHAPTER ONE

INTRODUCTION

1.1 Overview of the study

Water and sanitation (WaS) management is a prevalent subject relevant to every species of society regardless of country, topography, season, business and or household. Water needs permeate all aspects of human existence and activities, and water is fundamental and irreplaceable to humans (Spellman 2018). Moreover, the accessibility of water has a momentous bearing on the state of a country's development (Cosgrove and Rijsberman 2014).

Grey and Sadoff (2007) posit that inadequate provision of water results in massive damages to communities, particularly the underprivileged. Jemmali and Sullivan (2014) concur that access to water plays a significant role in the fight against poverty. A study conducted by Lilford, Oyeboode, Satterthwaite, Melendez-Torres, Chen, Mberu, Watson, Sartori, Ndugwa and Caiaffa (2016) found that in developing countries, inadequate drinking water and sanitation caused approximately 502 000 and 280 000 diarrheal deaths a year, respectively. However, according to UNISEF (2015), there is commendable progress in delivering WaS, although UN-Habitat (2016) estimated that globally, more than 1.1 billion people still want clean water from a source that is nontoxic and in excess of 2.6 billion people do not have toilets and other acceptable sanitation amenities.

The global consensus on the need to provide universal access to basic services, including WaS, to all humans has always been a priority in global agreements; such as the United Nations (UN) Millennium Development Goals (MDG) that asserted clean drinking water as a right to human beings (Saleth, Kadushkin and Ali 2005). The UN Sustainable Development Goals (SDG) are aimed at combating poverty, while fighting inequalities and problems associated with climate change (UN 2018).

In South Africa (SA), the National Development Plan (NDP) Vision for 2030 was launched in 2012, after its draft release late in 2011. The South African NDP

states that by 2030, every South African will have inexpensive, consistent access to appropriate water and proper sanitation (Fourie 2018). The plan further stipulates that local government and or municipalities will remain accountable in ensuring service provision in their demarcated areas and in managing the services directly (Larsen, Hoffmann, Lüthi, Truffer and Maurer 2016). However, Biswas (2018) points out that national and especially local governments in developing countries, are usually incapable of responding in an efficient and sustainable way to fast-track demographic evolutions.

The provision of safe WaS remains a challenge in SA, according to the Department of Water and Sanitation (DWaS 2018), notwithstanding the commendable efforts since the country's first democratic elections in 1994. Mbecke (2014a) believes these challenges are due to SA government entities experiencing multifaceted reconstructive development and organisational changes after the 1994 democratic regime. Moreover, when Fourie (2018) was researching NDP, he found the municipal sphere of government remains challenged with limited talent and abilities, poor management systems and structures, unjustified political interfering in technical and organisational decision-making, and irregular monetary abilities. Moreover, there is a pervasive insufficient WaS delivery in many parts of the country, validating that municipal capacity to substantiate improved service delivery is a constant argument amongst voters (Beck, Rodina, Luker and Harris 2016; DWaS 2018).

Swindell and Hilvert (2014) are of the view that municipal administrators, irrespective of the mandate, magnitude and or location of their communities, are confronted with difficulties that have compelled modifications in the way they conduct operations. These include challenges, such as minimal income generation, accumulating of pressures associated with water supply services, increased programmes and or projects, as well as progressively multifaceted complications, or adverse perceptions of the current administration, including employees. Government is compelled to consider innovative and radical methods of offering services. Swindell and Hilvert (2014) additionally articulate that discovering fresh administrative systems ideas, with which to capitalise on

numerous goals such as efficacy in productivity and fairness, have been a significant distinguishing factor in the state administration.

Subsequently, this research will focus on the holistic issues of governance, in connection to the provision of WaS to households and businesses, with special reference to the Ugu District Municipality (UDM), in the KwaZulu-Natal (KZN) province of SA. This study recognises that WaS issues cannot be looked at in isolation, as affirmed by van Koppen and Schreiner (2014a), who believe that WaS administration is an issue that should be tackled from various sectors associated with water, and not from an angle of a certain stakeholder or any given division or sub-division. It is an undertaking that entails the collaboration, partnership and synchronisation from within and external to the water sector, as well as from the various concerned parties.

However, Woodhouse and Muller (2017) maintain that the participation of several actors in the field of WaS design methods, development and administration, and with the overview of decent moral responsibility, answerability, transparency, and impartiality, as well as justice, has resulted in the tests related to building a good WaS governance in fact becoming more difficult. Although this study focuses on water governance, sanitation was nonetheless included, as the impact of deficiencies in each area often overlaps strongly.

Apparently, prescriptive and institutionalised methods to the concept of water governance have become particularly prominent in recent years in the framework of transnational debates related to the activities of the World Wide Fund for Nature (WWF), associated World Health Organization (WHO) and other initiatives (Preston 2015; WHO 2015). Current debates about water governance lean towards compartmentalising issues, causing more divisions, while encouraging sector departments to work in silos.

Although there are scholars that focus in detail on the prescriptive as well as policy-institutional features of governance, some focus on governance as a sociological and political advancement. However, they all agree that the impractical water establishments, failing regulations, and renowned inefficiencies

in management relating to water in mostly emerging nations, have been well-known constraints for decades (Williams and van't Hof 2016; Yousaf, Ihsan and Ellahi 2016; Yu 2016). Hence, the significance of institutions and governance in accomplishing WaS objectives is commonly accepted in both practitioner and academic societies.

It must be noted that institutional reorganisation does not simply suggest the formation of new types of institutional structures or municipalities, however, it may indicate the modification of rules within which services are provided. Official re-arrangements within governments are meant to regulate, among other things, the decision-maker, as well as redefine mandates, and who assigns resources (Cremer, Estache and Seabright 1994; Elina Herrala and Jouni Olavi Haapasalo 2012; Frank and Martinez-Vazquez 2014). The Budapest Water Summit held in 2013 and the High-Level International Conference on Water Cooperation (2013) both painted a picture that water governance is a fundamental problem associated with water management and service delivery (Council 2013). Ngidi and Dorasamy (2014) cautioned that the MDG will be difficult to meet should issues of governance not be solved.

Although there have been studies conducted on local government and or service delivery and in the WaS sector, the researcher observed most researchers have been concentrating on specific issues, such as water infrastructure, non-revenue water, drought, and climate change, in addition to water pollution and groundwater (Bates, Kundzewicz and Wu 2008; McKenzie, Siqalaba and Wegelin 2012; Adewumi, Ilemobade and van Zyl 2014; Ruiters and Matji 2015). These studies are independent of each other and in localised areas. The common approach of these scholars is the use of the reductionist approach in trying to understand issues of WaS, by reducing them to the interactions of their parts, and or to simpler or more fundamental things. Arnold and Wade (2015) argue that the ability to discern the elemental parts of a complex system do not necessarily mean a researcher thoroughly comprehends its whole description, since the interconnections between its components are likewise believed to have a substantial consequence in its entire functioning.

However, there have been limited studies conducted holistically on WaS delivery from rain water supply, rivers or surface water to abstraction, water infrastructure, and water distribution, as well as the municipal process and finally, to water consumers employing systems thinking. The identified opportunity was to acquire a thorough comprehension of the bigger picture, which links environment, economic and social interactions into a coherent framework identifying associations and interrelationships; patterns of change instead of recognising the static elements. This study aims to assist in transforming local government declarations into actions and prioritise community needs, particularly in terms of the provision of WaS.

The increasing consensus that the worldwide water predicament is primarily a crisis of governance, also presents an opportunity to conduct a case study at the UDM on water governance that specifically addresses, in certain socio-economic, political and, technological, cultural methods, environmental and structures that influence and even determine how water is governed and managed on the ground. de Loë and Patterson (2017) raise some concerns regarding seeking improved patterns of governance within an environment of different interests, dissimilar values and norms. It is further noted by de Loë and Patterson (2017) that there is no consensus on goals and objectives, with that scenario presenting daunting tasks that necessitate exceptional actions of synchronisation, collaboration and compromise from a diverse echelon of government, and from the private sector and societal stakeholders.

The difficulty for those entangled in governing and governance is to get public, private and social players to partake vigorously and directly in resolving complications and generating prospects, under both normative and institutional frameworks that offer the fundamentals for any activity (Mbecke 2014a; Megdal, Eden and Shamir 2017). However, to pursue sustainable delivery of satisfactory, effective, competent and safe water services, improved performance measurement and management is crucial (Mayosi and Benatar 2014).

The following illustration (Figure 1.1) serves as an orientation to an elementary water supply, also highlighting issues facing Water Service Authorities (WSAs), specifically the UDM. WSAs are all metropolitan municipalities, with many district municipalities and authorized local municipalities being constitutionally responsible for the provision of water services within their areas of jurisdiction. UDM is an authorised WSA, hence the terms UDM and WSA will be used interchangeable in the study.

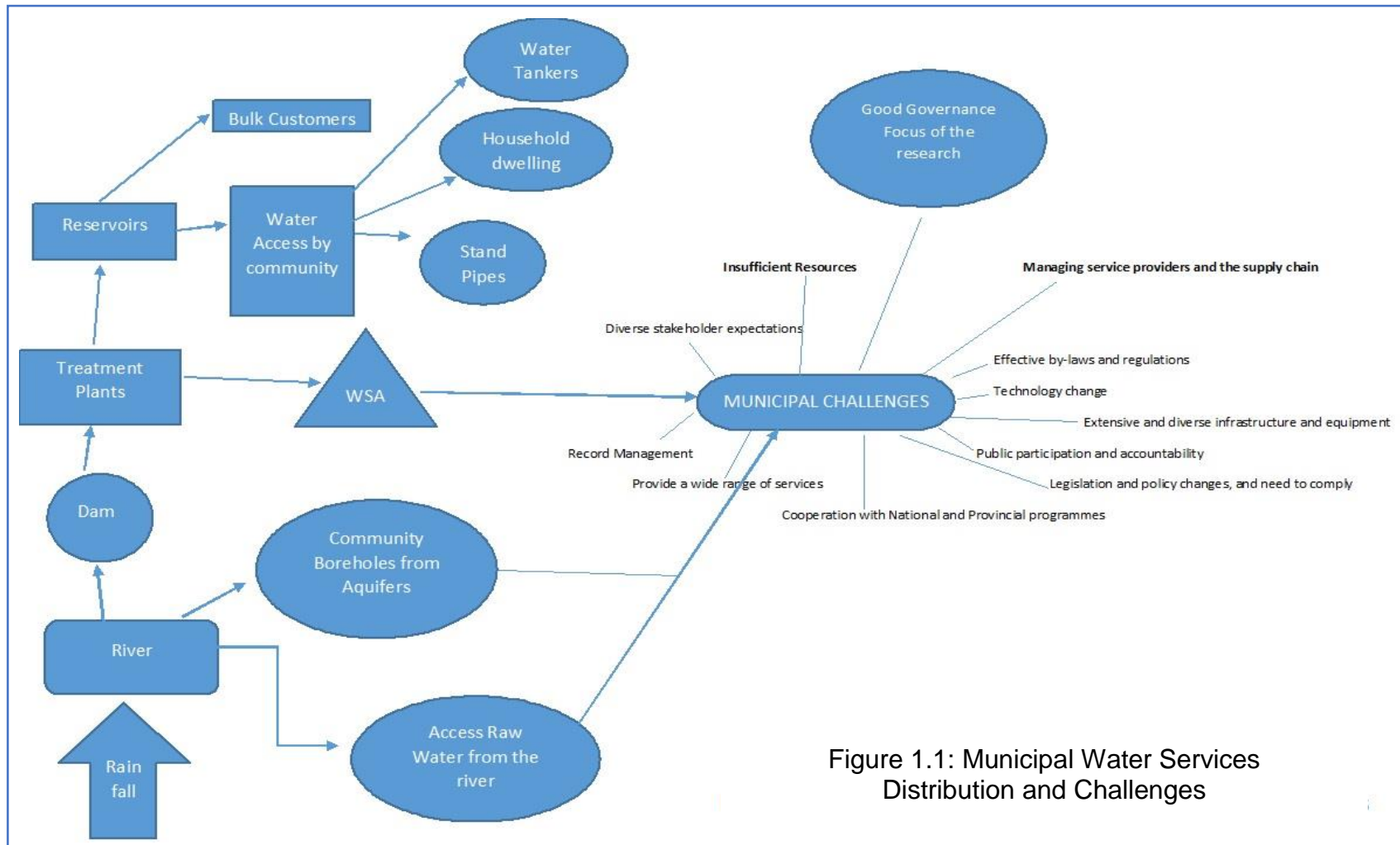


Figure 1.1: Municipal Water Services Distribution and Challenges

1.2 Background and research problem

The UDM is situated in the KZN Province, on the SA eastern coastline and consists of 85 municipal wards. The region is bordered in the North by the Ethekwini Municipality, in the West by Umgungundlovu and Harry Gwala District Municipalities and on the Southern side it shares borders with the Eastern Cape Province. UDM supplies water to the local municipalities, namely Ray Nkonyeni, Umuziwabantu, Umzumbe and Umdoni (UDM 2017).

The Statistics SA Survey on Community in 2016 concluded that the total population of the UDM is about 753 336, with a growth percentage of 0.042. Moreover, the UDM area of jurisdiction has 179 440 households, with a typical size of five people in a household (STATSSA 2017). Where the access to basic service delivery is concerned, 67 percent of the households are provided with water, while 91 percent have access to sanitation. The information provided in the UDM IDP 2016/20, coupled with Statistics SA and WHO data, concur that WaS service delivery is not only a challenge at international level, even SA is not exempted (Mashamaite 2014; Mayosi and Benatar 2014).

The challenges of WaS in SA can be traced back to the apartheid administration, where rules were designed for advancing the wants of the few, and the water policy was no exception. However, with the birth of democratic rule in 1994 the government changed, ensuring that water amenities are accessible to all South Africans, to upgrade the standard of living of all citizens (Woodhouse and Muller 2017). At the outset, the 1994 White Paper Policy focused on the institutions and mechanisms required to remove backlogs of more than 15 million people in the country (Woodhouse and Muller 2017). Subsequently, in 1996, the Constitution introduced a human rights dimension that entitled all citizens to adequate and sustainable water supply services (South Africa 1996). In the year 2011, a Service Delivery Planning (SDP) Framework and Methodology was established to recommend competence for designing, developing, application and institutionalisation of service provision mechanisms, activities and intervention initiatives meant to increase and institutionalise quality service to all (DPSA 2013).

Although the SA government committed to providing potable water to its citizens by 2008 and sanitation by 2010, the goal was postponed to 2014, however, the goal was not achieved (DWA 2017b). The National Department of Water Affairs (DWA) admitted in 2010 that the country faced major challenges in terms of WaS service delivery. This was due to institutional segmentation in the water sector, limited policy coherence, lack of a rational municipal frame, and overlapping boundaries, along with the absence of political legitimacy and willpower, and the failure to assign resources to relevant and required areas (Koma 2010; Managa 2012).

The DWA insisted that appropriate WaS policies had been established, revised, and advanced in the light of practical experience with operations. In addition, they also maintained several lessons had been learnt and applied to enhance the execution of strategies. Even after all these initiatives, Statistics SA revealed that the WaS target of universal access had not been met (STATSSA 2017). Service-delivery protests concerning inaccessibility to WaS have been ongoing throughout SA as some areas remain un-serviced or serviced with infrastructure that is unreliable and defective (Mpehle 2012; Nkomo 2017; Clifford-Holmes, Slinger, de Wet and Palmer 2018).

During the 2017 State of the Nation Address, SA President, Cyril Ramaphosa, conceded there were still significant inequities in access to and use of the country's water resources. Ramaphosa reiterated that there are also inequities in the benefits that accrue from water use, to the extent that even the African National Congress (ANC) 2019 manifesto mentions the necessity to prioritise the roll-out and delivery of water infrastructure to ensure the availability of clean water to all South Africans. This included the eradication of bucket systems and pit latrines in various parts of the country, as well as a review of water policies (Newsroom 2019). The address from the president was interpreted as that the restructuring programmes, which have sought to reshape and re-engineer different approaches and processes in quest of stimulating dramatic progress in access, quality and speed in delivering WaS, are currently ineffective and inferior and require improvements.

In spite of explicit national designs in municipal reorganisation, aimed at service provision enhancement, with respect to performance standards and the tools for planning and executing service developments (Nzimakwe and Mpehle 2012). Tsheola (2014) pointed out that records and levels of service delivery demonstrations in SA explain not only the failure of government in undertaking to reform the municipality, but also the ineffectiveness of different service delivery strategies. There is a genuine threat that the SA developmental programme might collapse, since the municipality is not capable of achieving programme goals (Tsheola 2014). Mpehle (2012) cautioned that a transformed SA municipal service is decided by one criterion above all; its usefulness in providing amenities that meet the key desires of all SA citizens. Therefore, a major necessity exists for quicker headway, additional action and better application.

Ramutsheli and van Rensburg (2015) believe that surveys regarding service delivery failure reveal the problem as mainly the design and application of programmes suitable to the requirements of the population the programme serves. Accordingly, this study scrutinised the degree of the existing service provided by the UDM and the underlying causes of substandard service provision, while also proposing meaningful interventions required to make sure that quality in service delivery is achieved through the application of systems methodology. Nevertheless, the growth achieved, which was measured against the background of an ongoing demand to continue fast-tracking service provision to achieve water access targets, and within an environment of mounting developments dependent on water for sustainability, as housing growth and service upgrading fast-tracks.

The researcher is reacting to demands of improving municipal productivity and efficiency in attaining society demands, by investigating the model of service delivery applied by the UDM. The study proposes the implementation of good governance in WaS to appreciate and understand the significance of planning and executing modelling cybernetic structure within specific social, economic, environmental and cultural conditions, with practices and collaboration

mechanisms between state and non-state actors in search of efficiency and shared responsibilities (Eshuis and Van Buuren 2014).

1.3 Research objectives

Human's water practices are presently flawed, unsustainable, rigid and or lack the agility required to achieve increasing water demands (Dennis and Dennis 2012; Jacobs and Snow 2015). Moreover, scholars in the water sector believe that counterproductive water organisations, deficient legislation, and general incompetence, predominantly in emerging countries, are recognised limitations and comprise the basic issues (Dewulf *et al.* 2009; Tortajada 2010b; Cooley *et al.* 2014; Woodhouse and Muller 2017). This study argues that certain institutional arrangements and aspects of governance, normally believed to be indicative of decent governance, should have a positive influence in the WaS sector, specifically for improving services.

The researcher acknowledged the level to which systems methodologies can tackle challenges within the municipal domain. By using systems methodology, the researcher wanted a holistic appreciation of the system, highlighting the soft issues and improving limitations using Viable Systems Methodology (VSM). The researcher aims to contribute to the body of knowledge of public management, integrating Soft Systems Methodology (SSM) and VSM principles, as well as deduce a methodological outcome to improve the application of both methodologies in WaS delivery.

The principal aim of this study was to identify performance interventions that can be used to optimise service delivery in the UDM. This was accomplished through the following steps:

- Investigating the viability status of service delivery systems in the UDM;
- Identifying gaps between an ideal VSM and the empirical observations in the UDM;
- Recommending systems performance interventions that can be used to bring the system of interest to optimise performance relative to service delivery.

1.4 Systems Thinking in evaluating Local Government

The local government is wrestling with complex disparities, especially in the arena of WaS governance, which are difficult to resolve (Mbecke 2014a; Mbecke 2014b). The change looks multifaceted, sometimes a messy situation, where water service authorities and other actors in the local and or regional level try to pursue order and a means of action to accomplish current responsibilities. However, it is apparent that order cannot be realised by one person or individual stakeholder, nor is anyone able to clearly steer the process of looking for the new order. This is due to the realisation that WaS governance centres on several diverse actors, whose understanding of beliefs, aspirations, approaches and time all vary, with several, mutual dependencies. In addition, municipal application of governance is extremely entrenched; variations are path reliant and difficult to manoeuvre.

The consequences produced by departmental separation, political transformation, service delivery protests, and the economic landscape, as well as social issues, and disparity in skill and knowledge, lead to municipal failures that reinforce complexity (Richter 2010; Iglesias *et al.* 2011). These components, when isolated, will not yield an acceptance and appreciation of systems thinking. However, through integration, researchers of systems thinking can begin to understand and identify the patterns that emerge vertically and horizontally throughout organizations, to create new processes and systems for better outcomes and organizational effectiveness (Haveri 2006; Zokaei *et al.* 2010; Pollitt and Hupe 2011; Ramutsheli and van Rensburg 2015; Lawhon and Makina 2017).

A holistic method that explores the individual municipal system is essential, hence, systems thinking methodologies formed the theoretical framework of this study. Systems thinking methodologies undertake that, by looking at the whole picture, the researcher will begin to visibly see patterns that can help formulate successful interventions (Cilliers *et al.* 2013). It is also a vital and the most important technique that offers a succeeding new perspective and a set of tools that can be utilised to address, as well as facilitate the construction of brilliant,

resilient, enduring and sustainable strategies and policies against WaS delivery complications (Osborne, Radnor, Kinder and Vidal 2013).

This study set out to make a case for the adoption of a viable systems approach for sustainable and practical service delivery within local government in the UDM. It attempts to pioneer new ideas and or concepts, methods or devices that can assist to shape the course of performance or pursue improved outcomes. The goal is to introduce viable systems thinking as the recommendation to improve systems performance.

The primary principle of systems thinking is broadly stated by Jackson (2003) as supportive of the interrelated landscape of the existence on earth, normally known as a holistic approach. This means examining the interconnected nature of events and the complex influences of the unfolding world around us. Systems thinking supports the idea that none of us can fully conceive the complexity around us and therefore, only have partial and provisional understanding that make up our perceptions of reality. Thus, systemic thinking is profoundly constructivist in its appreciation of the learning process. However, the operative style mostly uses the reductionist method.

1.5 Research approach

The researcher comes from a school of thought that honours social constructivism, while also recognising that social issues have many dimensions and layers, and that researchers must try to portray issues in a multifaceted fashion as, from their point of view, not every world view can be reduced to numbers. The belief is that meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas (Jacobs 2004; Bryman 2015).

Hence, systems thinking methodologies, combined with qualitative methods, formed the theoretical framework of the study. SSM was used from an approach that sees social reality as the construction of people's interpretation of their experiences and therefore used as a framework of enquiry. The study relied on participants' views of the situation being studied, which was achieved through in-

depth questions, focus groups and observations. Municipal officials deemed to be expert in WaS provision, as well as community representatives normally known as ward councillors, were targeted in the study (Leedy and Ormrod 2005; Creswell 2014).

The key question that underpinned the research was how WaS can best be managed within UDM, through the adoption of a viable systems approach for viable service delivery. VSM diagnosis is characterised by its thoroughness, its capacity to guide improvements and its swiftness. Moreover, it enables a holistic comprehension of the studied system, by examining systemic relationships, managerial responsibilities and present challenges, amongst others (Checkland 2000; Jackson 2001; Sung, You and Song 2008; Williams and van't Hof 2016).

VSM has been successfully applied to investigate organisational problems, such as shortcomings in its structures, communication patterns, information flows, and transformations, along with systemic relations. It is believed that compliance with VSM ideologies strengthens municipal productivity and enables suitable division of control (Davies 2002; Schwaninger 2006; Cezarino and Beltrán 2009; Zubane 2011). Due to its generality to other contexts, VSM was seen to be applicable to municipal WaS provision (Leonard 2007). VSM was developed to prepare the foundation aimed at understanding the structure and behaviour affecting viability of complex adaptive systems, with a framework for service delivery viability analysis developed during this research. The purpose of this framework was to provide a platform and test-bed for structured modelling and diagnoses of viability, its supporting structural attributes, and the management and control systems present in municipal organisational environments.

1.6 Scope and delimitations of the research

The population of this research enquiry covered the UDM in KZN, as opposed to all municipalities in SA. The selection was constrained by time and financial availability, while motivated by the convenience of obtaining the data. The researcher acknowledges that this is a case study of the UDM and therefore, the results cannot be generalised to the rest of the country's municipalities.

The scope of study for this research is on the governance of WaS, including problems and dynamics associated with water as an overall natural resource, also taking account of water privileges and technical elements of water quality. This study neither addressed the mechanics of water abstraction, water treatment and waste water discharges, nor the clean water and waste water treatment works. In addition, river flows and its functionalities, and project management of bulk water infrastructure were amongst other aspects not scrutinised. It must further be noted that the municipality under study is a WSA, however, there are municipal departmental units which do not form part of the WaS business chain, and those departments were not assessed in any form. Moreover, it must be noted that although the title of the study contains sanitation, this is because WaS data are mostly drawn from each other.

1.7 Organisation of the dissertation

This study consists of seven chapters.

Chapter One is a cornerstone section that presents an overview and background of the study, introducing systems methodologies in evaluating a municipality, research objectives, research context, an illustration of basic water supply along with municipal challenges and a summary of the chapters to follow.

Chapter Two offers the problem analysis, with issues that are basic and fundamental to WaS management and have a direct and or indirect impact on governance issues. The structure of Chapter Two is guided by Political, Environmental, Social, Technological, Economic, Legal (PESTEL) and its interactions.

Chapter Three presents a review of the literature that outlines the governance, which is the core of the research study. This section will afford a comprehensive account of service delivery concepts and or models of WaS, including their limitations.

Chapter Four provide the rationale of the research method, demonstrating the application of SSM and VSM with the benefits of these methods, the selection of

participants, the data collection procedures and the analytical protocol. In addition, ethical considerations taken in this study are outlined and triangulation of the study is discussed.

Chapter Five profile findings and empirical evidence that arose from VSM and SSM claims relating to a viable service delivery system in relation to WaS in the UDM.

Chapter Six discusses the application and findings of VSM in the UDM.

Chapter Seven set out the results of the VSM investigation of the UDM and the corresponding recommendations. This chapter will discuss the systemic learning and interventions, while further offering conclusions, implications, and opportunities for future research in the field of WaS.

CHAPTER TWO

PROBLEM ANALYSIS AND THEORETICAL FOUNDATIONS

2.1 Introduction

The governance of WaS is a broad subject that can be studied from many different angles. This chapter aligns, orientates, frames, and delineates issues to be studied. The subjects covered in this chapter are interrelated to issues of governance and are important, as governance cannot be understood without first unlocking essential concerns, such as availability or scarcity of water. This chapter forms the foundation of this study, which is meant to capture some of the crucial elements involved in delivering and managing of WaS, as well as to demonstrate the dynamics and complexity facing organisations providing the service.

The study departs from the point that water governance and water management are co-dependent, since effective governance systems enable concrete management tools to be applied appropriately. Chapter Two is aimed at unpacking and justifying some of the underlying issues that make WaS provision difficult to achieve. The structure of this chapter is guided by PESTEL analysis and a systems map, with the introduction of global water issues, considering that globalisation of water problems have prompted consciousness regarding the prospects of gathering philosophies, concepts and possible solutions, taken from global real-world experiences on parallel and very diverse contexts (Gupta and Pahl-Wostl 2013; Grafton, Wyrwoll, White and Allendes 2014). Moreover, there are issues within WaS that can only be understood, provided that the basic issues have been underlined.

The researcher highlights that a focus point is a crucial point of departure for systems analysis and can be a general area of concentration, a problem of interest or a probable explanation to a problem (Williams and van't Hof 2016). The general situation of interest in this study is the provision of WaS by a mandated WSA, which will be used interchangeably with the term municipality in this study. The study focuses on only one of the elements of water services, namely water supply. "Water supply services" which means, the abstraction from

a water source, conveyance, treatment, storage and supply of potable water, with an intention to be provided to consumers, as well as for industrial or other use, where such water is provided by or on behalf of a WSA, to consumers or other water services providers (WSPs) (DWA 2013). This study seeks to investigate the viability of systems used in local government, particularly the UDM that is providing WaS.

2.1.1 Basic water system

The provision of water looks very easy to an ordinary citizen. Rainfall is captured within the catchment (the visible water in rivers and underground aquifers), with bulk water service providers responsible for developing, operating and maintaining abstraction works. The raw water is treated in treatment plants and pumped into reservoirs, from which the underground pipeline networks carry clean water and distribute water to taps for domestic and commercial use (Sorlini, Pedrazzani, Palazzini and Collivignarelli 2013).

While it is easy to take the provision of water and the removal of water-borne waste for granted when you are part of a sophisticated local economy, in reality, these services are complex and require comprehensive management for their effective and efficient planning, infrastructure, implementation, and maintenance, as well as affordability. There are areas, mostly in the rural areas and informal settlement shacks, where communities lack water amenities, necessitating communities to obtain raw water from rivers and or aquifers. The basic human right to WaS that dictates the right for all, without discrimination, to adequate, harmless, suitable, reachable and reasonable WaS for private usage, has not been realised for some (Heleba 2011; Kemerink, Ahlers and Van der Zaag 2011; Sahle, Galvin, Pierce and Todd 2019).

Scholars believe some of the reasons for not realising this right, are related to the fact that water problems of the world are very complex, interconnected and are neither standardised nor continuous or harmonious over a certain period (Cilliers *et al.* 2013; Weaver, O'Keeffe, Hamer and Palmer 2017). They regularly differ substantially within regions, individual counties, various seasons, and from

one year to another. The proposals to issues of water hinges on various factors, such as water availability, as well as the practices through which water is administered. Moreover, Cooley *et al.* (2014) add that, to successfully resolve the interlinked nature of the problems, it is crucial that water related actions are carried out with a deep understanding inclusive of issues such as development, energy, biodiversity, and climate change, along with food security, and more.

2.2 Systems map

The complex nature of a water system is illustrated (Fig. 2.1) and provides an overview of the water system framework, in order to outline an appreciation of the complex connections a systems approach allows (Sterman 2000; Jackson 2001; Williams and van't Hof 2016).

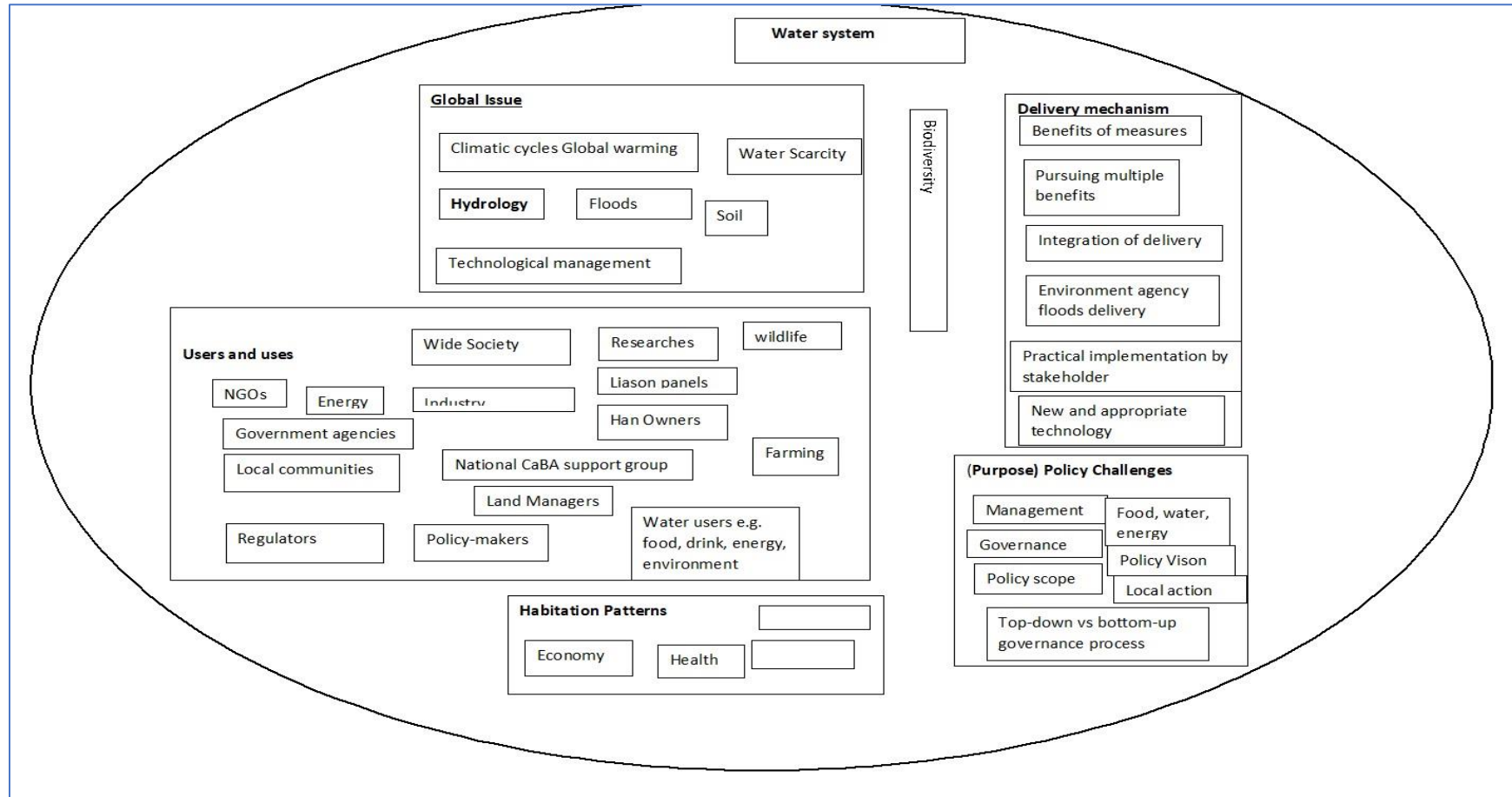


Figure 2.1: Water System Framework

2.3 Global paradigms of water management

Global patterns of water management are evolving and suggest that laws favour those who are strong negotiators at that particular time (Savenije and Van Der Zaag 2002; Daigger 2009; Tremblay 2011). According to Allan (2005), the paradigms of water are as follows; firstly, when water was required for domestic and livelihood purposes, the source of water was 'localised'. The second paradigm (19th to mid-20th century) is referred to as the "hydraulic mission". During this period, there was a sense that nature can be controlled and governments, agricultural interests, power generators and other big water users all scrambled to secure water for their constituencies. The third paradigm (late 1970s through to 1980s) raised the matter of environmental security, the notion that nature cannot be controlled and the idea that environmental water requirements are paramount. The 1990s brought the realisation that water is a commercial good, with a commercial value, and that water needs to be allocated efficiently, hence, in the fourth paradigm, economic principles were dominant. The fifth paradigm (starting 1992 through the Dublin and Rio conferences) posits that water resource management is a political process. Allan's exposition of the progression of water supply supports that today's water management incorporates all the paradigms.

Water management at present includes elements of localised water provision, of the hydraulic mission, of environmental security, of economic efficiency and political expedience, and this might explain why water governance, as well as integrated water supply, are such complex assignments (Pahl-Wostl, Jeffrey, Isendahl and Brugnach 2011; Siebrits *et al.* 2014). In summary, water management has experienced sequences of swift changes, from the beliefs of resource misuse to resource preservation and sustainable resource management, however, this means the objectives and conflicts of water users always coexist, although it also reflects the progression of government policies and momentary social values. This chapter will highlight the lack of consensus on the management of this resource; on the contrary, issues are becoming more complicated.

2.3.1 Global water systems

There has been long-standing concern that water systems are vulnerable to manmade and natural threats, as well as mounting pressure on global water resources, which is negatively affecting societal and economic well-being (Hanasaki *et al.* 2013). Shen and Chen (2010) stated that, even though the earth's natural gift of water is predicted to remain stable, human apportionment of water is currently measured at 50 percent and projected to multiply as the global population rises. Cosgrove and Rijsberman (2014) also agreed that pressures on water resources will probably become worse, considering the effects of growing population, climate change, fast urbanisation, and associated problems. Additionally, global water degradation is gradually increasing, raising expenses of treatment and threatening human and ecosystem health.

Moreover, Cosgrove and Rijsberman (2014) are of the view that the immediate physical accessibility of freshwater is not a measure of future assurance of safe, inexpensive water supply to everyone. The prevalent shortage of and inadequate access to water threatens socio-economic advancement and national security for nations around the globe. This is because initial methods to tackle these problems were mostly entirely grounded on developing large-scale physical infrastructure, such as dams and reservoirs, to produce new water supplies. However, there is increasing realisation that various technologies and or infrastructure alone are inappropriate in addressing enduring water management apprehensions, hence, the debate about water governance started to transpire early in the 1990's (Schulz, Martin-Ortega, Glenk and Ioris 2017).

2.3.2 Water scarcity

The shortage of water is the main concern distressing countries in the world, including SA (Tapela 2012; Hanasaki *et al.* 2013). The phenomena of water scarcity arises in the event where the demand approaches or surpasses the existing water supply (Kaniaru 2015). The World Resources Institute and International Water Management Institute estimate that 1.2 billion people, equivalent to 20 percent of the global population, reside in locations where there is physical water scarcity. In these areas, water abstractions for farming,

manufacturing, and domestic use surpass 75 percent of river flows. Moreover, extra millions reside in regions with physical and commercial water scarcity. However, where there is natural availability, water access is limited by human capability and or monetary resources. There is a mismatch between adequate water infrastructure, availability, impartial allocation and distribution (Otto 2018).

Hanasaki *et al.* (2013) pointed out that water scarcity is not associated with nature only, however, it may relate to human practices. Several societal behaviours, including inappropriate use of water, contamination, unsatisfactory or inadequate maintenance of infrastructure, and ineffective administration structures all contribute to water scarcity. In addition, Gilbert (2012) believes there is a satisfactory supply of water to meet world requirements, but water is distributed unevenly and too much of it is wasted, polluted and unsustainably managed. Moreover, surviving water scarcity necessitates actions and rules regarding water supply, including that it is aligned with the generally recognised notion of sustainable development, as shortage of water induces unnatural rivalry amongst users, snowballing the threat of societal conflicts (Friesen, Sinobas, Foglia and Ludwig 2017).

2.3.3 Water quality

Water quality is defined as the physical, chemical, biological and aesthetic characteristics of water that limit its appropriateness in various uses, including protection of the health and wholeness of water ecologies (Gray 2008). Crossman *et al.* (2013) cautioned that inadequate quality water endangers human and ecosystem healthiness, restricts commercial production and growth prospects, increases water treatment expenses, while it diminishes available safe drinking water. Seemingly, water quality apprehensions remain prevalent, though the exact level is unknown (Boelens and Seemann 2014; Alcamo, Henrichs and Rösch 2017). In most developing countries, a large volume of sewage and of business discharging in to watercourses without any treatment. This custom together with growing population, intensifying industrial and farming actions, and climate change contributing to bad quality water. Considering numerous studies linking drinking water to a vast number of microbial infections, the primary aim of

water quality management should be to ensure end users are not exposed to doses of disease causing pathogens (Bain *et al.* 2014). As noted above, there are areas where there is water available, but not suitable for human use and or the ecosystem.

2.3.4 Access to drinking water and sanitation

According to Clark and Hakim (2014), the unsuccessful provision of safe consumable water with satisfactory sanitation facilities to everyone, is possibly the extreme development disappointment of this century. Despite some improvement, accessibility in water supply remains an issue to most community groups. It was estimated that over 780 million people lacked access to basic water service and the MDG to half the population without WaS has not been met by many countries (Organization, Supply and Programme 2015).

Although the report criticises the MDG for the drinking water target, highlighting that it was founded on accessibility, disregarding issues of reasonable prices, level of contamination and reliable consistent supply of water. Access to clean water is central to various rights, including the rights to education, health, safety and an environment that is not detrimental to human health or well-being (Sultana and Loftus 2015). Inadequate WaS hinders the enjoyment of Constitutional privileges and intensifies the susceptibility of disadvantaged groups, including women and people living with disabilities. Moreover, it also influences the exercise of various cultures' practices and or faith (Woodhouse 2008; Sahle *et al.* 2019).

2.3.5 Climate change

Masih, Maskey, Mussá and Trambauer (2014) asserted that drought is a natural hazard of the world's climate, and it is expected to worsen with climate change projections. Dube, Maphosa and Scott-Goldman (2014) claim Africa is perceived as a defenceless continent to climate change and unpredictability, owing to numerous pressures and low adaptive capabilities. Masih *et al.* (2014) expect the effects of climate change, namely fluctuations in temperature, rainfall and sea level rise. are expected to bring erratic consequences in availability of natural water in the world and could result in a state of desertification of areas in the

world. For countries to survive, Dube *et al.* (2014) proposed that frameworks and policies should be in line and in a better position to comprehend and advance strategies to fight vulnerability, increase resilience and adaptability to water organisation, as well as institutional structures, to deal with a varying environment. Mussa *et al.* (2015) suggested that SA needs to prepare for this natural phenomenon because climate is highly variable, affecting the availability of water resources and the reliability of water services. In 2018, Cape Town in SA practically ran out of water, to a point where the City almost declared a 'day zero', where the city would have no water and supplies to the suburbs would be shut off (Ov 2018).

Dube *et al.* (2014) and Mussa *et al.* (2015) posited that adapting and designing measures to begin to 'manage' climate associated implications of climate change will, however, not be an easy task. Stating that managing water effectively in a changing environment requires well thought through policies, as well as additional investigation on the interface and collaboration between local and worldwide players in defining the upcoming vulnerability and resilience of current practices of local administration to acclimatise to varying circumstances. Climate change adds an 'additional layer' of change, complexity and uncertainty to an already challenging environment.

Nkhata and Breen (2016) likewise recognise that water planning practices entail profound appreciation of water's distinct value in human existence, the interaction between humans and nature and the communal implication of water for nationwide commercial advancement. The relationship amongst rising demands from various operators, the problems characterised by trans-boundary co-operation and the running of an adjustable water supply pose shared trials for water administrators.

2.3.6 Water-Energy-Food Nexus

There are countries where energy is a major user of water and there are concerns that the awaited energy sources, such as biofuels, will be an extra burden to water resources, as well as worldwide sustenance systems (Bazilian *et al.* 2011). that The production and operation of biofuels depend on water, as argued by

Bazilian *et al.* (2011). Additionally, biofuels intensify contamination and add to the competition of users for inadequate water resources. Likewise, biofuels contest with farming activities for land and water, impacting the rise of food expenses, thus threatening food security. Consequently, the effects of growing biofuel for manufacturing should be clearly known, so that general decisions are connected to international agricultural production, food charges, and water availability (Scott, Kurian and Wescoat 2015).

Pradhan and Mbohwa (2014) cautioned that the relationship between Water-Energy-Food is complicated and cannot be summarised due to huge quantities of energy being essential in the abstraction, treatment, distribution and use of water. Issues of growing population, coupled with climate change, are prompting managers to contemplate importing water from far distances, strengthening access through groundwater, and or establishing extra, marginal, lesser excellence materials, in the case of extensive treatment. Conway *et al.* (2015) cautioned that the ineffective deliberation of relationships in policy and in decision-making may lead to unintentional penalties. Furthermore, these authors maintain that international human groups should attempt to resolve these established, multifaceted, interconnected complications that are regarded as a vital threat to human civilisation in developing countries. The relationship between water, energy, and food, manufacturing can be interpreted as interdependence of each on the other for survival.

2.3.7 Dishonesty in the water sector

Sohail and Cavill (2008) explained that dishonesty in WaS takes many forms and is found at every stage of the water delivery sequence. Corruption may be identified from the design of rules, budgeting, construction, and maintaining and functioning of water networks. It is an epidemic affecting water supply and use in most areas. Instances of dishonesty include water clients disbursing money to misrepresent meter analysis to reduce their payments, consumers paying enticements to hurry up repair jobs, and consumers paying for WaS connections. It has been alleged that some community leaders embezzle money allocated to

projects, as well as squeezing money from the repair and maintenance, which is known to be widespread (Sohail and Cavill 2008; Bellaubi and Pahl-Wostl 2017).

Basically, corruption problems range from trivial enticement in water provision, acquisition or supply chain management (SCM) associated with the looting of projects, and hiding industrial effluent, to misapplication of water procedures and apportionment guidelines (Davis 2004; Sohail and Cavill 2008). According to Sohail and Cavill (2008), dishonesty also takes place higher up the water authorities, where policies are designed to fit a particular company. Day-to-day operations are disturbed by this scenario, which ultimately mostly impacts disadvantaged groups. This substantial corruption emphasises undemocratic, discriminatory water rules, deters resources from pro-poor programmes and impasses infrastructure build-outs to satisfy user requests. The monetary and economic expenses are difficult to calculate; however, the generous sum of money received represents the prospect of draining resources.

Groenfeldt and Schmidt (2013) maintained that dishonesty in the water sector highly influences international water disasters, endangering millions of lives and worsening environmental dilapidation. Salaries and poverty cannot be separated from political side-lining, minimal community ranking and unfair supremacy associations. The above-mentioned aspects restrict the methods and platform presented for underprivileged people to fight corruption. The possibility is that underprivileged people may consider the necessity to lessen their personal helplessness and choose corruption to find some level of political shield and monetary safety, making it even more difficult to disrupt the series of dishonesty in the water sector. Groenfeldt and McKenna-McGruff (2013) reasoned that dishonesty has a bearing on water provision and is central to issues of governance. Moreover, dishonesty drains investment funds, raises fees, decreases water supplies, and the underprivileged bear the highest load.

2.4 Political analysis

The investigation of the past regarding water rules and rights in the SA context indicates that political arrangements are imperative in the execution of water rights and policies. This is evident because, as the country transformed from

various colonisers, Dutch, British and Afrikaners, and to a self-ruled government representative of every racial group in the republic, consequently, the water rules and stemming of water rights changed (Tewari 2009; Meissner 2016).

In summary, two significant, authorised policies explain the terms and circumstances of water use before 1994. The initial policies were based on Riparian doctrine (law related to or situated on the banks of a river), and the right to water was based on the possession of riparian land. A riparian titleholder was issued right to public watercourse to be used in a sensible way. The other is *dominus fluminis*, which is the total ownership principle that necessitates full control of the resource by the governing party. It is apparent from the doctrines that colonial water rules omitted Africans, because they were not allowed to fairly contest in the land markets (Tewari 2009; Heleba 2011; Clarvis, Allan and Hannah 2014).

The present, self-governing administration wanted to attain a sense of balance between riparian and *dominus fluminis* ideologies, hence, the recent rights administration was instituted (de Visser 2010; Cash 2016). In this policy, water causes are taken as resources belonging to and controlled by the state and are accessible for communal use by all SA residents. This is occasionally identified as the public trust doctrine and a self-governing political arrangement promoting a just structure of water rights beneficial to everyone. Water is considered as a semi-public and semi-private service because the government implemented a dual economy style to stimulate commercial growth. Likewise, international actions for environmental and human rights established countless modifications in the 20th century, shaping water laws and rights in numerous nations, to the point where laws founded on these rights encourage acceptable and reasonable access for all, are determining countrywide and worldwide policy actions (Thompson 2006; Van Wyk and Oranje 2014).

Many powerful regimes, including SA, legitimately adopted a right to water policy that warrants everyone has access to adequate, safe, satisfactory, and physically available, as well as inexpensive water for individual and domestic use because a healthy human life demands sufficient and safe water (Van Wyk and Oranje

2014; Couzens 2015; Meissner 2016). This advocates for the application of the basic needs method and imbedded a seed, shaping SA rules (Streeten *et al.* 1981).

Kaniaru (2015) is of the view that the relationship involving water and politics is indivisible, contributes to water shortage in the region and can easily engender a host of economic and environmental insecurities. According to Kaniaru (2015), the relationship has the prospect of causing tensions and can also be a platform for promoting collaboration. It is essential that the rules that rectify disparities in the institutional and lawful agenda relating to water rights and apportionment, be reputable at all levels to promote equity in the utilisation of communal water, as imagined in the Revised Southern Africa Development Community Water Protocol (Conway *et al.* 2015).

Seeing that the political dimension currently commands equal rights and opportunities for all water beneficiaries to be involved in making decisions, it is therefore proper to strengthen stakeholder engagements, in order to accelerate conversant pronouncement, endorse execution of plans effectively and improve conflict resolution. Stakeholders must include indigenous people or the poor, and their recognition as legitimate stakeholders in water-related decision-making stands to greatly improve outcomes in the democratic government (Gowlland-Gualtieri 2007; Iglesias *et al.* 2011).

2.4.1 Decentralisation

The methodical assessment of the South African position prior to 1994 presented the inconsistency in national application to WaS management; a mainstream of the population was prohibited from accessing safe drinking water, as well as sanitation, and water administration was unsustainable (Backeberg 2005; Heleba 2011; Kemerink *et al.* 2011). To correct the above inadequacies and accomplish goals of self-governing in SA, the government adopted a decentralised, operative, effective, and equitable, as well as environmentally sustainable water governance guideline. The aim of decentralisation was to rebuild administration spheres from a hierarchical, bureaucratic system of top-down managing, to a system of nested self-governments, symbolising involvement and collaboration,

transparency and answerability. The tactic was in line with the important global treatise on integrated water resource management (IWRM) and themes, such as basic human and ecological needs, ecosystem management, and the participation of non-state actors (Cameron 2014; Faguet 2014; Herrfahrdt-Pähle 2014).

Although the intentions of decentralisation are reasonable, decentralisation does not automatically promote accountability and public participation (Arora *et al.* 2015; Sujarwoto 2017). The involvement of decentralisation to socio-economic development and poverty reduction is doubtful and although many African states implemented decentralisation and rural development programmes aimed at poverty reduction throughout the 1970's and 1980's, the majority are still poor or became even more impoverished (Graven 2014; Fosu 2015). Cameron (2014) and Faguet (2014) also attested that decentralisation worsens public service provision by decreasing productive efficiency and the quality of policy-making. The authors argued that central government benefits from greater economies of scale in public goods production and a higher quality of human capital. Decentralisation entails a loss in both respects, leading to more expensive and/or lower quality public goods. Decentralisation will further be discussed in the governance chapter.

2.5 Environmental analysis

SA's water availability is regarded as scarce and restricted to a certain degree (DWA 2013). Accordingly, environmental concerns have become more prominent in recent years, particularly given the country's apparent vulnerability to climate change (Gowlland-Gualtieri 2007). It is significant that Section 24 of the Constitution bestows everybody with the right to an environment that is not harmful to their health or well-being, and to have it protected for the benefit of present and future generations. This is done through judicial and associated tools to promote sustainable development in the use of natural resources, while encouraging reasonable commercial and societal growth (Gleick 2003; Mackay 2003).

In supplementing the Constitution, the National Water Act (NWA), 36 of 1998, is applied using ecological reserve determination to balance basic human requirements and maintain ecological equilibrium, as well as licensing water use relevant to farming and manufacturing, according to the National Water Research Strategy (DWA 2002). In other words, the act intends to “provide for fundamental reform of the law relating to water resources”. The ecological reserve is the core in the debates regarding sustainability, since the guarding of water ecologies is measured as an important feature in preserving the full complement of ecosystem goods and services, where everyone has a right, and that various individuals depend on subsistence incomes (Woodhouse 2008).

Lewicki, Gray and Elliott (2003), as well as Mackay (2003), stated that sustainable management of natural resources, especially water, requires trade-offs to be recognised amongst social, economic and environmental imperatives to attain a proper equilibrium. As a result, the NWA of 1998 provides for a nationwide classification system for water resources. In terms of this provision, some water reserves may be classified as requiring a high level of protection, due to the value it offers society, and then the reserve would correspondingly be more conservative, with additional safety factors built into its determination.

The rewards associated with state classification structure include the fact that it consents to strategic pronouncements that recognise the accurate worth of water and illustrate the reliability and transparency of pronouncements about trade-offs. The IWRM is viewed internationally as the greatest style of managing freshwater resources, as it allows the holistic management of land and water, while taking several related aspects of sustainable development into account (Gowlland-Gualtieri 2007). Pereira, Cordery and Lacovides (2009) highlighted that in areas where there is a shortage of water, it is normally noted that water sources are regularly degraded or exposed to courses of dilapidation equally in volume and quality, which are the causes of the water shortage. From the above information, it is almost certain there will always be challenges of water availability in SA.

2.5.1 Hydrology

Rainfall is the influential feature behind hydrologic developments occurring in a watershed, to the point that nearly all hydrologic investigations rely on precipitation numbers obtainable from rain gauges. Consequently, ordinary variations in the hydrological sequence cause provisional interruptions to the circulation and volume of water, verified by events such as famines and floods (Tartakovsky 2013; Bierkens *et al.* 2015). In addition to the rain, Ashton, Hardwick and Breen (2008) add that variations in the wider environment, at national or international level, could lead to and be an indication of substantial enduring effects to some or all pieces of the hydrological cycle. In summary, what happens in semi-arid regions, is that robust evapotranspiration sets apart the hydrological cycles, reducing the availability of fresh water. The evidence is associated with impacts of water quality, biodiversity and ecosystem functioning, along with desertification, urbanisation, and the migration of populations.

According to Abu-Mahfouz *et al.* (2016), the ways through which climate change will affect the biodiversity configuration, is over distorted hydrologic processes. Apparently, it will distress universal precipitation, subsequently intensify the inconsistency in rainfall routines, both in time and space, which, in turn, change the hydrologic settings that normalise ecological processes. For this purpose, it is vital to emphasise the precise apparatuses through which hydrology influences biodiversity, as well as socio-economic methods, because hydrologic mechanisms produce a dynamic role in shaping and maintaining terrestrial ecosystems.

Lumsden, Schulze and Hewitson (2009) agreed that the hydrologic cycle in dry and semi-arid areas is transformed due to long-term human exploitation and related factors. They added that under arid and semi-arid conditions, water resources turn out to be more unbalanced and ecosystems probably suffer from severe water stress. In SA, plain worsening of water and ecosystems has been observed, such as the evaporation of inland lakes and dams, the complete drying up of seasonal rivers, and even the destruction of agriculture and the ruin of cities, such as Cape Town (Arcanjo 2018).

2.5.2 Water Availability in South Africa

According to Fauchereau, Trzaska, Rouault and Richard (2003), SA is a semi-arid state (65 percent of the country), with a normal amount of rainfall of 450mm/year, which is less than the average of about 860mm/year. Furthermore, the insufficient rainfall is unevenly distributed, with some regions receiving less than 100mm rain in a year. The vulnerability in water systems is also aggravated by periodic and inter-annual disparities in rainfall, is augmented by high run-off production and evaporation rates; as a result, only nine percent of precipitation reaches the rivers, compared to a world average of 31percent. However, human demand on the world's available freshwater supplies continues to grow as the global population increases (DWA 2013; Jacobs and Llemobade 2013).

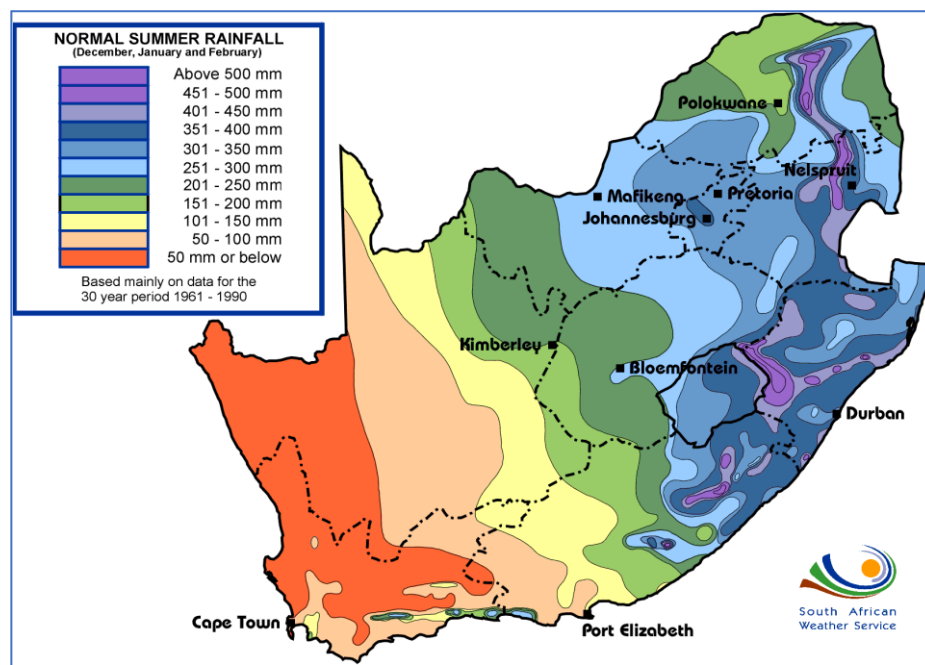


Figure 2.2: Rainfall Pattern for South Africa (1961-1990)

Source: South African Weather Service (2015)

Green *et al.* (2015) highlighted that humans' water requirements and natural ecosystems are generally regarded as competing with each other. This is due to habitual water management usually diminishing the normal variability of river flows to reach stable and reliable water supplies for domestic and industrial uses, irrigation, navigation, and hydropower, and to restrain dangerous water

conditions, such as floods and droughts. Equally important is that restrictions exist in the withdrawal volume of water from freshwater systems, in order to maintain natural operational efficiency, native species, and prevention of the services and products they provide becoming brutally degraded.

Thopil and Pouris (2016) concurred, stating that healthy freshwater ecologies deliver a fortune worth of goods and services for humans, but our appropriation of freshwater flows should be managed better, should we expect to sustain these profits and freshwater biodiversity. The point is that nine percent of water in the rivers is not enough and must be managed sustainably (Richter, Perumal and Becker 2003; Tewari and Oumar 2013).

2.5.3 Groundwater

Groundwater appearance and or color is subject to the type of geology, geomorphology or weathering, as well as actual precipitation, including the most recent and the historic. The value of groundwater in the environment is that it offers the base in maintaining the flow of surface water in rivers, preserving satisfactory water quality, including weakening dirt and wastes, and acts as a brilliant foundation for water by supplying over 75 percent of the drinkable supply in most areas (MacDonald *et al.* 2012; Taylor *et al.* 2013). SA's groundwater strategy states that the volumes of water stored underground are much higher, compared to that of surface water. It is not surprising, therefore, that in SA, groundwater is the main supply of drinking water and irrigation. There is a relationship, in that safeguarding of groundwater strengthens food security. Moreover, the growing dependable water supplies through SA will depend on the development of groundwater (MacDonald *et al.* 2009; MacDonald *et al.* 2012). Kidd (2017) is convinced there is a water resource that is untapped in the South African ground.

Shen and Chen (2010) acknowledged that groundwater is closely linked with the topography and use of land, considering that the landscape is susceptible to anthropogenic actions. The use of land influences groundwater reserves through variations in revitalising and fluctuating stresses for water. Unsuitable poor use of land, as well as predominantly hazardous chemicals, instigate long-lasting

groundwater quality complications (Chakraborti *et al.* 2016). In ordinary circumstances, groundwater is of high quality appropriate for drinking, although shallow aquifers are easily contaminated. Taylor *et al.* (2013) cautioned that with groundwater, even should there have been a behaviour change in terms of water exploitation, it would take ages for the aquifers to recover in some areas, due to mistreatment of groundwater, which has led to soil sinking.

2.5.4 Water pollution

The contamination in water reserves used for domestic activities is a life-threatening issue, causing severe health problems associated with a rise in medical treatments (Mayosi and Benatar 2014). The contamination stems from agricultural activities, industries (pesticide or fertiliser runoff, discharges of hazardous materials), or undeniably raw human sewage, which is the case in most waste water treatment plants (WWTP) that are not functional (DWA 2013).

Manickum and John (2014) concur with DWA studies, in that contamination of surface water is not that of sub-surface water, stating that WSAs are mostly responsible for contaminating water reserves, particularly for downstream stakeholders, emphasising issues regarding controls or disjointedness in administration structures. The release of faecal substance from local Ventilated Improved Pit (VIPs) latrines to rivers, as well as non-functional and shutting down of WWTP, are polluting rivers by default. Undoubtedly, contamination of rivers and watercourses by raw and poorly processed municipal and manufacturing wastes may render the waterways inappropriate for use in irrigation and may harm water ecosystems (Osuolale and Okoh 2017).

The study on WWTP conducted in 2008 (Wintgens, Salehi, Hochstrat and Melin (2008) showed that only private WWTP were fully functional, with municipal plants advised to close down immediately after being handed over to the WSAs because of decentralisation. Hering *et al.* (2015) argued that the environment itself may be responsible for river contamination; mentioning arsenic contamination of groundwater in Bangladesh may be the generally recognised topical example. In SA, the withdrawal of certain minerals such as gold, copper, and nickel, is associated with acid drainage complications effecting lasting

damage to watercourses and biodiversity. Additionally, some wastes from by the metals industries comprise large quantities of toxic constituents, such as cyanides and heavy metals, which have serious human health and ecological implications (Akcil and Koldas 2006; Chakraborti *et al.* 2016).

2.5.5 Blue and Green Drops Assessments

The Blue Drop Certification programme for drinking water quality management regulation and the Green Drop Certification programme for wastewater quality management regulation are significant in ensuring effective and efficient delivery of sustainable water services, recognised by both SA and international establishments (DWA 2017a). The DWA initiated the Blue Drop and Green Drop certification in 2008, with the objective of introducing key requirements for the effective, efficient and transparent management of drinking water by WSAs and or municipalities and providers (any institution involved with the treatment and provision of water). The least score for Blue Drop Certification is 95 percent and 90 percent for Green Drop Certification, respectively.

Helness, Damman, de Clercq and Elema (2017) explained that the certification programme works by measuring and comparing the results of the performance of WSAs and their providers. Specially appointed assessors visit each water treatment plant and score it according to a list of set criteria. Municipalities are subsequently awarded (or penalised) upon evidence of their excellence (or failure), according to the minimum standards of requirements. It was also designed to change behaviour and attitude towards wastewater services in the public sector and encourage positive action towards compliance and publication of performance results. The programme promotes incentive-based regulation and establishes excellence as the benchmark for wastewater services in SA. The Green Drop Reports for 2014 indicates that there are still worse performing municipalities obtaining less than 30 percent Blue Drop reports in 2014 (DWA 2017a), however, the trend is generally to show an increase in municipal compliance with water standards.

2.6 Technological analysis

Most nations are encountering pressures on water safety from contamination, increased population demands, drought, and land, as well as climate variation. Shannon *et al.* (2008) stated that everybody will need to reduce water use to feed a rising population in a warming world. Inventions in technological, land and water use management methods, coupled with skills advancement, are required to handle existing challenges and guarantee sustainable water. In addition to the complexity associated with managing water systems for public use, this means municipalities will want to access the latest and most comprehensive technology (Blanke *et al.* 2007; Kiparsky, Sedlak, Thompson Jr. and Truffer 2013). Likewise, the administration of water must be improved to increase the quality and quantity of supply.

Alcamo *et al.* (2017) believe enormous technological investment allows rich countries to counterbalance water stressors, instead of alleviating the fundamental causes and as a result, poor countries continue to be vulnerable. Likewise, inadequate investment endangers biodiversity habitats because up to 65 percent of inland discharge is categorised as threatening. Academics have fashioned technological inventions to cater for additional resourceful use of water in preservation, recycling wastewater and use of desalinated water.

The water technological opportunities have been acknowledged to curb issues of old infrastructure and extend investment funds in maintenance, as well as in upgrades. This technology assists in assessments of leak detection, forecasting models on the condition of assets and restoration desired. Currently, green infrastructure is mostly used in water pipes, to decrease pumping and treatment expenses. Waste water from manufacturing is reused and is becoming the most compliant method by industries (Gray 2017).

2.6.1 Water recycling

Considering SA is semi-arid, problems of water availability and drought are evident in most provinces, demanding the execution of contingency strategies, and reconsidering long-term water provision methods (Adewumi, Ilemobade and Van Zyl 2010). As a result, water reuse as well as recycling are an attractive choice to increase and improve the effectiveness of treatment methods and

minimise water expenses, taking into account that water reserves are on site, without the need to apply to water authorities (Angelakis and Gikas 2014). There has been an awareness in direct water reclamation (direct potable reuse (DPR)), since the construction of the plants in Beaufort West (DPR), George (indirect potable reuse (IPR)) and Mossel Bay (reuse for industrial purposes). In this case, wastewater is reclaimed for drinking purposes and considered to be safe after being treated (Wintgens *et al.* 2008).

Direct water reuse includes the reuse of treated wastewater or effluent by direct transfer from the site where it was produced, to the site of the new or different beneficial application. Indirect water reuse comprises the reuse of treated wastewater from a surface water or groundwater body where it was discharged to with the intention of reuse, before being abstracted for reuse at a new or different site of beneficial application (Friedrich, Pillay and Buckley 2009).

The reuse of municipal wastewater for irrigation in the peri-urban zones of many developing countries' cities has both positive and negative impacts. The recycled water and nutrients are important for water conservation, but the health risks are significant, unless there are tight controls. Not only are the farmers themselves exposed to high risk from pathogens, in addition, their produce is then exported to a wider public that may also suffer (Mwabi *et al.* 2011). Methods for controlling and assessing water management are conventionally founded on water withdrawals only. Accordingly, water saving education usually emphasises analysing the magnitude of water extractions, which might misjudge the full influence on downstream water users, as reuse is unnoticed by definition (Angelakis and Gikas 2014).

2.6.2 Desalination of Sea Water

Industries are gradually dependent upon desalination of ocean and brackish water provisions, especially in coastal cities and town areas, where adequate quantities of saline water may be or are readily available (Joubert, Stewart and Eberhard 2003; Mukheibir and Ziervogel 2007). Desalination is believed by du Plessis, Burger, Swartz and Muse (2006) as more viable to provide fresh water

for domestic purposes. However, traditional municipal water treatment and desalination methods are energy intensive.

Desalination is currently used by countries with an extreme need for fresh water, with these countries having sufficient financial funding capability and access to the energy required to produce it (Turner, Naidoo, Theron and Broodryk 2015). The other disadvantage of desalination is the increase in energy use and the problems associated with greenhouse gas (GHG) emissions. Thus, minimising energy used in desalination is important, as it addresses the environmental catastrophising of GHG emissions. In SA, thermal desalination methods are not recommended for desalination of brackish or sea water, except when there is sufficient waste heat or low-cost fuels accessible, with reverse osmosis mostly a preferred choice. Desalination by reverse osmosis is expected to play a significant role in the future provision of water in SA by the general water community (Holman 2010; Amy *et al.* 2017).

2.6.3 Water infrastructure

The consistent provision of WaS through infrastructure is essential for the most basic human and commercial growth to happen, although it is a problem for water providers, mostly in Africa (Ruiters 2013; Zeff, Herman, Reed and Characklis 2016). This is because the delivery and/or development of water supply necessitate enormous investment to be developed, as well as maintenance of infrastructure, subsequently, problems of water sustainability and consistency are experienced (Ruiters 2013; Furlong, De Silva, Guthrie and Considine 2016).

WSAs face substantial investments in infrastructure to address backlogs in underprivileged households, along with the infrastructure requirements of a rising economy, in the event that companies and households require extra infrastructure facilities and to renovate or substitute infrastructure that is old for its design life (DWA 2015a). The ineffectiveness of WSAs to maintain infrastructure increases annually, is multiplied in subsequent years, which leads to bottlenecks and over-utilisation of present infrastructure properties. This quickens the decline in the condition of these assets, bringing forward the date at which the requirement can be changed (Manamela 2010).

2.6.4 Poor infrastructure

The aging of the underground infrastructure increases the burden on WSAs to prioritise and maintain the rapidly declining water quality (Hollingworth, Koch, Chimuti and Malzbender 2011). The maintenance and rehabilitation of aging pipelines is calculated in terms of budget apportionment and investment planning, however, there is an indication of bad performance associated with the operations and maintenance of water services infrastructure. The water service asset maintenance problem is so severe that the National Treasury has expressed concern about the low levels of expenditure on repairs and maintenance and the renewal of existing infrastructure in most WSAs and provided the following direction (National Treasury 2011; Gay and Sinha 2014).

In 2014, 37 percent of households had interrupted water services, mainly due to technical reasons, while most WSA providers in SA are experiencing insufficient investment to rehabilitate, replace and maintain infrastructure. Accordingly, the average age of the infrastructure is increasing with time and the condition of assets deteriorating. This presents a risk to the future sustainability of water services infrastructure. Rehabilitation expenses increase exponentially when these investments are left too late. Water resource infrastructure with an estimated depreciated replacement value of R160 billion is currently managed by the DWS (2013b). Nonetheless, the water infrastructure asset register for various WSAs is unfinished or does not exist and the full-depreciated value of SA's water infrastructure is thus incomplete (Ruiters and Matji 2015).

De Silva, Guthrie and Considine (2016) support the belief that a non-functional infrastructure exists in municipalities. De Silva *et al.* (2016) caution that non-functioning infrastructure constitutes a costly investment that does not provide a service or delivers a return. Such infrastructure can directly cause unsafe or unhealthy conditions (not just to persons or to institutions, but also to the natural environment), or costly stoppages of economic production, and other unfavourable consequences. The unreliability of infrastructure can also induce wasteful duplication of infrastructure investment, for example, institutions must

purchase a generator or water storage tanks as stand-by facilities, for use during those occasions when infrastructure fails.

The efficiency of WSA infrastructure investment in supporting and guiding growth and combating poverty depends, firstly, on the effectiveness with which infrastructure assets are managed, secondly, on the capacity of public institutions to plan and guide the process of special development and thirdly, on the ability of the public sector to co-ordinate its investments to deliver. The construction of infrastructure to store and transport water, as well as to protect vulnerable areas from flooding, has always been an important dimension of water resource management. The operation of available infrastructure enables water managers to achieve their goals, while routine operations ensure water is stored and transported to where it is needed (Furlong *et al.* 2016).

Effective infrastructure operation, guided by good understanding of hydrology (the science of water resources and their circulation), helps to maintain reliable supplies during droughts and to protect communities during floods. A backlog of water service infrastructure maintenance or infrastructure rehabilitation is the value of maintenance or rehabilitation that cannot be undertaken due to a lack of financial or other capacity constraints. It is mentioned in the Water Resource Strategy (DWA 2013) that water supply shortfalls are not the consequence of resource deficiencies but can be attributed, in part, to bad methods of water supply. Better-quality management will unravel the immediate problems.

2.6.5 Pressure management

Pressure control involves the inexpensive technical solution to accomplish seepage decrease in water distribution webs in short to medium time (Araujo, Ramos and Coelho 2006). Bhagwan, Wegelin, Mckenzie and Wensley (2014) asserted that, in the right setting and with appropriate design, pressure control is a cost-effective method of water savings. Through widespread global and SA practices, with experience, it is estimated that leakage is directly related to pressure, as halving of pressure will halve leakage (Kanakoudis and Gonelas 2014; Kanakoudis, Gonelas and Patelis 2014). It is recommended that pressures in the networks are surveyed and optimised to ensure that any additional

pressure is parched. Pressure management is the single intervention that makes the greatest difference in a short period, as water pressures in our distribution systems in SA tend to be excessive, and it has been established that there is a more or less linear correlation between water pressure and water leakage (Araujo *et al.* 2006; Kanakoudis *et al.* 2014). Reducing leakages from water distribution networks (WDN) is a main issue that will offer operational assistance, including the improvement of system hydraulic capacity, the increase of asset longevity, saving of water resources and, ultimately, the reduction of the carbon footprint for water abstraction, treatment and pumping (Berardi, Laucelli, Ugarelli and Giustolisi 2015).

2.6.6 Water Demand Management

Water Demand Management (WDM) is any measure implemented in order to reduce expected water use or demand (Mwelase 2016). Historically, the safekeeping of water supply was driven by developing new water reservoirs, as opposed to lowering water demand. Since the number of emergent water sources has fallen, WSAs have shifted focus to include demand management through conservation and or incentive plans (Calderón and Servén 2014). McKenzie and Wegelin (2009) projected Rand Water demand to rise from its current value of approximately 1 200 million m³/annum, to more than 1 500 million m³/annum in the year 2024-25, in the event that no Water Conservation/WDM procedures are executed.

Water Conservation and Demand Management (WCDM) actions range from societal involvements in community awareness concerning household water efficiency and losses, to the refurbishing of billing regularities, the evaluation of the tariffs, vigorous leak detection, and better management of meters and water pressures (McKenzie *et al.* 2012). Wegelin and Jacobs (2013) acknowledged it is more cost effective to plug leaks and lessen water wastage than it is to build a new dam and transfer scheme from a neighbouring catchment. In the light of rigid constraints of insufficient water supply conditions, the implementation of demand management principles will constitute an essential tool in ensuring sustainable water services and addressing the problems in the water service sector.

2.7 Legal analysis of water

The existing statutory outline made a noticeable change from the preceding water rules. The current administration wanted to address societal discriminations and environmental issues, while accomplishing efficiency (Gowlland-Gualtieri 2007; Kemerink *et al.* 2011). The Constitution of SA, adopted in 1996, comprises a Bill of Rights (Chapter Two) that guarantees rights of individuals to a clean environment and water. The first four key principles set the legal foundation of the law, stating that:

- The water law is to be subjected to and consistent with the Constitution (Principle 1);
- All water, irrespective of its occurrence in the water cycle, is a common resource and its use is subject to national control (Principle 2);
- There is no ownership of water but only a right (environment and basic human needs) or an authorisation for its use; and any authorisation is not granted in perpetuity (Principle 3);
- The riparian principle is abolished (Principle 4).

According to Stuart-Hill (2015), SA legal environmental policies are appropriate, even though its application is irregular, varying and often insufficient. The lack of implementation of standards is highlighted as a case of poor planning in water management. The current example is government's lack of success to deliver free basic WaS nationwide. Schreiner (2013) maintained that other disappointments include administrative failures to issue water licences in a fair and impartial manner. The situation is observed to be disjointed and subject to impractical conditions, which are hindering commercial actions, while encouraging unrestrained, illegal water use that undermined other activities; as well as widespread pollution of rivers, especially by WSAs and the mining industry, which damaged the natural environment and imposed costs on other water users.

2.7.1 The right to water

The right to water stated in the Constitution has been strengthened by developing various governmental policies in line with rearranging the water framework. This

includes two main acts, the 1997 Water Services Act and the 1998 NWA. In context, the right is interpreted by both physical and economic access to water; this means it is compulsory for the state to take practical statutory measures available to accomplish the goals related to the right of access to water (Rusca and Schwartz 2017).

The cabinet approved the Strategic Framework for Water Services (SFWS), which was to eradicate the backlog in basic amenities and support the initiatives for WSAs to deliver acceptable level of services. As a result, the application of this constitutional right was taken a step further in February 2001, with the official approval of the Free Basic Water policy (FBWP) (Peters and Oldfield 2005; WSA 2007; Muller 2008).

The FBWP focuses on the water requirements for underprivileged groups, by promising individual households a free minimum amount of potable water of six kilolitres a month. The policy presumes that 25 litres of water per day is enough for each household (Pejan 2013). However, it has been proven that underprivileged families in SA do not live a healthy life with 25 litres a day. As a replacement, 80-100 litres are essential per person, incorporating basic personal, food and hygiene, excluding water for subsistence; this is key in eliminating poverty (Mehta 2014).

The approaches for handling issues of insufficient amounts and unreliable quality of water intensify pressures for water in the domestic subdivision. The ordinary public is unable to afford the extra costs to manage deficiencies of water supply and in most cases, the underprivileged communities pay in terms of their health because of unhygienic and contaminated drinking water. Boelens and Seemann (2014) asserted that the prevalent hypothesis that the strategy of enacting water rights was significant in enhancing the security of water, which was also established by global funding organisations, was not true, because there are dissimilar dimensions, as well as activities associated with water security that are regularly a mismatch and cannot be followed concurrently. The good news is that the post-apartheid government in SA committed itself to ensuring progressive realisation of human rights within a developmental agenda (Woodhouse 2008).

Peters and Oldfield (2005) argued that 25 litres a day for an individual is half the quantity suggested by the WHO. As a result, the FBWP is slated, highlighting that quantities are low and not appropriate to address basic water requirements. Moreover, critics are saying the FBWP does not offer a noteworthy fiscal break because of low quantities. It must be noted that quantities relating to the FBWP vary in each country, from 45–70 L (Heleba 2011).

2.8 Social analysis aspect of water

The socio-economic growth of nations is mainly determined by the accessibility of consistent water and its capability to utilise water reserve for fruitful activities (Nyambod and Nazmul 2010). The basic needs theory developed in the mid-70s supports the notion that water can be used as an instrument to alleviate poverty; by improving individual's lives, providing reasonable, reliable access to safe WaS, whilst bringing societal prosperity to the nation (Adie, Duda, and Ntoumanis 2008). When the supply water is inadequate, in terms of quantity and quality, it is a restrictive feature in eliminating poverty and commercial repossession, causing poor health and low production, food uncertainty, and constricted commercial expansion (Heleba 2011; Mehta 2014).

Inadequate sanitation is also the original cause of 2 213 000 deaths per year due to hazardous water and hygiene (Wolf *et al.* 2014). The disappointment of numerous emergent nations' water utilities to deliver satisfactory services, to low-income employees and to rural areas, are in contrast with calls for universal access to water services, which is founded on the idea of human rights. Despite the convincing opinions favouring the state to take charge of all activities related to accessibility, conservation and reasonable pricing of water services, mostly for the underprivileged that are vulnerable, it has been demonstrated that delivering acceptable water services is a mission beyond the technical, monetary and organisational abilities of various emerging national governments (Rodina 2016). Muller (2014) mentioned that although there is a gradual realisation and awareness of the rights to WaS for some, there is nothing communicated regarding the waiting period for everyone to enjoy those services.

The societal facet of water governance also concerns the equitable distribution of water resources and services among various social and economic groups, and its effects on society (Tapela 2012; Fuo 2013; Moletsane, de Klerk and Bevan-Dye 2014). Apart from being unevenly distributed in time and space, water resources and services are also unevenly distributed among various socio-economic groups in both rural and urban settlements (Evans *et al.* 2014). It must be noted that the SA government started the prioritisation of basic services to disadvantaged groups from 1994. Daring goals were set, guided by the then, new policy agenda, which was contained within the 'free basic WaS' for families with incomes less than the social grant (roughly US\$1 per day). During the year 2012, 3.47 million and 1.84 million persons benefitted from free services for WaS (Supply and Programme 2014).

Water supply in SA is limited, and it can be argued that it is mostly because the majority of the population live below US\$1 per day of income and as a result, the government is required to provide services at a subsidised charge, while consumers must use the services sensibly (Hellberg 2017). In advanced states, water associated charges are issues of non-significance, whereas, in a nation such as SA, where there are people who live below the poverty line, affordable prices are unquestionably a significant subject (Hutton and Varughese 2016).

As to whether free basic water is adequate in addressing the necessities of the underprivileged is queried, only because of its supposition that low-income families utilise a small volume of water (Rhodes and McKenzie 2018). It has been established that individual behaviour associated with water use is shaped by a certain degree of consciousness, income, fee of the service, and apparent risk of water scarcity and the effect on the quality of life it brings. However, of these elements, charges and threats and or the perception of not having WaS demonstrated the utmost effective methods in behavioural changes in electricity usage, both in urban and rural families in various emerging states, although it is different when it comes to sustainable water use (Dube *et al.* 2014).

The Constitution mandates government to subsidise the access and provision of water because it is considered a basic human right. However, infrastructure

associated with water supply has huge capital and operating expenses that must be recovered by means of payments or charges; as a result, this makes water a monetary resource (Gowlland-Gualtieri 2007). As a socio-economic right, access to water is protected as a statutory prerogative in national legislation. The interpretation of this entitlement is informed by the constitutional right of access to adequate water, while the constitutional right may also support the enforcement of the statutory right.

The national government is required to establish a framework for the "progressive realisation" of the socio-economic right to access water, while the WSA has the obligation to ensure water delivery to people in the area of authority. Consequently, other water sectors including government departments, have a duty to support the WSA in providing water services, with the national government bearing the responsibility in relation to the allocation of national revenue on an equitable basis (SA 2014).

2.8.1 Women in water

It is common knowledge that women are the primary doorkeepers of domestic water in various emergent states, considering that women are culturally accountable for the domestic water supplies and management (Ivens 2008). Cosgrove and Rijsberman (2014) call attention to women's association with water normally not being based on money, to the point that water specialists require innovative tools to measure its value. Hence, they overlook females, rather than take the trouble to reach out to them in any meaningful way. There are studies validating that females have a considerable role in food making, though it differs in various countries. Apparently, in Africa, females generate about 70 percent of the food, whereas 60 percent is generated in Asia. Therefore, women are the main water users both in agricultural and industrial sectors.

Butler and Adamowski (2015) indicate that the real-world benefits received from the access to WaS include enhanced health for women and girls because of better quality life, enhanced dignity, and minimum exposure to hazards linked with travelling long distances, water-borne ailments, animal attacks, and physical complications due to heavy water loads. However, Butler and Adamowski (2015)

argued that females are hardly perceived by experts and managers as key users of water because the associated records and information are largely supplied by men and or with a male user's approach. The obvious gains of women's involvement in community decision-making to waste committees are minimal, notwithstanding the eminence of women's contribution in worldwide pronouncements.

2.8.2 The role of consumers in Water Demand Management

WDM has gradually become recognised as a crucial counterpart in water supply, to achieve sustainability of fresh water. Binet, Carlevaro and Paul (2014) declared that communities are an essential resource for WSAs, notwithstanding the fact that 80 percent of the implementation of demand management takes place at grass roots; in individual homes, where consumers must adapt their water use practices to promote economic efficiency and sustainability of the resource. Therefore, communities must be taken on board and provided with the necessary skills to take ownership of their progress. Effective demand management requires the provision of consistent, realistic and honest information to consumers that allows them to make informed decisions. Wegelin and Jacobs (2013) believe the provision of clear realistic information is essential to healthy communication between the WSA and communities, particularly in cases related to the delivery of basic water, which is often a sensitive issue, fuelled with unrealistic promises of free services, and short delivery times that are neither helpful nor sustainable.

The water services provided are for consumers, they are the direct beneficiaries of the infrastructure and as such, should play a role in reporting faults and directing municipal resources to where they are required. Communities are an asset and possess local knowledge that can, at times, supplement or conceal the limited institutional memory of municipal personnel. The long-term objectives of demand management ensure that consumers take responsibility for water conservation and the infrastructure installed by the municipality (McKenzie *et al.* 2012; Romano and Kapelan 2014).

2.9 Economies of water

With water being a limited resource in SA, it is widely accepted that its availability will constrain the economic development of the country in the longer-term future (Mulder 2006; WRC 2012). The slogan of water for all is dominating the current decades as shown by worldwide approaches and pronouncement such as the MDGs (2000-2015) and the SDGs (2015-2030). Expenses and charging methods are at the centre of these approaches seeing that they advocate general inclusivity, enhanced performance to WSA, safeguarding effective demand management and empowering customers (Rusca and Schwartz 2017). The NWA supports a policy frame for water markets in SA as a vehicle to resolve problems of water apportionment and demand.

In 1998, the government adopted water legislation (NWA) that incorporates some new, constitutionally-based aims for water administration emphasising fiscal proficiency, societal impartiality, and environmental sustainability, as a determining principle. Grey and Sadoff (2007) and Roa-García (2014) believe that representatives can approach the use of water as a tool for stimulating growth in two ways, a market-led distribution for the economy sector and a rights-based apportionment for the underprivileged. The approach offers fiscal tools such as pricing plans concurrently with monetary support or subsidy policies. Consequently, water is offered at various charges for different users and activities. These tools guarantees that self-indulgent water users pay more.

The estimating of water is a challenging matter in SA as countless people are unable to have enough money to pay for it, predominantly in rural parts and slum dwellers in towns, altogether substantial private and public entities are expected to pay for their water use (Evans *et al.* 2014; Esu 2017). Life supplies for the underprivileged is not a cheap process and necessitates a justifiable strategy for sponsoring water grants (Tewari and Oumar 2013). The revenue stream is used to subsidise other services where charges cannot be levied. Rating of water is a crucial part of WSA reorganisations, permitting the actual charge of handling and delivering water facilities to be improved directly from customers (Dinar 2014).

In SA, irrigation is the major use totalling about 57 percent of state water. There is evidence suggesting that emerging farming is characterised by improper infrastructure wasting a lot of water (Garrick *et al.* 2013). Although the current water administrators believe and support the market-based policies restructurings to control wastages apportionment issues (Njiraini 2016a). Nevertheless, abnormal transaction expenses prevent triumph of the proposed reorganisations and as a result it is a combination of accomplishments and disappointments from diverse regions (Tewari and Oumar 2013). In SA, in particular, it is reported that there is slight development related to water restructurings, water users endure challenges of fading quality, bad service and administration, water scarcities, and partial water delivery (Njiraini 2016b). Therefore, impartial, sustainable water supply, accountable use of water, financial WSAs necessitate a changed pricing structure. Tapela (2012) asserts that resolving water issues is a universal priority and industries and emerging states are obliged to advance plans to deliver clean water efficiently and reasonably to all communities.

Goals devoted to clean WaS were recommended by the UN General Assembly as part of the Sustainable Development Goals (SDG) framework for 2015–2030 (Grafton *et al.* 2014; Guiteras, Levinsohn and Mobarak 2015). Apparently, there have been studies to assess the worldwide expenses of achieving the water, sanitation, and hygiene (WASH)-related targets of SDG, so to regulate the financing requirements to achieve. Two targets were assessed: (1) achieving universal and equitable access to safe and affordable drinking water for all and (2) achieving access to adequate and equitable sanitation and hygiene for all and ending open defecation.

An exercise to project budgets requirement for capital investment, establishment and operations, asset maintenance to endure the life span was conducted. The prices that only include extending amenities to the unserved in 2015 and eliminate the expenses of maintaining access for those already being served by a given service level in 2015. The total capital cost of meeting targets is \$114 billion per year (range: \$74 to \$166 billion). This total comprises the annual costs

of safe water (\$37.6 billion), basic sanitation (\$19.5 billion), and safe faecal waste management (\$49 billion), plus hygiene (\$2.0 billion). The expenses encompassed a projected 50 percent of families first having basic water and pit latrines before investing in the higher-level service (Gleick 2014; Grafton *et al.* 2014).

Although the report describes an incomplete investigation associated with WaS target, the report can be used as a base for projected expenses. The remaining task will be to attract and retain qualified workforce to operate and maintain WaS infrastructure. The proposal is that nations must conduct a detailed investigation of the precise features that will determine expenses such as safeguarding bulk water, wastewater sewerage systems, water supply and defining effective behavioural revolution programs to preserve water (Hutton and Bartram 2008; Hutton and Varughese 2016).

2.10 Uses of water

The Water Research Commission (WRC) report (Clark 2015) highlighted that the primary challenge of water management is that while several expansions address the requirements of a specific area or communal group, water reserves are technically defined as a “shared pool supply”, extracted and used by a diversity of users. With an increase in pressures on the reserve, there is a snowballing interface amongst uses and users that necessitates proper control. There is a need for an all-inclusive method to manage water reserves, considering the connections and collaborations in diverse uses and users.

Meissner (2016) agreed that the universal water predicament is mostly a governance crisis, highlighting that the safeguarding of water for everybody, particularly for vulnerable people, is not based only on hydrology (water quantity, quality, supply, demand) and funding. It is, likewise, a matter of good governance demanding flexibility from, organisations, cooperative energies and comprehensive competences. Consequently, the general development method, such as scheduling and execution of water activities, is also reliant on commercial and industrious sectors, where requests and interests of multiple public, private

and societal participants interconnect with each other (Moriarty, Butterworth, van Koppen and Soussan 2004; WHO and UNICEF 2014).

Table 2.1: Proportional water use per main economic sector

Sector	Water use (%)
Afforestation	3
Livestock watering/ Conservation	2,5
Agricultural/Irrigation	60
Mining	2,5
Power generation	2
Municipal/Domestic use	27
Industrial	3

Source: Department of Water and Sanitation (2013)

2.10.1 Consumption and utility

While sea and ocean water may be used in various fashions, ranging from transportation, to being a place for discarding waste and for recreation, this study focuses on freshwater. Grafton *et al.* (2014) posited that water usages may be categorised as consumptive and non-consumptive. According to Gleick (2003), consumptive water is not instantly accessible for another use. Seepages, including sub-surface drip and evaporation, are viewed as consumptive, as well as the water incorporated into a product. Treated surface water is non-consumptive when it can be put to further use, while non-consumptive water does not lessen the source or ruin water for future use. The complication of diverse water users is connected with the convolution produced by diverse uses to which water resources are allocated, including irrigation, potable water, power generation, and industrial production, as well as environmental amenities, and recreation. Individual users have explicit requirements in terms of quantity, timing and quality of water, depending upon the envisioned use. The following section focuses on the uses of water.

2.10.2 Agricultural and industrial water use

Cosgrove and Rijsberman (2014) stated that worldwide, food production is strongly connected to water availability, with 71 percent of water used for agriculture, through irrigation, for livestock, fisheries and aquaculture. However, it is estimated that between 15-35 percent of water used for irrigation, is wasted. In SA, commercial agriculture withdraws over 61 percent of freshwater, compared to the 30 percent used in the apartheid period (NWRS 2013). The increase in worldwide populations demands additional food security, whilst water reserves are fixed. Consequently, there is a need to acquire knowledge to harvest more food, with minimum water, through the enhancement of irrigation systems, agricultural produce types, as well as other technologies (Grafton *et al.* 2014).

It is approximated that industries use 15 percent of global water, counting power facilities for cooling and or as a power source, for mining, chemical practices and manufacturing. The percentage of industrial consumptive usage is, however, lower than agricultural usage. The current universal hydropower water utilisation is 16 percent and is the single largest method of renewable energy, indicating 92 percent of total renewable energy generated (Ai, Sandoval-Solis, Dahlke and Lane 2015).

2.10.3 Household water use

Hering *et al.* (2015) acknowledged that domestic water withdrawals are supplied by the WSA and or privately arranged home methods. Perennial rivers in wetlands regularly offer the main percentage of water for drinking, irrigation, food, as well as traditional medicines and roof thatching. The domestic water supply is approximately 50L a day (Gleick 2012), without counting water for gardening. Gleick estimates 2L for ingestion, 20L for sanitation benefits, 15L for cleansing, and 10L for cooking and kitchen. Nonetheless, during examination the water consumption associated with food and energy in countries surpasses the direct consumption of water.

Domestic water is persistent and foreseeable through the year, despite initial warnings concerning water availability as a limit to development. Various water

users complain about prevalent water illiteracy, instigating from the situation in the temperate zone that is, generally, well endowed with water. Considering that SA is amongst the countries advocating restrictions in water associated activities, water illiteracy amongst administrators, politicians and those making decisions is clearly very low. Experts and knowledgeable stakeholders are responsible for conveying and coordinating information that is central to support water management methods (Grafton *et al.* 2014).

2.10.4 Leisure water use

The recreational use of water is rising because of the growing tourism industry. In the Mediterranean, the world's most important tourist areas are characterised by water availability. Moreover, hotel services are the main patrons of fresh water in the tourist markets (LaVanchy 2017). Recreational functions and or water use are tied to the volumes of water stored, hence, the water reserved is classified as recreational water management (Razumova, Rey-Maqueira and Lozano 2016).

The control of release from a reservoir is scheduled to improve white-water rafting, anglers, and water skiers, along with nature fanatics and swimmers. Moreover, there is a substantial increase in the ocean's use for recreational purposes, while golf courses are habitually known as consuming disproportionate volumes of water, specifically in drier areas. Furthermore, recreational usage might decrease the accessibility of water for other users. For example, water reserved for boating in Summer is unavailable to farmers through the Spring planting season. Water for white-water rafting might be unavailable for hydroelectric creations throughout the period of high electricity needs (Kaniaru 2015).

2.10.5 Environmental water use

Rusca *et al.* (2017) emphasized that water allocated for environmental usage profits the entire ecosystems and or for social usage. This water is found in wetlands, lakes planned to make wildlife habitation, fish in dams, and water discharged from reserves prearranged to benefit fish, that are disturbed when the water is contaminated (McDonald 2004; Richter 2010).

Similar recreational practices and environmental usage are usually non-consumptive but can decrease the accessibility of water for various operators. Additionally, there is a tolerable level of flow that safeguards water quality by filtering, as well as facilitating the decomposition of pollutants and aiding the preservation of soil productiveness. Floodplains reduce the impact of floods and minimise their harshness, as well as damages. There is an expectation of increased use as bio- and eco-centric value methods are being implemented to cater for nature reserves and national parks, away from opposing human requirements (Sandoval-Solis and McKinney 2012).

2.11 Water and competing or conflicting needs

Water represents potential and power and is the source of collaboration and conflict (Mills-Novoa and Hermoza 2017). The problems regarding water management are tough to assimilate due to various user interests, opposing guidelines of diverse sectors with water associated purposes, and bottom-up and top-down methods to water supply.

The extent of opposing interests over water includes yearly growing pressures for household use, WSAs, farming and commercial operators, as well as recreational, environmental and hydropower generation, with water and ecosystem, water supply and waste water collection, in addition to treatment and disposal also incorporated, along with socio-economic and political disparities between riparian countries. The right to exploit natural resources within their own jurisdiction is also embraced, in relation to interests of lower riparian countries on the natural flow of a river (McKinney and Thorson 2015).

Diverse opinions advocating for centralisation and decentralisation, including those forewarning about impacts of climatic, physical, human and environmental issues, should be attended to in a coordinated manner. Other disputes arising from water lie between the rich and the underprivileged, unclear interests of project recipients and service providers, in gender associated differences, and the trade-off between existing and upcoming requirements, as well as technologies and interrelated societal uncertainties, interests of donors and beneficiaries, water pollution and air pollution, along with solid waste disposal

and related water linkages. The main test is to harmonise the rival requirements of each of the participants within a watershed (Wolf, Kramer, Carius and Dabelko 2005; Dewulf *et al.* 2009; McKinney and Thorson 2015). Balancing some of the above competing issues requires bringing together various stakeholders and not just water resource management experts because, to a certain degree, the functioning of water governance hinges on various issues, including resolving mistrust and or conflicting circumstances.

Scholars on the governance of water are of the opinion that water is soon to be the cause of competitiveness and rivalry, mostly because of scarcity and the fair level of apportionment. Concerns also exist on matters of power dynamics between sharing countries, the availability of other viable substitutes to fresh water supplies, as well as the level to which a certain state's transnational borders are affiliated with, or merely a situational matter of location between shared river systems. Moreover, water security is interrelated to national security of the government in the country, as it has been established that in SA, water is seemingly one of the limiting aspects to commercial advancement, to where the array of community demonstrations is expected to escalate into violence.

It was demonstrated in the above topics that undeniably, water shortages are linked to the issues of poverty, population development in all aspects, infrastructure complications, and environmental dilapidation, and can intensify human security. Hence, the sustainable concept in water supply needs to be increased in order to meet the present and coming generation, in terms of balancing water pressures as well as ecosystem functionality (Gleick 2014). The implications are that stakeholders must be aware and able to strike a balance between the accessibility, handling of water supply and implementing IWRM strategies at all levels.

Disparities between availability and demand manifest through the ineffectiveness of water to meet the pressures associated with deficient and or extreme water demand, due to the pressure on water, aquatic ecosystems and human's excessive water consumption. Additional aspects relate to recreational handlers, for example, when water used during irrigation returns to the rivers contaminated

by chemicals used in farming activities, or when the upstream irrigator or any user does not consider downstream users, then there will be excessive use upstream. The mentioned illustration is a common source of the negative environmental impact and a main driver of water misuse.

There are instances where there is no conflict in water management and public benefits, such as the aesthetic and ecosystem values. Typically, water administrators, including national management, ensure provision of public water benefits, although under-provision persists, hence, it is essential to properly understand and manage the multifaceted system of general performance and assessment (Wolf *et al.* 2005).

The impact of WaS on other sectors ranges from competition involving various stakeholders, to failure to control pollution by state institutions at national level or to assist local institutions to do so. The influence of WaS is further related to the lack of consistency of supply and adequate ecological and human health reserves, failure to pay consideration to social dimensions, lack of reliable and sustainable backing, and merely 'paying lip service' to women's role in water management.

2.12 Water governance

The following chapter is central to the study, in that it will attempt to expose the water governance measures currently in use and evaluate their success. Water governance is generally described as comprised of political, monetary and societal practices with organisational arrangements, through which administrators, privately owned institutions and civic groups conceptualise and apply decisions, such as apportionment, advancement plans and management of water related resources (Tortajada 2010a, 2010b; Mukhtarov and Gerlak 2014). Moreover, water governance encompasses all systems in place to extend water supply services to various societal echelons and for miscellaneous uses. The involvement of participants and beneficiaries, considering their views, contributions, interests, and priorities, respecting their legal rights, accomplishment of obligations and mediating their differences, constitute water governance. Mukhtarov and Gerlak (2014) highlighted the fact that although

transformation of water organisations and rules and practices in numerous states is taking place, the improvement in governance has been restricted and sluggish and frequently impulsive. In emerging countries, water establishments are inoperative and disjointed, with overlapping mandates and/or contradicting decisions.

According to the WRC (2015), the shifting of governance forces has shaped the prioritisation of the developmental requirements, encouraging partnerships in the application of programmes, and recognising inter-sectoral relationships. Accordingly, these progressive approaches necessitate that there are consented ideas, agreements, pledges and contributions from various sectors, including domestic and foreign agencies (Tortajada 2010a, 2010b). Whereas some believe that integrated methods are essential in managing water resourcefully, the status persists, however, in that application has continued to be inadequate and disappointing in all nations, regardless of the level of development.

It has been proven that participation in policy design, synchronisation, consultation and information discussion between organisations and interested parties at various stages, contribute to an improved knowledge of each other's policy purposes, operating modalities and tools accessible for execution. Notwithstanding, pronouncements must firstly be intelligible, with a comprehensive set of values, leading to a liberal, competent and impartial management of water reserves.

Water governance highlights the connection of water associated complications by indicating natural restrictions, deficiency in funding and suitable technologies, as well as other deep malfunctions in water governance. The perceptions and or values regarding water provision held by people and stakeholders, greatly influence decisions with regards to the management of the existing water. The assurance to achieve water service values is frightening (Tortajada 2010a, 2010b; Mukhtarov and Gerlak 2014; Muller, Chikozho and Hollingworth 2015).

2.12.1 Challenges in water governance

Geert (2014) posited that water governance methods are interrelated with that of commercial, environmental, human settlement and societal advancement activities. This further complicates institutional arrangements and instigates fragmentation, with uneven application of water related service (Teisman and Edelenbos 2011). Hence, the approaches to water issues appear to be multifaceted and dynamic. Hirsch, Levine and Miller (2007) highlighted that should a challenge be multidimensional, there will be interconnection within various policies and actors involved; however, the systems to deal with these complexities will still be vague and the ambiguity of processes will multiply.

Dewulf, Mancero, Cárdenas and Sucozhanay (2011), as well as Teisman and Edelenbos (2011), argued that diverse rules normally contradict each other, which is problematic, particularly when it comes to motivating different organisations and or departments to work together and collaborate their functions. Moreover, administrators accountable to these policies regularly organise their execution unconnectedly and frequently without knowledge about activities in other related fields. It appears to be impracticable to establish the correct and even stable boundaries in multiple social courses. The arranged predicament of water governance is the prevailing division of tasks. Reaching some level of collaboration and integration in such disjointed structures is a central challenge in governance. Lewicki *et al.* (2003) cautioned that diverse players frequently voice conflicting sentiments about the exact nature of the problem or the interpretation of the status quo. Their assorted experiences influence their attention and characterisation of the situation and consequently, they communicate dissimilar information, with different proposals to avert the situation.

Notwithstanding that countries are progressively becoming interrelated, owing to the movement of information markets, and globalisation, it is startling to note that pronouncements and institutions are disjointed, uncoordinated, and unsuitable in handling the intensifying technical and ecological transformation (Dewulf *et al.* 2011; Arora *et al.* 2015). Symptoms associated with fragmentation include the

devolution of government and power, the advancement of public-private corporation layouts, and the amplified effect of non-governmental establishments and epistemic societies on procedural activities to a few political stages. These advances, together with an increasing effect of multidimensional treaties on national strategies and the spread of policy revolutions across diverse states, have consequences for our aptitude to deal with hasty and incremental communal-ecological alteration (Duit, Galaz, Eckerberg and Ebbesson 2010).

2.13 Conclusion

Chapter Two confirmed that the ultimate decisions against water issues will need to cover matters of accessibility, clarify approaches, as well as institutional arrangements, predominant socio-political, technologies, in addition to development and maintenance of infrastructure suitability of the present legal frame. Moreover, governance methods such as political intrusions, openness, immorality, and relevance of research collaboration from local, national and provincial levels were highlighted. Al-Saidi (2017) believes an evaluation may be required to guide understanding on international water governance forces, in order to address water issues successfully and optimise prospects afforded by the fourth industrial revolution (4IR).

While the framework of water governance is considered as a foundation in the provision of water, the preliminary study showed that in developing nations, water institutions are not functional and often fragmented, with uncoordinated initiatives and/or inconsistent decisions. Consequently, developmental issues necessitate collaboration, partnership and synchronisation in the water sector and with various stakeholders. The next chapter provides a detailed account of conceptual issues of WaS governance.

CHAPTER THREE

CONTEXTUALISING MUNICIPALITIES AS WATER SERVICE ORGANISATIONS

3.1 Introduction

The water systems discussed in the previous chapter outlined systems, showed interactions, as well as relationships involved with the provision of WaS. Chapter Three maps out the service delivery model for WaS delivery in the WSA under study and the topics covered attempt to explore whether the model of service delivery is viable. The term “viable” does not or is not intended to mean financial viability and sustainability of revenue sources as normally understood (Kanyane 2011). The context of ‘viability’ in this chapter, stems from systems thinking concepts of viable organisations, specifically organisations that are purposeful, adaptive, and able to maintain their long-term stability (Hoverstadt and Bowling 2002a; Schwaninger 2006; Sung *et al.* 2008). Therefore, the institutional arrangements, delivery plans and or tools of implementation will be unpacked and examined to investigate the level of viability. The literature review demonstrates theoretical aspirations and challenges of the government, particularly the municipality, in relation to actual service delivery on the ground.

It was demonstrated in the previous chapter that physical and technical factors, including access to storage and distribution systems, may mostly be determined by the practicability of various forms of water management approaches. Moreover, institutions may likewise shape the operations of water management programmes, since institutions influence how water users and water providers manage and synchronise their activities to resolve water related dilemmas (Heikkila 2017). Moriarty *et al.* (2004) concur in stating that at the centre of the WaS crisis is inadequate management and governance, as opposed to the absence of water as a physical natural resource. Moreover, as the Auditor General of South Africa (AGSA 2018) and the DWS (2018) pointed out, SA municipal organisations face problems originating from a limited understanding of (and willingness to apply) suitable governance methods; this is demonstrated by unsatisfactory service delivery.

Motubatse, Ngwakwe and Sebola (2017) noted that problems of bad governance are continuously going to increase following poor performance by any state entity and or when resources are misused, amenities not provided and residents (particularly the disadvantaged) are deprived of societal, legal and economic protection. However, with regard to experiencing irregularities in the provision of essential services amongst communities. Ngidi and Dorasamy (2014) and Yousaf *et al.* (2016) reported that the challenges relating to protests against ineffective governance are familiar to most SA municipalities. In addition, these protests relating to governance, stimulate a multitude of questions about what needs to be done, when it must be executed, and in what way (Asha 2014; Van der Waldt 2014). Regrettably, the country's situation is not exclusive and applying successful governance has remained an issue confronted by various municipalities (Thornton 2018).

The chapter will also provide the necessary insight in understanding WaS governance, the state and current municipal service delivery models, concepts, theories and its performances, while investigating whether there is a need for the municipality to improve its delivery system using systems methodologies. A thorough understanding of the way authorities shape themselves to deliver WaS service, in terms of governance and its challenges, is required. It is commonly understood that institutions determine the types of choices and boundaries, as well as communities it serves within governments, whereas the wider notion of governance covers the principles and procedures by which government business is exercised. A necessary reminder is that the reviewed data are generally concerned with the provision of water; as a result, the focus and scholarly articles reviewed were on water rather than on sanitation. Nonetheless, parallels will be drawn from one to the other, as management of the two are often intertwined, and progress in both institutional and governance programmes impacts sub-sectors.

Figure 3.1 depicts the spheres of government that have a stake in the water value chain.

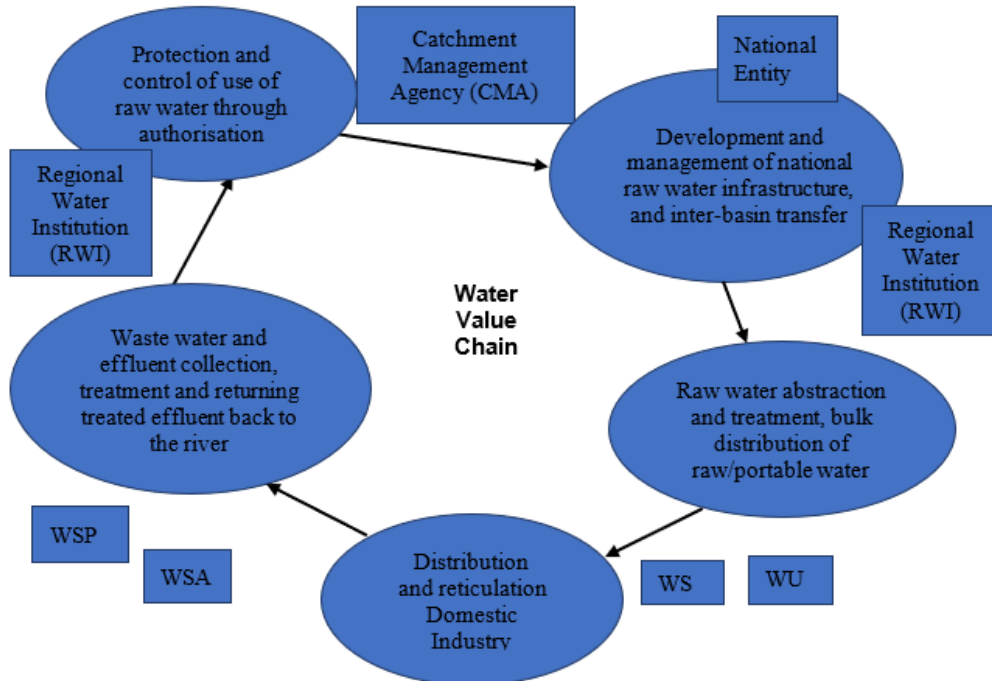


Figure 3.1: Water Value Chain

Source: WRC (2015)

3.2 Background of municipal structures

The value of water and the relevant authorities responsible at each stage are illustrated (Figure 3.1). Proper administrating structure for a municipality depends on its precise features, such as the nature of the services it was designed to provide, the revenue sources accessible to it, and the magnitude as well as the demographical area of the municipality, comparative to the state/province or entire country, in addition to the level of intergovernmental relations, and the history of collaboration within neighbouring municipalities. Although, according to Dipholo, Mafema and Tshishonga (2011) and Boix and Svolik (2013), public establishments are regarded as conventionally hierarchical organisations that operate according to a top-down command structure; in the sense that strategic plans originate from the upper structures and are executed by a flow of commands over the tiered levels.

Shafritz, Borick, Russell and Hyde (2016) point out that when employees of any big department and or municipality are questioned about their institutional arrangements, a sequence of confused and frequently contradictory interpretations are likely the result. Koma (2010) agreed, in that this way of working is sluggish and not flexible to handle the cumulative rate of transformation with multifaceted surroundings in municipalities.

Virtanen and Vakkuri (2015) posited that municipalities or public-oriented institutions dependent on state funding have a habit of possessing many levels of prescribed administrative controls and community scrutiny, to demonstrate a higher degree of answerability. However, Seip (2011) is of the opinion that public institutions are subjected to added red tape and hierarchical (bureaucratic) administrative structures. Organisations such as municipalities have a tendency to avoid entrusting their authority to their subordinates and sub-units, while at the same time keeping powers to themselves, not allowing managers occupying lower-level positions to make any decision. Seip (2011) maintained there is more autonomy and flexibility of leaders and managers in privately-run organisations. Rasul and Rogger (2016) highlighted that regimented, official, standardised, customised and bureaucratised institutional arrangements, as well as organograms, are not suitable for adjustments and adaptations in the event and periods of complex, stormy, as well as unpredictable environmental variations.

Technology advances directly and continuously influence the relations of individuals in institutions, while also affecting communication between them and at administrative levels (Suliman *et al.* 2018). One of the perceived benefits of technology is that it enables more direct and “flatter” forms of interaction and business dealings. Morgan (2015) explored the five types of organisational structure, explaining that: “A flatter structure seeks to open up the lines of communication and collaboration, while removing layers within the organisation”. The consensus is that this has driven a societal shift away from a “centralized world” to more decentralised and disintermediated options (Fenwick and Vermeulen 2018). Hence, the conclusion that technological advancements have led to guide in an innovative concept of a flatter structure, as well as networked

forms of institutions, with a broader distribution of units or sections to reach everyone that performs work in real time. Moreover, it is important that organisations are viewed in a different light, even though there is uncertainty and confusion around the nature relating to flatter, new-style institutions (Pietilä 2006; Wang and Feeney 2016). The current operational style does not prescribe much as to who reports to whom or maybe who wants to converse with whom, however, the fundamental requirements dictate how every piece of a multifaceted, interrelated jigsaw is organised and integrated to form a complete, synergistic institution. Nonetheless, in most cases it is exactly this insight of the whole that is normally lost.

Giroux and McLelland (2003) cautioned that the obvious risk in using more relaxed structures is the possibility of losing cohesion of the whole, along with synergy, in trying to execute a multitude of business components and profit centres able to respond to a diverse market and related pressures institutional support necessitates. The familiarity of data, as well as information, turn to be trapped in the surrounding networks, limiting the likelihood of employees working in co-operation with others across institutional borders. Employees in various parts of the municipality are not aware of associated problems and activities that are outside of their concern because, in this case, the organisation and or municipality has lost its joining nerve (Davies 2002).

Osborn *et al.* (2013) are of the opinion that generally, the failure in municipalities lies in gaining full payback of modernisations and has nothing to do with certain means of upgrading applied. However, the problematic issue is rooted in the approach taken in introducing a new improvement package, insofar as interaction is concerned with the physical, economic, social, and psychological arrangements in which execution happens. Simply put, it is not a problem related to a tool, a human resource and or a leadership, however, it is a systemic issue, produced by the interaction of tools, equipment, and employees, including leadership.

Systems thinking theory as a coherent framework for identifying links and interrelationships, might be a perfect tool to use, because systems thinking

observes the world as a multifaceted arrangement and then appreciates its interconnectedness and interrelationships (Mingers and White 2010; Arnold and Wade 2015).

Adaptation of strategy, technology, size and structural arrangements are initiated to move an organisation into a better level of efficiency. Structural arrangements are founded on general teamwork, horizontal communication, partnership, as well as the decentralisation of decision-making, allowing an organisation to work in a similar manner as a living organism (Rant and Rozman 2008). It was noted however, that the IWRM governance approach founded on neo-classical, revisionist, and market-friendly concepts is faulty, especially in areas of institutional mechanisms through which WaS plans are managed (Pearce 2002; Hill 2013).

3.2.1 The Scope of water supply services

The management of water comprises two unique, although closely related ideas, namely water resource management and water supply services. Thompson (2006) defined the management of water resources to include the protection, usage, development, and conservation, as well as control of resources, to accomplish social equity, economic development and environmental sustainability; whereas water services consist of the delivery through water supply to all users, including potable and commercial use.

The study focuses on the component of water services, such as water supply from the abstraction, conveyance, treatment, storage and distribution of potable water, water intended to be converted to potable water and water for industrial or other use. Nevertheless, it must be noted that WaS supply services also include municipal arrangements required to guarantee the delivery of water (WHO and UNICEF 2015; UNICEF 2015). Generally, water management and water governance are interdependent subjects in so far as effective governance methods are intended to aid real-world management plans, to be executed appropriately as circumstances require. Nonetheless, water systems are multifaceted, intricate and go outside the borders of municipalities, provinces and

countries (Pollitt and Bouckaert 2011). This calls for concerted and combined water governance by everyone involved in administration of water services.

3.2.2 Municipal revenues

The competences and capabilities of local government to grow its own income is the basis of municipal services' sustainability. The problems confronted by municipalities regarding collection of revenue to perform their mandatory duties to various consumers, especially non-paying rural customers, is becoming a norm (DWA 2002; Mazibuko 2013). According to Mazibuko (2013), water and property rates together account for approximately half of all unpaid commitments per source of income.

Manyaka and Madzivhandila (2013) affirmed that municipalities do not have equal capacity to grow income because the degree of their shortcomings differ, being significantly higher in rural municipalities. The capacity of municipalities to increase income and advance infrastructure, according to Manyaka and Madzivhandila (2013), is normally affected by inefficient day-to-day activities, inadequate knowledge of the poverty-stricken families to be subsidised, unsatisfactory technology, and limited data integrity, as well as defective and inefficient manual procedures, unpredictable credit regulator actions, along with values of non-payment of services and a shortage of capacity and expertise.

The valuable policy of debt recovery facilitates a process in which a service provider effectively determines the consumption patterns of service by individual household accurately, to be able to transfer as well as distribute costs. Nonetheless, the correct price measurement has, to a certain extent, little meaning when municipalities cannot collect monies due for services provided (Nikolaou 2014).

Aboojee (2013) and van den Berg (2015) acknowledged that income collection is customarily inundated with a high degree of incompetence, leading to inadequate provision of service. In turn, this has led to reluctance in paying amongst consumers and subsequently, low collection and fiscal losses to the municipalities. Moreover, Aboojee (2013) and van den Berg (2015) inferred that

municipalities must bear the expenses related to the provision of services, with negligible or no chance of recuperating expenses.

The conclusion is that there is limited income generation in many municipalities, particularly in rural areas. The consequence of this, seemingly vulnerable income generation, is that municipalities cannot influence funding needed for reasonable municipal functions (Chirieleison and Montrone 2013). A sustainable tariff policy and payment for services over and above basic needs are essential for financial viability (Bhagwan *et al.* 2014; Abu-Mahfouz *et al.* 2016).

The FBWP in SA has been demonstrated to work only when water volumes are restricted to a basic volume and there are sufficient payments by higher volume users to cross-subsidise. The biggest risk to financial sustainability is municipalities where all water is regarded as free, instead of it being restricted to a basic volume. This has led to excessive use and wastage and cash flow problems in some areas. Muller (2014) asserted that the rights of the institution (municipality or other entity to be sustainable and financially viable) are as important as the right of an individual. In practice this means, for example, that consumers who have rights as individuals cannot merely demand increasingly more of a free service as their right, while the service provider requires adequate income in order to sustain itself. This raises and or brings an issue of rights and responsibilities into the spotlight.

Frequently asked questions are, is municipal water merely seen as a social good, expected as a 'human right', or is it valued as a vital but limited resource that entails costs and requires care? These perceptions, are strongly dependent on legal and public consensus, reflecting a long-lived dispute in the water sector between economic concerns, environmental issues and social justice (Hordijk, Sara and Sutherland 2014). Income generation empowers a municipality to provide services and can contribute to fiscal viability.

Municipalities must consider population increase when scheduling and costing the provision of water services and its infrastructure expansion. It is assumed that should the billing programmes not be enhanced and matched with communally

justifiable services, the current population growth, parallel with this form and behaviour, suggests that SA will shortly surpass the limits of its economically functioning, land-based water resources, excluding sea waters. Community sustainability in water services supply is proportional to financial sustainability because societal aspects frequently influence the monetary sustainability of providing service.

The societal rights in Section 4(3)(c) of the Water Service Act provide that individuals cannot be deprived of access to basic water services due to non-payment, in the event a person verifies to the satisfaction of the applicable WSAs that they are incapable to pay for services. This renders the task of recovering expenses problematic for municipalities, as the burden rests on them to demonstrate this. Kanyane (2011) and Manyaka and Madzivhandila (2013) are in agreement that revenue collection is an enabler of fiscal sustainability and establishing the challenges, is the first step. Moreover, it is essential that municipalities ensure billing logistics are correct, consumers are provided timeously with accurate accounts, and that the collection of unpaid revenues owed to them is being done appropriately (National Treasury 2015).

3.2.3 Municipal funding

The capability to successfully coordinate resources towards WaS provision depends on various institutions with their predetermined conditions, rules and mechanisms for access to and distribution of funding and any kind of incentives or assistance in designing delivery systems (Saleth *et al.* 2005). The SA Constitution requires municipalities to grow their own income from service charges, property taxes, surcharges and other duties. Furthermore, the Municipal Systems Act (Act 32 of 2000), as well as Local Government Budgets and the Expenditure Review (2008), state that municipalities both in rural or urban areas are obligated to raise revenues due and payable to them and must be mostly self-financing (Atkinson 2007) although money allocated by the national government should be distributed between other spheres.

The Division of Revenue Act gives effect to s214 (1) of the Constitution, for the equitable division of nationally raised revenue among the three spheres of

government. Financial management with the business concepts of finance are at the centre of any municipal process, as these are vital to the business organisation's ability to run its operations professionally and successfully.

National allocations to municipalities comprise equitable sharing and the Municipal Infrastructure Grant (MIG), which is spent to methodically eradicate backlogs in basic infrastructure and enhance capacity (Gay and Sinha 2014). The MIG, Urban Settlements Development Grant (USDG), Regional Bulk Infrastructure Grant (RBIG) and the Water Services Infrastructure Grant (WSIG) are assigned at the discretion of the national department. The municipal equitable portion is planned to cover operational expenses, with infrastructure grants chiefly allocated by formula (Ruiters 2013).

While the adequacy of the transfer, in terms of significance is somewhat contested, analysis available currently indicates that the level of transfers is sufficient. The experience of individual municipalities in not having sufficient revenue, is typically related to a lack of fiscal effort on their part, resulting in over reliance on grant funding (Clark 2015). Ruiters and Matji (2016) posited that to be able to obtain funding is the essence in water infrastructure provision, likewise with the funding model for individual projects.

Regrettably, the price of water services infrastructure provision escalates to the point where several emerging countries cannot afford this provision, which is made worse by recent findings showing that municipal consumer debt and revenue planning are a problematic area in SA municipalities; caused by non-payment, partly due to poverty and ever-increasing joblessness in society (Molobela 2016). Municipalities complain that the national government does not factor in rates of unemployment aspects when allocating grants in intergovernmental transfers.

3.2.4 Financial health of the municipality

Financial management is explained as administration of municipal monies to accomplish fiscal obligations (Brigham and Houston 2012). According to Eze and Harrison (2013), the modern monetary administration can be defined as the

totality of technical proficiencies, talent, accountability and transparency. Ciuhureanu, Balteş and Brezai (2009) posited that financial management affects every component in the organisation, and public finance perhaps needs to be carefully measured to be the dominant influence in shaping the viability of municipalities. Apparently, the lack of thorough financial management systems in municipalities will force the discontinuation of operations (Kanyane 2011; Molobela 2016).

Therefore, it is crucial in this study to discuss the financial health status of the municipality when researching on governance in the municipality. The reality is that financial administration is a significant component of the entire business function. Financial governance in water provision involves economic, social, political and administrative systems established to develop, manage and deliver water resources at various levels of society (Cave and Plummer 2013; Gleick 2014).

Gupta and Pahl-Wostl (2013) posited that currently there are concerns raised by policy makers and scholarly communities about the ineffectiveness of some water governance processes that impede effective provision of water. These concerns are not new and Bogardi *et al.* (2012) cautioned that MDG were unlikely to be met, stating poor financial management as one of the reasons. The operations of the WSA are normally outperformed by inadequate governance arrangements manifesting and demonstrated in societal problems. Thus, without an effective water governance framework for water utilities, whether publicly or privately supplied, water regulation will remain ineffective (Xu, Yu, Zhong and Xing 2016).

3.3 Governance in context

The word governance is used as an umbrella idea, with no approved description and well-defined meaning, to where it is difficult to firmly explore the different traditions in which governance is invoked, across a variety of disciplines, strategy and or plans, and endorsed administration reports. Consensus exists that governance is not identical with government but rather, it constitutes a complex process that considers multi-level involvement beyond the state, where decision-

making embraces public institutions, the private sector and civic society (Tortajada 2010b). Tortajada agreed with Pollitt and Hupe (2011), when defining governance as the mechanisms, systems processes and institutions, through which people and particular groups express interests, exercise lawful rights, accomplish obligations and intercede their differences.

Governance entails changes in the roles, structure, and operational processes of government, and or the way social problems are resolved. The common factor in all definitions seem to suggest managing WaS with a consensus, in a uniform, collaborative and accountable manner. Duit *et al.* (2010), Benson, Gain and Rouillard (2015), and Cash (2016) summarised governance as the official and casual measures that regulate public choices, as well as actions, from the standpoint of preserving the state's constitutional principles.

Tortajada (2010b) acknowledged that cooperation amongst public and private institutions, involvement of participants, and monetary and or regulatory tools are ineffective, except when there are administrative mechanisms in place, and pledges and participation of every stakeholder. In addition, Tortajada (2010b) stated that arrangements that allow the structuring of collective action must be promoted and strengthened. Good governance effects better-quality functioning of the public sector, including municipalities (Maserumule 2011; Matshabamphala 2014; Thornton 2018). As a result, the actual application of good governance guidelines and methods have continuously been necessary in municipal institutions (Begum *et al.* 2014; Jorgensen and Sørensen 2012: 71).

Governance is crucial for economic, social and environmental results and to achieve resolution to issues such as inclusiveness, answerability, transparency, certainty and responsiveness. When governing methods do not accomplish the above-mentioned conditions, it becomes bad governance. Bad governance causes political instability and societal risk, municipal fiasco, inflexibility and a weakening in the capability of coping with common difficulties.

There is a belief that water governance comprises the skill to design municipal policies and frameworks that communally recognise and mobilise resources to

be distributed to every stakeholder. The formulation of water strategies should have the ultimate objective of sustainable development of natural water, to be provided effectively, and involve crucial actors and stakeholders in the entire process (Cave and Plummer 2013). Governance actions in all echelons become weak across many social groups whose associations with each other are continually changing.

3.3.1 National Government

SA institutional arrangements summarised in the NWA (1998) stipulates that the state is the executor and overseer of the country's water resources and accordingly, obliged to ensure water is protected, used sparingly, conserved, and controlled in an equitable and sustainable manner for use by everyone. The National DWA possesses most of the large dams and associated water infrastructure and assumes the planning responsibilities, as well as execution of future water resource growth developments. Rohr, Cilliers and Fourie (2017) posited that national government has the constitutional obligation to support and reinforce the capacity of municipalities in the accomplishment of its roles, and to regulate municipalities to guarantee actual enactment of obligations. National government can remodel regulations governing WaS service delivery (Water Services Amendment Act 108: 1997).

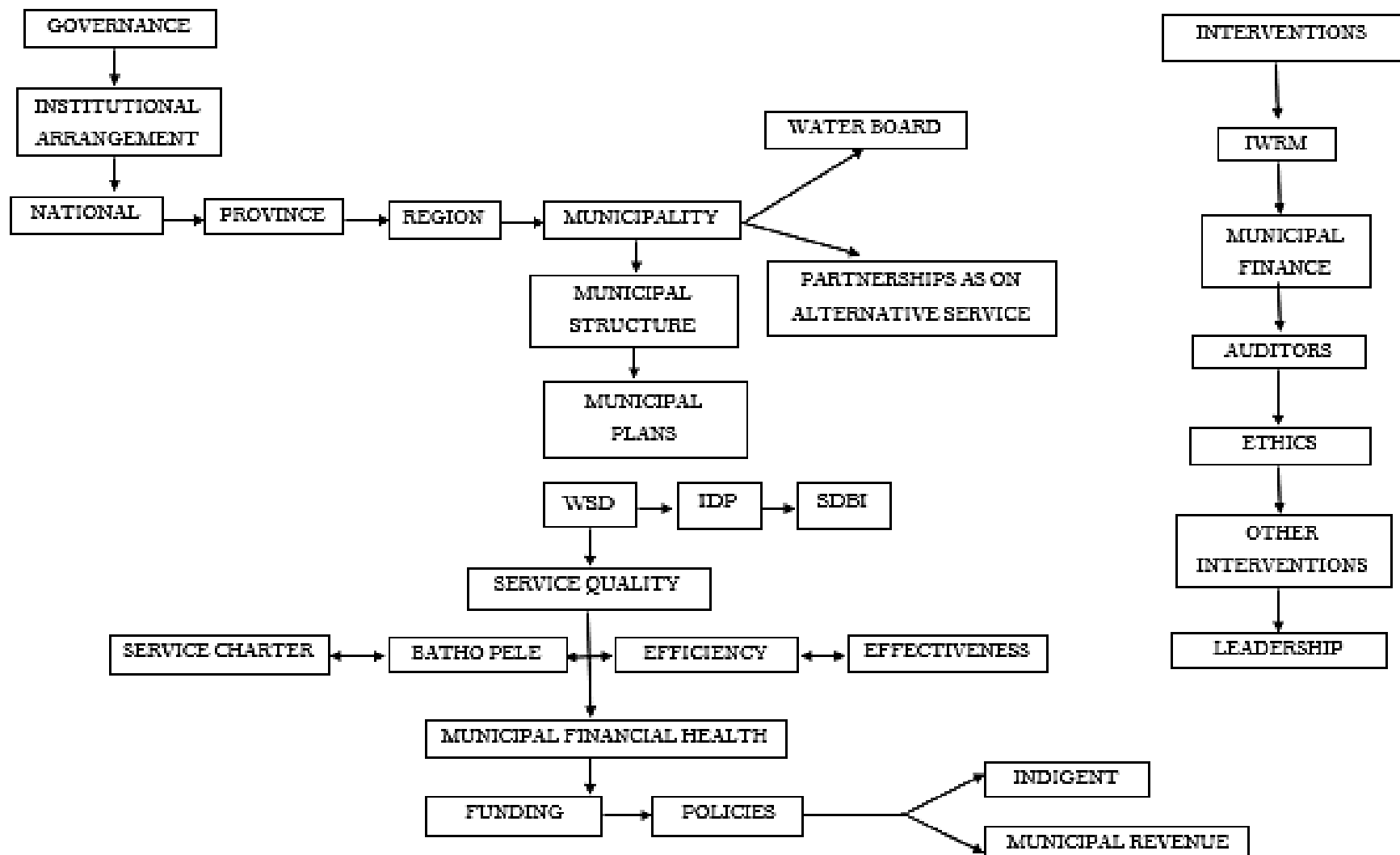


Figure 3.2: Overview of municipal governance framework

While there is the issue of overlapping authorities, coupled with issues of affiliation between the levels of government, Atkinson (2007) advanced that the utmost problematic interrogations have been the comprehension of the phrase “distinctive, interdependent and interrelated”. The Constitution is unambiguous, in that all spheres of government should perform their duties in a way that does not intrude on the geographical, functional or institutional veracity of government in any other sphere. However, overlapping roles and undistinguishable commands between state organs have been established to be the cause of deficiency in accountability, repetition of services, unproductive service delivery and an added burden in municipalities, as the level of government closest to the public (Elina Herrala and Jouni Olavi Haapasalo 2012).

SA policy encourages the engagement of the private sector to provide improved service standards, as well as to eradicate the water backlog that is a burden on employees of the municipalities (Ngidi and Dorasamy 2014; Njiraini 2016b). The DWS maintains a healthy partnership with the South African Local Government Association (SALGA), the Development Bank of Southern Africa (DBSA), Catchment Management Agencies, and Water Use Authorities (WUAs), along with the Trans Caledon Tunnel Authority (TCTA), the Water Institute of Southern Africa (WISA), the WRC, as well as Universities and Universities of Technology, to embrace the concept of water governance. It must, however, be stated that the country is facing various challenges with regards to its water resources and the management thereof (Bakker, Kooy, Shofiani and Martijn 2008).

Section 41 of the Constitution (SA 1996) openly grants a platform for cooperative governance, to bridge the gap caused by fragmentation in the administration processes associated with environmental management as a sector. The various aspects of environmental management, such as the Department of Water Affairs and Forestry (DWAF), DWS, Department of Environmental Affairs and Tourism (DEAT), and the Department of Minerals and Energy, in addition to the Department of Agriculture, and Land affairs, are bound to create an environmental management war; seeing that these departments are supposed to protect the environment and at the same time, do so with overlapping

commands. Most of the time, these government divisions frequently do not agree with each other on the plans, hence encouraging arguments, resulting in no coordination amongst environmental sector units. Moreover, the conflict is caused by misinterpretation of regulations and or application of regulations in different contexts (Giroux and McLelland 2003; Förster, Downsborough and Chomba 2017).

Issues regarding concurrent competence add to the problems because it is ambiguous in matters of primary jurisdiction in the application and management of environmental and water services, for example, environmental pollution against water pollution and who should be the lead department. It was established that water pollution management, as well as coastal management, are a concurrent matter, where national and provincial departments, as well as the district municipality and local municipal all have competence (DWA 2017).

A question arises as to which of the DEAT (National) and the DWS (Provincial), District (WSA) or Local municipality (who has jurisdiction of land) has a duty to act first. Should all departments and municipalities duplicate their respective roles? The answer might be suggested as the duty to cooperate between the departments as instructed by the constitution and emphasised in intergovernmental regulations, even though history has proven that this approach has been unsuccessful in tackling issues of distinct delineation of functions.

Therefore, sector department duplicate resources do not resolve any problems but point at each other. The DWAF equally has pollution control duties derived from the NWA (SA 1998), while the departments of agriculture (national and provincial) equally have water resource protection duties imposed by the Conservation of Agricultural Resources Act (SA 1983). The same problem is obviously erroneous when the Department of Environment does not have the mandate of water, fisheries or land.

Uncertainty not only arises regarding natural sources but can also result from lack of knowledge and/or understanding. The compartmentalisation of how national departmental policies deal with water issues as different “authorities

become responsible for their own commitments,” often with limited, if any, inter-institutional coordination across sectors, leads to inefficiency (van Koppen and Schreiner 2014b).

3.3.2 Provincial Government

The provincial government is mandated to apply national regulation within the functional areas listed in Schedule 4 of the Constitution and mediate should a municipality be unable to accomplish its executive responsibilities. The functional areas of the province include setting design standards (DWAF 2003: 23). Although, customer departments are responsible for the supply of WaS services and the related expenses of bulk WaS infrastructure in their own facilities (WSA 2007: 24). The provincial government, jointly with national government, has the constitutional obligation to assist as well as reinforce the capacity of municipalities to regulate and in executing functions, guarantee successful performance in their obligations, through designing and applying support mechanisms, guidelines and involvement as pronounced in Sections 7 and 8 of the Constitution.

Seeing that WaS provision is a concurrent function, a generic failure to provide WaS may be understood as the failure of all spheres of government involved to service communities. The Systems Act provides for a broad monitoring framework, assigning provinces to create a monitoring procedure and draft plans to align municipal Integrated Development Plans (IDPs) and to monitor the execution of authorities and functions. Chapter 2 of the MFMA equally provides for supervision by the National Treasury and provincial treasuries of municipalities’ administration of funds.

The requirements relating to monitoring and assisting municipalities are found in sections 154(1), 155(6) and 155(7) of the Constitution, where it is stated that provincial governments must provide monitoring and support of local governments. In chapter 8, the Water Service Act similarly provides for the monitoring of water services and intervention by the Minister and the different members of the Executive Councils responsible for local government in all the

provinces. While localised planning is promoted, Muller (2014) pointed out that there is a propensity by national government to apply a standardised top-down approach, grounded on political and economic benefits, to maintain a customary style in identifying local problems, and adjusting localised priorities, budget capability and information processing.

3.3.3 Local Government and or Water Services Authorities

A municipality is a separate sphere of government with executive powers in their area of dominion (section 40 of the 1996 Constitution: SA 1996). Moreover, a WSA is any municipality answerable in making sure there is access to water services. Those municipalities have their mandate derived from schedule 5 of the Constitution (SA 1996), the (SA DWAF 1997), the Local Government: Municipal Structures Act (SA 1998). The municipal assembly has the authority to design and control its internal actions, decides on style of form to arrange their operation and the nature of mandate or area of responsibility it dispenses to party-political structures, office-bearers and the municipal manager (MM). From this right, municipalities carry with them a responsibility to account and deliver (Asha 2014). The partnership institutionalised in the co-operative governance as expressed in the Constitution, is intended to ensure that policies are implemented in a co-ordinated manner for effective service delivery to all citizens.

The ability to co-ordinate activities allows the municipality to refine and revise their methods and approaches seeking partnerships in the delivery of basic services to the citizens (SA 1998; Leibbrandt and Botha 2014). When WSAs fail to design plans, strategies and or are unsuccessful in the implementation stages of essential service provision and unable to deliver effective, valuable services in a sustainable manner, national government, together with provincial government, have the authority to intervene (SA 1996). WSAs are obliged to design a Water Services Development Plan (WSDP) in their area of jurisdiction.

In technical terms, municipalities break down as a result of not achieving their statutory and legal obligations associated with water provision, which is directly relevant to the province and consequently, the national department, considering

it is a concurrent function. It has been established that systems for WaS delivery lie both in internal as well as external to local government functionality. Systems internal to local government pertain mainly to the provision, administration, operations and maintenance of facilities, whereas external systems refer to role players outside of the functions prescribed for local government but within government and civil society, it is essential for overall sanitation delivery (Bakker *et al.* 2008; Koelble and Siddle 2014; Ramutsheli and van Rensburg 2015). However, all systems need to work in synergy to further the objectives and the demand for WaS services.

3.3.4 Water Boards

Water Boards (WBs) are regional or bulk WSPs (sell water to, or accept wastewater from other WSPs). Since they are WSPs, the Boards are answerable to the WSAs. WBs are operated and regulated by DWAF and National Treasury under the terms of the Water Services Act of 1997 and the Public Finance Management Act of 1999. The Minister of the DWS officially appoints WBs to assist municipalities in delivering services, where needed. Besseling (2008) stated that WBs have a crucial part in the South African water subdivision, since they run dams, bulk water infrastructure, retail infrastructure and wastewater systems, moreover, they offer technical backing to the WSA.

There are WSAs that do not depend on WBs for regional bulk water supply infrastructure, however, they should function within the norms and standards of the WSA, NWA and related regulations and strategies. In SA, there were 13 WBs that indirectly served more than 24 million people in 90 municipalities in 2005 (Besseling 2008). In the KZN province, Umgeni Water is one such example amongst a few that are part of the UDM.

3.4 Social integration of water use

The idea of societal inclusion symbolises the achievement that every social cluster partakes and has equal access to water services and related support. The participation of societies in WSA subjects is granted by the Constitution, coupled with good water governance and actual stakeholder assignment that are

inseparably connected (Merrey, Drechsel, de Vries and Sally 2005). Megdal *et al.* (2017) clarified that municipalities are not methods of directing local communities, instead, they are an instrument of social coordination for agreeing on mutual problems confronted by administrators and residents of specified localities.

The 1994 White Paper further identified that the partnership with local citizens will not only encourage transformation within the municipality but will determine the best use for public resources, as citizens' input or opinions are encouraged when planning and preparing the IDP. Public ideas must be accommodated in the planning, execution, and evaluation of water services. Societies must be offered the opportunity to register their wishes, with regards to WaS in municipal authorities, but must equally be educated on the possible influences of environmental issues and the confinement of the natural resource (Wester, Merrey and De Lange 2003; McDonald 2004).

The closeness between a municipality and civic society lies in that the municipality is answerable to society, and enables informal ways that shape amenities to accurately accomplish local requirements and expectations. Koppen, Giordano and Butterworth (2008) are convinced that in numerous cases, underprivileged and defenceless groups such as the aged, incapacitated, and individuals suffering from chronic sicknesses, or individuals living in refugee camps, might be disadvantaged to receive proper water delivery. They caution that disregarding the significance of social inclusion would bear severe consequences. For instance, not safeguarding a consistent distribution of water to a marginalised farming ethnic minority will threaten their livelihoods and can influence them to abandon their land.

Although democratic water rules necessitate public involvement and representation, the rural poor, living in formerly disadvantaged society, are characteristically omitted from contributing in public decision-making concerning water access due to poverty dimensions, such as illiteracy, language barriers, mobility and access to information (Schreiner and van Koppen 2002). Despite

the NWA and pragmatic methods to offer free basic water to the disadvantaged communities in the country, it still experiences challenges due to various reasons associated with access to the available water supply. Mayosi and Benatar (2014) added that public scarcity, ill health and access to water are thoroughly entwined, which is demonstrated mostly in rural areas where communities are deprived of the benefits of safe and drinking water amenities situated close by.

Homes that are far from safe drinking water sources normally fetch bathing and drinking water from polluted surface water reserves, sharing with domestic and wild animals. It is common knowledge that issues related to water access to perform domestic activities are crucial to support home livelihoods, however, it is characteristically absent in the compartmentalisation of SA's water sectors, strategies and establishments. In addition, money, poverty and socio-political segregation are added areas of ill-being that are directly linked to water access. Since water is critical, should an individual wish to partake in income generating events, such as small-scale livestock nurturing and cottage businesses, for example, fermenting and block manufacturing, inadequate access to water contributes to the side-lining of the underprivileged (Shah 1999; Harvey 2008; Fosu 2015).

Schreiner and Van Koppen (2002) highlighted that the other side of the coin, in stressing several associations between water and poverty, is the fact that water access may greatly contribute in eradicating poverty when water is supplied constantly to the underprivileged. Trends support that underprivileged societies' well-being in terms of cash, possessions, resilience, and socio-political inclusion, in the overall course of their lives, will be enhanced with improved access to safe, inexpensive and consistent water.

The vital deduction is that access to safe water is important, predominantly so for underprivileged rural families, for whom access is understood as coverage and functional water infrastructure, as well as the ability of a family to secure a water source. Nowadays, backlogs continue in both service delivery and infrastructure, specifically in historically poor parts of the country. The main cause being

strategies that fail to offer satisfaction to every recipient, often distributing resources inadequately and ineffectively (Akinboade, Mokwena and Kinfack 2014).

3.5 Institutional arrangements

Camkin and Neto (2016) explained that in the field of WaS provision, formal municipal arrangements also include prescribed regulations governing individual behaviour, public and private arrangements of other stakeholders, as well as everyday customs and values shared amongst societies. Ordinarily, the entire arrangement of the municipality influences how and who are users of water, and providers that manage activities to resolve water service dilemmas. Moreover, Biggs *et al.* (2017) insisted that official boundaries and or jurisdictions have been considered most significant in influencing water services.

Preston (2015) argued that institutions, regardless of size when fragmented in tackling water, will be unable to comprehensively resource plan and address issues across national and local boundaries. This is partly because any natural resource turns out to be mobile and interconnected with other natural resources. Moreover, local water problems are interrelated and interwoven, linking additional actors, while spreading provincially and worldwide. Therefore, deciding on the location, boundaries or jurisdiction can be difficult or even impossible. Brandenberger, Schläpfer, Leifeld and Fischer (2015) concurred that water-related issues are normally transboundary and across various sectors and usually reach various decisional stages. The above-mentioned features increase the complexity of making decisions and applying of relevant structures, which makes water politics and guidelines an exceptional circumstance because of overlapping sub-systems and regulations.

3.6 Challenges of institutional arrangements

It has been established that water management in SA is set apart by an array of legislation and establishments governing water use and services, with Cooley *et al.* (2014) concurring, while highlighting that water governance methods are concurrently occurring on numerous levels on local, regional, national and global

levels. According to Pollitt and Bouckaert (2011: 9), one of the weakest areas remains the disintegration of water service management in regulation and administration. The institutional complexity and disintegration of water problems cause an enormous challenge to governments. In addition, the connection between policy-making and execution is unclear and regularly it is also contrary and unexpected, with unknown application normally leading to the creation of new policies (Iglesias *et al.* 2011; Förster *et al.* 2017).

The understanding is that governance was developed since the entities identified their interdependency and reliance on each other, recognising that the activities of one may influence the operations of others. Moreover, water governance was formed due to overlying jurisdictional regulations, various decision-makers and administrators, contending interests, and uneven allocation of resources, along with societal and environmental effects, as well as reservations about the imminent future in a speedily moving world. However, Muller (2014) posited that there would always be a challenge to obtain optimal institutional representations, since public organisations are task-oriented and frame issues and potential solutions they are dealing with through their mandated responsibilities. The same institution therefore develops individual procedures, instead of combined multiparty operational procedures, even when this makes cooperative actions more difficult. Separately, authorities and government officials demand control and centrality of which practically will be unable to avoid the complexity during the stages of making policies and application they initiated (Dewulf *et al.* 2009; Dewulf *et al.* 2011).

There are various dangers and unpredictability on matters of making decisions regarding water planning, execution and management because of various reasons (DWA 2013; Loucks 2011; Shamir 2002). These risks and ambiguities accrue due to the method of conveying water to areas where it is wanted, in a consistent manner and at a sensible fee, in ideal conditions and quantity (Loucks 2011). Water is required for several users and uses, that usually compete or have contradictory benefits, while meeting social and environmental requisites. The added strain of uncertainty and variability in water reserves, as well as demand

because of many factors such as the season, climate, weather, contamination, and transportation and purification expenses.

Additionally, societal, ecological, and commercial aspects influence these choices and decisions, however, they cannot be projected with confidence (Loucks 2011). The outcomes of any decision made may immediately vary, producing unintended consequences because of the multifaceted nature of water supply methods. An additional problem with choices and decisions made is that its effects are regularly long-lasting and widespread (Backeberg 2005; Bakker *et al.* 2008; Koelble and Siddle 2014).

Decisions on water issues are frequently addressed independently, rather than in an all-encompassing tactical framework that extends to entire economies, the environment and humanities. The choices and outcomes are disadvantageous to individuals, groups, or sectors' ability to integrate their knowledge and encourage their opinions, hence, the circle of sustainable actions continue. The decisions and pronouncements become weakened by misleading information, the inability to integrate applicable opinions, and inadequate support from institutions that were not engaged, regardless of the motive for not engaging.

What usually transpires is that those decisions and pronouncements are challenged on the grounds of the promotion of justice and administration (Camkin and Neto 2016). Politicians, public servants, water sectors and various decision makers and entities, such as catchment management organisations, appreciate their responsibilities to deliberate on information in making their choices without fear or prejudice. Stakeholders have the right to information to support and guide the various forms of scientific, traditional, and communal knowledge (Ekane *et al.* 2014).

The complications of water interrelationships amongst actors and institutions, with their unending dynamism and growth, have been understood insofar as governance discussions are typically applied to a certain level, with the supposition that its application therefore, remains theoretical in nature. Concerns raised relate mostly to the advancement of approaches and ideologies, and

worsen when an attempt at execution is made or during the implementation stages. Time and time again, it has been advocated that the structure of controls and roles suggests the need for cooperative governance, mainly where water services are concerned because it impacts various sectors (Bakker *et al.* 2008; Brandenberger *et al.* 2015; Beck *et al.* 2016).

The process of local planning must, preferably, consider the combination of all proportions and subdivisions, including WaS, human settlements, health, pollution control, along with rural and urban planning and development, environment and conservation, and economic and infrastructural development. Regrettably, the IDPs for local and district municipalities do not adequately permit integration and positioning of authorities with their roles and powers, which is additionally confused by the limited knowledge in the application of law in cross-sections, across sectorial management, with programmes effectively completed; notably the WSDP. According to IFAC (2013), proper governance is an imperative element in the entire government as it validates that municipalities not only assure decision-making but also ensure competent usage of resources, while it also fortifies municipalities' answerability for the stewardship of public possessions.

3.7 Integrated Water Resource Management

Researchers and practitioners proposed the IWRM as an answer to the disintegration and inadequate cooperation that transpires when decisions involve various political, administrative and all other sector boundaries (Nojiyeza 2014; Movik, Mehta and Manzungu 2016). Lange and Hassan (2007:120) commended that the IWRM necessitates complex interactions among different elements of the hydrological cycle and between fresh water systems, the surrounding biophysical and socio-economic environment; all should be taken into account in managing and planning development and use of water resources in the country. In other words, IWRM facilitates the effective cooperation and coordination between agencies involved in managing different aspects of water and related resources for various purposes, including poverty reduction and environmental health.

SA, therefore, adopted the principles of IWRM from the NWA, 36 of 1998, which comprise collaboration and inclusiveness of everybody in the country, in order that everyone is empowered to partake actively in WaS services. The interpretation of IWRM is along international thinking that endorses the coordinated progress and administration of water, land and related resources, to increase the consequential economic and societal well-being in a reasonable manner, without surrendering the sustainability of vital ecosystems (DWAF 2004). According to Nojiyeza (2014), the benefits of implementing IWRM are positively distinct, stating some as: water security, efficient and effective demand management, pollution control, as well as good quality and improved waste management.

Although SA is held to be the main country in the world to propagate laws that use water to achieve societal transformation and focus attention on the environment and social justice, water sector reorganisations have not been an outstanding victory, nor have they halted the water predicament (Siebrits *et al.* 2014). Moreover, IWRM and water governance values generated serious deviations where policies, regulations and establishments are concerned, with SA yet to implement a water discrepancy that necessitates crucial management, mitigation and interventions.

3.7.1 Implementation of IWMR in Municipalities

A report that observed the municipal application of IWRM in the Southern African Development Community (SADC) region by Nyagwambo, Chonguiça, Cox and Monggae (2008), concluded there is inadequate participation of municipalities in IWRM. IWRM organisations are insufficiently accessible to municipalities, and municipalities are normally inattentive with accomplishing WaS targets within their local borders and therefore, IWRM problems fall off their agenda.

Nyagwambo *et al.* (2008) further observed how municipalities roles and duties in IWRM were neither properly abstracted, nor coordinated. The contention is that the enhanced endorsed frameworks, strengthened monetary provision, healthier information management, and increasing responsiveness, as well as targeting

training on management methods and instruments, are compulsory in tackling the missing connection among capacities, requests and aptitudes at local level and in decision-making on advanced administration levels (Nyagwambo *et al.* 2008; Denby, Movik, Mehta and van Koppen 2016; Movik *et al.* 2016).

It was determined by Nyagwambo *et al.* (2008) that municipalities are not officially appointed as the administration body to head implementation of the IWRM programme and it would not be realistic, seeing that their focus is completely local, whereas IWRM matters transcend municipal borders. Moreover, Pollard and du Toit (2005) observed that, at that time, municipalities in SA had a restricted duty within the management of water supply. However, they have a high interest in water resource management, as in rewarding their several directives, such as water provision and its planning, as this is where their accomplishments depend. Furthermore, their activities have an influence on water resources because they are both handlers and contaminators of water. Notwithstanding this meaning, little determination has gone into emerging real-world customs, for municipalities to participate in IWRM and to implement the framework in their actions (Alba and Bolding 2016; Denby *et al.* 2016; Mills-Novoa and Hermoza 2017).

Although it is expected that a municipality should govern WaS according to the principles set out, the researcher established no evidence suggesting that principles of IWMM are clearly applied or supporting how they are applied and what the results are. Considering this statement, the study will continue with local government processes, excluding IWRM. Furthermore, the delivery of services in municipalities is the same, regardless of what services they deliver, as there are standard service delivery tools and plans.

3.7.2 Limitations of IWRM

IWRM obtained continuous support from academics, agencies, and worldwide pronouncements, regardless of the difficulties encountered by various emerging nations owing to the limited applicable supportive institutional frameworks (Wang *et al.* 2012). Cohen and Davidson (2011) acknowledged that although IWRM

deals with varying issues central to the suitable planning, operation and organisation of drinking water supply services, there is limited indication of the application of IWRM ideologies in the WaS sector because IWRM is normally professed as a river basin management concept. Moreover, the IWRM concept is typically excluded because protagonists do not offer acceptable direction on how it should be merged into strategies, nor its development, thus impacting managerial decisions (Alba and Bolding 2016).

Other critics of IWRM claim it is limited in its real-world application currently and or in future practices, due to its deficient viability, with government departments still separated in executing their duties (Biswas 2018; McDonnell 2008; Mukhtarov 2009; Saravanan *et al.* 2008). Concerning economics, criticism includes that IWRM lacks scientific data detailing features constituting economic and social welfare. Moreover, the information is sketchy on matters of equity, sustainability and vibrant ecosystems. IWRM is largely not practical to apply and execute in any sphere of administration and even less so in decentralised municipal structures. Leaders in political organisations claiming to be experts in the arena regularly exploit the important guidelines that are pre-conditions for the application of IWRM. The general practice is that there are diverse plans for various related sectors. The division in managing environmental sector establishments' fragmentation of water establishments, is the foundation of institutional confrontations and the formation of the local few that manipulate the underprivileged.

This is demonstrated by the fact that even inside the DWAF there are recognisable and official disconnections reflected in policy between water resources and water services. The understanding is that within DWAF, water services is managed through set of policies and relevant institutional arrangements, such as municipalities and or WBs, while the water resources sections are administered through a different set of personnel, policies, and institutional settings that involve Catchment Management Areas (CMA) or Catchment Management Forums.

The two units at DWAF are believed to have not been collaborating on their tasks, especially when creating tools, such as policies and organograms, hence, disengagements were reflected on the ground. The bigger problem was in terms of institutional tasks and related boundaries that direct construction, as well as the planning of agendas and application thereof. By default, municipalities cannot interfere in matters of water resource planning, whereas the immediate discourse concerns the requirement for municipalities to accomplish responsibility for WaS, necessitating them to have relationships with the water resources section, in terms of insight in decision-making (Lawhon and Makina 2017).

Nojiyeza (2014) reflected on and summarised blockages in the application of IWRM as the unwillingness to transform and modernise with time, the inadequacy of instruments for systems integration, the hardships of realising operative water governance, and the authority of water administrators that perceive themselves as water experts but who are either deficient in knowledge of water resources or their systems are unsustainably exacerbated by high expenses of operation as well as maintenance. It is accepted that the role of IWRM in strengthening operations of water service and introducing municipal and governmental improvements across SA is irrefutable, although its application has not achieved the original prospect of creating an all-inclusive strategy as an answer to national water service problems.

Madigele, Snowball and Fraser (2015) posited that water services restructuring might collapse on a broader socio-economic feature, for example, inadequate funding, political uncertainty or the intrusion of international drivers, such as market policies, 4IR or even climate change issues. The involvement of beneficiaries in water service establishments coupled with their decision may be the foundation to the success of IWRM, however, currently the mechanisms of financing IWRM institutions and programmes are few and far between and there has been no meaningful transformation. It is regrettably noted that the disapproval concerning the deficiency in concrete developments associated with IWRM application has been in evidence for some time (Allan 2005; Biswas 2018; Blomquist and Schlager 2005).

3.8 Municipal Water and Sanitation Service Plans

The principal tool in water services planning is the WSDP. The WSA is obliged to develop and approve a WSDP every five years, which is reviewed yearly (Thabethe 2011). The content of the plan must include physical, social, economic, and financial, as well as environmental and institutional characteristics of water services delivery of a certain WSA area. The WSDP encapsulates all the tasks and responsibilities required in water service delivery and presents a medium-term planning horizon.

In addition to the WSDP, a municipality is required to adopt a Water Master Plan (WMP) and Sanitation Master Plan (SMP). These two plans provide for a long-term planning horizon of 20 to 30 years. Such long-term planning is necessary, considering the time lags in developing water services infrastructure and increasing scarcity of the natural resource. The NWA demands that a WSDP must be part of the IDP, to prepare for planning of delivery and extension of water to all areas.

The targets and or purpose included in the plan must be aligned with societal customs, national or provincial sectoral strategies and observe the IDP framework of the district municipality. Section 26(b) of the Systems Act states a municipality is required to assess the existing level of services in the municipal area (Schreiner 2013). This may lead to the planning of the expansion of water and/or sanitation networks. In addition to a WSDP, Municipalities have to adopt an IDP that will mirror a valuation of prevailing levels of development in those municipalities with limited access to basic needs; it should serve as proof to other spheres of government that a municipality is exercising due diligence in managing its water services. A municipality approves an IDP for a 5-year period and reviews it annually (Fuo 2013).

3.8.1 Integrated Development Planning

The IDP is a municipal planning tool that narrates a declaration of purpose, strategies, programmes, and municipal arrangements and practices, as well as observation methods, assessment and financial movements. These are all-

inclusive, comprehensive strategies that direct the future growth of the municipal area, providing guidance to both the municipality and various spheres of government operational in the area. Moreover, it must encompass a spatial development framework, spending priorities and projects to be executed over a 5-year period (Dlamini 2013; Mbili 2015).

Critics of the IDP always evaluate whether it has produced more integrated and participatory ways of working, a more joined up government, a more strategic framework, or a better organised structure for achieving developmental goals. Moreover, the question arises as to whether this integration has led to more effective delivery of services and to more effective responses to problems, such as poverty and spatial fragmentation. In response, Resnick (2014) determined that it will take a very long time to produce clear answers.

However, a study investigating the implementation of an IDP at the UDM, revealed that the municipality was not executing the plan efficiently (Dlamini 2013). The study showed that planning was not appropriate within the departments, the IDP was not harmonised with the budget, later developing a deficiency and incapability to successfully deliver plans, while there were also limited personnel within the IDP section. The study also found inadequate participation of other senior managers in the formulation, to the point where it had not descended to lower levels of employees. The periodical reports regularly presented were only for the purpose of compliance and were, therefore, not thoroughly reviewed to ensure they aided and worked as primary pointers of poor performance and aligned with the established goals (Dlamini 2013).

In the year 2015, Mbili undertook a study to assess the application of the performance management (PM) system within the UDM. The recommendation was that certain instruments must be set to ensure that the budget was a result of IDP projects and to guarantee appropriate configuration between the IDP and various sector plans. Mbili (2015) revealed that the UDM has not used PM as a device of providing service to all, instead, it is conducted for submission purposes, whereas the effects are impossible to gauge. The service provision

results are thus negligible, however, should PM have been accurately applied, it may have been seen to be a perfect instrument to advance service provision.

Resnick (2014) found that IDP application is fruitful in cases where it delivers the envisioned outcomes, such as enhancement and quickening of the delivery of crucial amenities and municipal advancement. In addition, Maphunye, Tshishonga and Mafema (2014) concluded that the disappointment of SA municipalities to solidify maintainable, straightforward services to its peoples, originates from the non-alignment of economic, societal growth approaches with IDP within the municipality, as well as cadre placement, nepotism, maladministration and mishandling of money within local establishments, this includes greediness, dishonesty and values of self-enrichment amongst municipal officials.

3.8.2 Service Delivery and Budget Implementation Plan

Each municipality should possess an operational plan that is at municipal and or unit level (Hinton 2012). This operational plan is termed a Service Delivery and Budget Implementation plan (SDBIP). The SDBIP gives effect to the IDP and the budget of the municipality (Mdanisi 2010; Imuezerua and Chinomona 2015). Basically, the SDBIP is the administration instrument to execute annual targets, but divided into trimesters, with monthly budget goals, which ultimately connects service delivery throughput with the overall budget of the municipality. This specific plan is detailed and gives reliable administration information, as well as the efforts, including monetary resources to be applied. The SDBIP must additionally detail spending information for both capital projects and ordinary service per municipal ward, in order that each of the outputs can be broken down per ward, to support ward councillors in service provision figures to be relayed to residents (Vatala 2005; De Visser 2007).

Municipalities are mandated to ensure conversion of service ideas into action (Brouwer, Tesfaye and Pauw 2011). Consequently, the functioning strategy demonstrates the manner in which results such as enhanced service provision can be achieved, along with better promises on the part of the labour force, and

refining levels of client fulfilment. The SDBIP similarly allows the council to evaluate the running of the municipality against quarterly goals. Additionally, the presence of functioning strategies aids auditors to assess performance in the planned objectives (Vatala 2005; Municipality 2013).

The Municipal Finance Management Act (MFMA), Act 56 of 2003, clearly states it is the responsibility of the mayor to harmonise the budget development method with various vital planning tools, such as the IDP (inclusive of the WSDP) and the plans must be aligned with accurate future income and disbursement forecasts. An appropriately articulated SDBIP guarantees that suitable data are distributed internally and externally for determination of evaluating implementation of the budget, performance of senior leadership and accomplishment of the strategic objectives set by council. There is inadequate effective methods or frameworks in place to direct and enable the application of the continuing schemes and programmes. PM of the IDP in most municipalities is principally obsessed with distinct routine, through the SDBIP and the Human Resources (HR) department of the municipality managing scorecards.

Imuezerua and Chinomona (2015) pointed out that the SDBIP assists as a contract between the administration, council and the community, over the pronouncement of objectives and purposes customary to the council, as measurable consequences that can be effected by management within a year. However, observing service delivery protests in SA regarding service provision is an indication of the deficiency in application of frameworks to guide and facilitate the implementation of projects and programmes.

3.8.3 Service Delivery Improvement Plan

The Service Delivery Improvement Plan (SDIP) is the guiding instrument in measuring sustainability and continuity that is effective and reliable in the gradual enhancement of service provision. This instrument provides a foundation for issuing information on the standard of service, as well as the Service Delivery Charter (SDC), which encourages all community groups to join government department activities. Moreover, the purpose of the SDC is to preserve service

delivery standards and fast-track transformation of the municipality from a rules-bound administration, to one that employs an outcomes-based method (Wilson 2012). Where service delivery standards help to measure the level of achievement in objectives, the responsiveness to society's wishes are addressed effectively and efficiently (Cameron 2009).

According to Dlamini (2013), municipalities must ensure that members of societies have access to their services, through IDPs and SDBIPs. In addition, Public Service Regulations (PSR) promote the execution of Batho Pele principles (BPP) by creating a platform for the establishment and through synchronisation of SDIPs by municipalities (Wilson 2012; Tomkinson 2017). In terms of PSR, municipalities should develop and sustain a SDIP, produce yearly accounts regarding municipal commitment that set out service standards to be expected by citizens, and clarify how those service standards will be realised. Consequently, municipalities are anticipated to deliver quality services with utmost value-for-money by framing measurable objectives, through the use of existing resources.

3.8.4 Quality of service delivery in municipalities

The Water Services Act, 108 of 1997, regulates the standard of WaS provision. In addition to regulation, service delivery models are applied to accomplish outcomes that are inclusive, effectual, and of quality, which also contribute to an independent social order. This is founded on the values of the 1994 White Paper, constitutional, legal and international obligations, the Service Charters, and the BPP that inform the municipal service delivery directive.

Furthermore, the above policy framework established the standards for the quality of service South African people should demand and expect, and its approval caused residents to be defined as clients of the service (Sureshchandar, Rajendran and Anantharaman 2002; Moletsane *et al.* 2014; Cheruiyot, Wray and Katumba 2015). However, Thomas (2017) contended that residents can only be perceived as beneficiaries and not as clients, due to people being co-producers and active beneficiaries of municipal services. Therefore, it is vital that

administrators appreciate the dynamic part of consumers in determining service standards essential to achieving their requests.

Consumers of these services have their understandings and perceptions of encounters in dealing with the WSA. As a WaS stakeholder, they register their degree of gratification and or disappointment with service quality through numerous available channels (Mashamaite 2014; Mbecke 2014b). The nature of stakeholder reaction in a developmental framework of SA is significant in re-thinking services, as well as in redesigning attributes of superior service. According to Mbecke (2014b), there are numerous factors shaping the perception of valuable service, to the point where the assessment of service offered informs municipalities of the degrees of approval and or dissatisfaction with services.

It has been observed that local government is in trouble in offering services. Regular demonstrations are associated with service delivery caused by massive infrastructure backlog, such as roads, housing, water, and sanitation, as well as bad fiscal management and the failure to effect appropriate approaches, diplomacies, and plans. The inferences made from various communication media such as newspapers, radio, social media, and television about claims of society regarding sub-standard services offered by municipalities have intensified. Municipalities are continuously in the news with various areas where societies make forceful appeals for better services (Akinboade *et al.* 2014; Mashamaite 2014). The meaning of good service delivery, when considering the image that citizens have of the government, is not always valued fairly (Pretorius and Schurink 2007; Burgess, Propper, Ratto and Tominey 2017).

The basis of providing services is not supposed to be understood or linked to transactional activity. However, many cases have turned into transactional activities, because citizens refuse to vote, or cease to interact with administration methods when they perceive that reproaching of service is disregarded. Societies believe government representatives ought to demonstrate high degrees of answerability and be responsive in offering services. The demonstration of sensitivity and answerability in carrying out service influences loyalty of citizens

and collaboration with government and its processes. The constant adverse disapproval of services, regardless of the experience or allegation, is reduced, with the manifestation of faithfulness and support demonstrated throughout the voting period (Pitlik and Kouba 2015).

Voters do not associate themselves in terms of their faithfulness to party-politics but associate and admire the grades and outcomes of municipal programmes in a governance mission that embraces characteristics of societal involvement in facets of policy developments. Disapproval offers an opportunity for municipalities to be pragmatic in addressing growing service delivery matters, so as to regain conviction, polish and sustain relationships of decent governance between citizens, officials and the political groups, in trying to maintain political stability (Oikkonen and Luoma-Aho 2015).

The municipalities are collectively pressured to prove they are offering customised packages and demonstrate enhanced performance. The quality of service provided to communities, as well as fulfilment and value are the fundamental concerns of municipalities; to the point that various initiatives being developed are taking an interest in refining service quality provision. The important problem is that residents express satisfaction or dissatisfaction and communicate their feelings through word of mouth. This form of communiqué is a formidable component in forming an opinion regarding service quality that will, subsequently, determine the image of the municipality. Therefore, the level of quality provided by municipalities may determine the difference between victory and its collapse.

3.8.5 Partnerships as an alternate service delivery approach

Chapter 8 of the Municipal Systems Act, (Act 32 of 2000) provides flexibility to municipalities to adopt an alternate approach to service provision by means of municipal service partnerships. Active participation of citizens through alternate service delivery mechanisms poses different obstacles and benefits for communities through partnership projects, outsourcing, public-private partnerships and privatisation. In this case, the WSA may choose to outsource

or enter into contractual agreements with another WSP that could be a public or private body, which opens opportunities for quasi-government bodies such as the WBs.

The municipality is the legal entity with whom authority to engage contractors lies, as it is ultimately accountable for service provision to its consumers. This includes participation of non-governmental organisations (NGOs) and community-based organisations or for the private sector to be contracted through a service delivery agreement between the service provider and the municipality. However, according to Effah, Ameyaw and Chan (2013), governments lacked the capacity to manage contracts. It is argued that there is a lack of clarity and change of policies, SCM policies in particular do not bode well for long-term contracts.

Effah Ameyaw and Chan (2013) recommended managing the transition of pricing from a state-subsidised model to a market-driven, private sector model, while ensuring there is a viable market for the services being rendered through Private Public Partnerships (PPPs) is critical. The state does not solely present guidelines to encourage equity and fairness, it also develops proposals highlighting public-private partnerships to encourage private companies to work together with municipalities in providing services. There is an increasing trend from municipalities in finding ways to engage privately-owned organisations in the role of service delivery programmes. People currently require more from the WSA in terms of high-quality service delivery. The assumption is that the private sector offers high quality, when compared to municipalities (Slabbet 2016). It is believed that the Umgeni WB provides superior quality to that of the UDM.

3.9 Citizen's Charter

In general, the degree of satisfaction with the WSA is low, regardless of the fact that various departments implemented service delivery promises and service charters that outline the expected levels of service (Mbecke 2014b). Thomassen, Ahaus, Van de Walle and Nabitz (2014) are of the view that service charters are positioned between the node of public administration reforms and government

initiatives to improve citizen trust in governments. Their views are founded on the understanding that a citizen's charter represents systematic efforts of public organisations towards citizens or clients, relating to the standard of services, information, choice and consultation, non-discrimination and accessibility, as well as grievances, redress, courtesy and value for money.

The Citizen Charter forms part of the local government service charter and describes services to be offered and ways in which it will be presented, highlighting enhancement of productivity and efficacy in conduct related to service delivered (SALGA 2021). The Charter aimed to raise standards and facilitate changes in the organisational culture, which must be supported by changes in management structures, in systems, and in operational procedures. Harrison *et al.* (2013) stated that organisations today face complex, rapidly changing and unprecedented environments

and local governments are not exempt. SA municipalities face enormous challenges to sustain water service provision and so realise government objectives to spread quality services from a fairly small population in 1994, to the entire and increasing population.

According to Mofolo and Smith (2009), the crucial features of good governance are transparency, accountability and responsiveness of the administration. Charter programmes were early government efforts to encourage quality improvements in the public sector because it was, at that point, evident that public administration should go beyond the policy of searching for efficient mechanisms of service delivery but to empower citizens and employees through improving service delivery and applying quality initiatives (Otteng and Jagero 2014).

However, after observing and reading about service delivery riots arising from local government, it is safe to generalise that Citizen Charter initiatives, as an answer in the pursuit of resolving day-to-day difficulties of community encounters, have not been realised. Citizen Charters as catalyst in raising standards of service and performance across the range of public services, is not effective. The fair judgement is that SA is not transformed because the criteria of effectiveness

in service provision are not in line with the basic requests of all people. Service charters are intended to refine customer fulfilment and inspire the operative use of taxpayers' money. The Citizens Charter, as a commitment tool by the state, supposes that society will be supplied with information and representation as a guide, in the event of service standards failure. The state is unsuccessful in implementing its vow to defend the rights of the citizen, in agreement with the Constitution of the Republic, and as set out further in the Bill of Rights (Heleba 2011; Otteng and Jagero 2014).

3.10 Batho Pele Principles

The collective demands of community groups, coupled with frequencies of ferocious demonstration against poor service delivery, has highlighted the necessity to do more. As a result, the BPP was introduced and hence, viewed as a response in addressing the needs of the protestors (Maramura and Thakhathi 2016). The BPP attempted to propel public employees to become accustomed to and pursue service excellency and pledge themselves to uninterruptedly provide service delivery. The guiding values for transforming service delivery demands are that citizens are given an opportunity to deliberate on issues and be furnished with information on service standards in an honest and transparent manner. Values such as redress, value for money, accessibility and courtesy also form part of the BPP.

Consequently, the mentioned principles are mandatory, considering it contended that a transformed municipality is measured against its pledge to constantly improve service delivery. The BPP serve as a mechanism that encourages citizens to hold public servants accountable for the level of service delivery received and as a blueprint for the quality improvement. The strength of this method lies in the collaboration formed when significant essentials are combined to supplement activities of local people, together with the resources and possessions to which they have access to (Ngidi 2013; Ngidi and Dorasamy 2014).

Mashamaite (2014) stated that public services are considered inadequate in transparency and openness, as well as in the provision of accurate and simple information on services and standards, along with thoughtlessness to customers and poor service standards, amongst others. The use of the country's BPP (Africa 1997) as a monitoring and appraisal framework, as well as the sub-standard of quality of services in municipalities, minimise public discontent and provide a platform to understand issues of poverty, joblessness, inequality and inadequate service delivery (Maphunye *et al.* 2014). This is due to the disconnection between municipalities and local residents, weakening the potential of this sphere to accomplish its constitutional, democratic and developmental directives. The substantial reliance of people on government as the single provider of basic services (water, sanitation, housing, electricity) is further queried, stating that it is worrying, considering government alone is incapable of meeting its mandate. This can be attributed to numerous factors, such as limited monetary means and the inability to employ a capable, conversant workforce. Noteworthy is that service provision in developed countries is not the duty of government alone, it is shared with privately-owned organisations and civic society groups (Gong, Jiang and Leung 2019).

Achieving suitable tools to measure quality carries with it the subject of monitoring and assessments, since these should be considered prior to and throughout the period of service rendering. Paradoxically, appraisal and reflection instruments are seldom applied in improving quality in SA's municipal services. The records logged by municipalities and intensity of service delivery demonstrations in SA illustrate disappointment in government's attempts to transform municipalities and the ineptness of the BPP to influence service delivery inadequacies. Moreover, residents appear to also direct their dissatisfaction about the failure of municipalities to involve societies in the governance, as well activities of the local government (Mashamaite 2014).

The BPP comprise a thoughtful policy to instil an accountability ethos and caring practices by public stewards. Officials are required to be oriented on service, attempt service superiority, and commit to unceasing service delivery perfection.

Some argue that the BPP are central to government's existence, however, government officials perceive it as an additional load to everyday operations, possibly because senior management have referred to the BPP as a separate tool that is non-core business. Whereas BPP should be fused into the municipal strategies guiding them, it should be an accepted practice to use the BPP to advance institutional strategy (Mofolo and Smith 2009; Maphunye *et al.* 2014).

3.11 Water efficiency

It is not enough for water service providing institutions to produce enough output to satisfy the demand for water services, as this production also needs to be accomplished through the minimal use of raw materials, labour and other available resources (inputs). Moreover, the efficacy in the use of water optimises the minimising of water losses throughout transportation, storage and usage. Dlamini *et al.* (2011) stated that domestic usage and irrigation schemes lose water, with average percentages of over 50 percent and 70 percent, respectively. There are several diverse practices of intensifying efficiency in water usage, starting with flushing toilets designed to save water, and minimal flow drip irrigation schemes, to fees that encourage demand reduction and reconsideration of innovative technologies (Gleick 2003; Ghosh, Kansal and Aghi 2016; Yu 2016). According to Sousa, Ribeiro, Muranho and Marques (2015), future demand of water requirements might be met merely by improving efficacy and with existing water supplies.

It was established in Chapter Two that SA is a dry state with inadequate water reserves, though it uses more water per capita compared to some of its drier neighbouring states, such as Botswana and Namibia (Hedden and Cilliers 2014). In addition to this, it is approximated that almost 37 percent of water is categorised as non-revenue water, indicating losses through physical leaks and commercial losses, as well as unbillable authorised consumption, such as water used in firefighting (McKenzie *et al.* 2012; Mwelase 2016). It is acknowledged by McKenzie *et al.* (2012) that this loss is at a comparable level to the international norm, however, it is much higher when compared to similar water-scarce nations, such as Australia, which loses ten percent. Given the problems associated with

water use in society, it is expected that developing, distributing and handling water impartially and competently, while ensuring environmental sustainability is achieved, will not be an easy task. It necessitates the consideration of different voices, appreciation of joint decision creation by shared waters, as well as usage of scarce monetary and human resources.

In order to satisfy demand amongst water services users for greater efficiency in its provision, it is necessary that inefficiencies are identified. One of the ways of alleviating water scarcity is by increasing the efficiency of water use. World-wide, public sector organisations and municipalities are under pressure to improve quality, efficiency and service provision, partly due to tight budgets, new environmental laws and local residents demanding improved services (Burke, Carrillo and Vakharia 2007). An extensive range of equipment, guidelines and administrative systems exist that can be used to ensure objectives are achieved within explicit conditions, period and place (Rogers and Hall 2003).

With taps the most generally used water instruments in households, the recommendation is to design taps to avert wastage of water. Mehta *et al.* (2012) warned that taps may perhaps be the generally used water-fitting instrument, however, it is selected based on price or visual preference. The aerator-controlled instruments, such as an aerator shower, are made to reduce water usage and proven to be an efficacious water saving method. The minimisation of water loss comprises infrastructure designs, construction and operation and maintenance systems, not forgetting user behaviour, such as leaving taps open or not repairing broken taps. Improving the well-organised use of water also includes demand management, re-use, and overview of water-saving procedures (Mehta *et al.* 2012).

3.12 Effectiveness of Water Management

Effectiveness is the accomplishment of goals and efficiency is the ratio of effective output to the input required to achieve it. On the one hand, efficiency can be broadly measured from activities conducted accurately, whereas effectiveness, on the other hand, relates to doing the right thing. Effective water

use consists of minimising the loss of water, an increased culture of conserving water, while supporting the proper allocation of water over ideal beneficial use, and equitable access, as well as monetary competences. Application of integrated demand and supply methods, with knowledge to minimise and achieve sustainable usage of water, achieved through regulating environmental ruin and attainment of adequate quality, as well as a compromise of founded choices that reflect home-grown requirements, are all illustrations of effectiveness in water use related to services (Rogers and Hall 2003; Crossman *et al.* 2013).

3.12.1 Tariff policy

The Local Government Municipal Systems Act, 32 of 2000: Section 74: 107; and the MFMA, 56 of 2003, as well as Section 4 of the NWA, stipulate that municipal councils ought to either approve and execute tariff policies concerning fee levying for services provided or do this through techniques of service delivery agreements. The guidelines on tariff setting are that a tariff policy must reflect at least the service rendering related expenses, which include but are not limited to capital, functioning, upkeep, and administration and auxiliary costs, along with interest charges. Furthermore, charges must be determined in examining the fiscal sustainability of water supply, considering various grant subsidies associated with that service. Lastly, tariff charges should distinguish between diverse groups of users, debtors, service providers, and service standards, as well as geographical zones and other material substances, bearing in mind that variation should not be biased (Hambira and Gandidzanwa 2006).

Currently, the pricing plan is incoherently applied in the country, mainly because of historic conditions with irregular progression (DWA 2002). There is significant variation in charges and these charges are not based on the volume of water used or the capital budget (Mulder 2006; Mashitisho 2017), to the extent that operational processes and caring for infrastructure have been worsened, notwithstanding government grants (DWA 2015/16).

According to the DWA (2015/16), the effects of charging low fees for water service is that it encourages surplus consumption, and influences scarcity of

water. The DWA approach is that when there is scarcity, water fees should increase to correctly reflect the scarcity of water and to completely recover management expenses. The other recommendation is to establish an economic regulation (or independent regulators) of water charges in SA. The danger of low charges includes the possibility of a sudden increase in the event of deficient quantity or quality (Zetland and Gasson 2013).

In trying to resolve the above mentioned problems, the DWA reviewed the pricing plan linking tariffs and expenditures, with the aim of recuperating the full expenses related to water expansion, as well as reliable provision (DWA 2015b). The DWA recommended application of proper pricing through billing and income collection refinement. Scheme-based pricing was recommended to match expenditure, possibly generate more money, and develop responsive financial guidelines throughout the water supply chain, from reservoirs to the consumption tap.

Mashitisho (2017) contended that a charge set by a WSA for a service must be designed to offer methods of controlling the volume of water supplied to each family and should be based on a volume supporting service practicability and sustainability. It would discourage uneconomical or wasteful use of water and consider the incremental price that would be sustained, in order to expand infrastructure size to cater for growth and demand.

3.12.2 Indigent policy

The degree and levels of poverty in SA homes compels establishment of an indigent policy regulating the delivery of predominantly free basic services, which impact mainly women, children, youth, and persons with disabilities, as well as the frequently ill and the old who are unable to pay for key services provided by WSAs, (Shah 1999; Moriarty *et al.* 2004; Jemmali and Sullivan 2014; Fosu 2015). Earle, Goldin and Kgomotso (2005) posited that the FBWP, announced in December of the year 2000 during municipal elections, represented an effort to progressively realise the right to sufficient water. This policy provides a bridge between the need for equity and redress and the goal of economic efficiency.

The application of the free basic services policy is within the intergovernmental arrangement that focuses on improving capability, productivity, efficacy, and sustainability, as well as answerability of the WSA (Giné Garriga and Pérez Foguet 2013). Essential water supply is defined as the prescribed minimum standard of supply necessary for a reliable supply. The free basic services policy commits to free services to indigent households, providing a minimum of six kilolitres of water per household per month, within a 200-meter radius of the household and at least a VIP latrine/sanitation facility (Water Services Act, 108 of 1997). Even though many municipalities have adopted and implemented the FBWP, in rural areas many under-resourced municipalities are still finding it difficult to provide these services (Tissington *et al.* 2008).

The WHO estimated that access to 25 L per person per day (pppd) is a minimum to maintain life, however, the enjoyment of a healthy life requires much more. Research by the South African Municipal Workers' Union (SAMWU) concluded that the amount of water needed to meet environmental health concerns is 63 to 110 L pppd. The estimate does not include water used for subsistence gardening or the operation of small businesses, which are practices that are often essential for the survival of the poor (Heleba 2011; Marson and Savin 2015). The above statistics imply that a FBWP limited to 25 L pppd, will not ensure every person has access to sufficient water.

The exact amount of water required to enjoy all rights in the Constitution vary depending on circumstances. These include the region of the country one lives in, the type of water technology a household has access to or whether water is needed for irrigation, as well as the quality and quantity of water to households, including informal households “to support life and personal hygiene”. It also signifies that water belongs to everyone and the definitive aim of managing water is to realise sustainable use of water for the profit of all users. The DWA (2015b) indicated that this right is subject to specific obligations, such as payment for services (over and above the basic amount) and the limitation and disconnection of the service in certain circumstances.

3.12.3 Water tariff structure

The charge of water has turned out to be a financial tool to correct the effectiveness of water provision, as well as supporting the sustainability of reserves (Nikolaou 2014). Global establishments, such as the UN, as well as the Organization for Economic Cooperation and Development (OECD) launched norms and standards that should be reflected on, when setting prices. These principles include expense recovery, environmental damages, the advancement of effective water use, as well as openness and societal welfare. However, there is constant disagreement concerning the level to which these aspects can manipulate charges (Binet *et al.* 2014).

Lange, Mungatana and Hassan (2007) are of the opinion that the water-pricing structure is founded on the values of impartiality, affordability and efficiency. Equity dictates that all citizens should have access to safe water to meet their basic needs. Affordability implies that people must not spend more than five percent of their disposable income on water, while efficiency implies that in urban areas, the full supply costs need to be recovered and that in rural areas, the operation and maintenance part of investment costs need to be recovered. Water is provided through communal standpipes and individual connections.

The proportion of affluent and underprivileged customers, as well as the consumption rate in an area, in other words, the percentage of few to many customers and the proportion between business and household customers, are fundamental to the practicability of cross subsidisation (WSA 2007). It is then worthwhile that organisational officials collect appropriate information on these features to allow good fiscal planning (WSA 2007). The essential methods to develop a justifiable tariff must not be in contradiction with the DWA's tariff plans and procedures. Though, raising income through cross subsidisation might be affected by the keenness and capability of higher income water users to pay above the normal charge of supply, in addition to the effects the price changes will have on water use; and finally, the necessity to reduce distortions to the local economy (Mashitisho 2017; DWS 2018). The standpipes are free in rural areas or attract a monthly flat tariff in urban areas. For individual connections, a

progress block tariff system is used by the entity to recover costs and reduce wastage.

In cases where water demand is not well-imposed and observed, the WSA can find itself with enormous unpaid amounts owed in unaccounted for water. Expenditure may also accrue from large volumes of treated water, whereas there is no revenue made to counterbalance those incidentals. The WSA must guard the total recovery of expenses with profit, while considering the notion of impartiality and the societal unbiasedness of prices. These two perceptions might create conflicts of interest between customers and utilities, which should be well-adjusted by regulators and authorities, making the design of water tariffs a multifaceted procedure that involves multiple aspects.

3.13 Monitoring of the Municipality

Auditing of municipalities remains one of the most important tools because of the unbiased opinions and impartial valuations of determining whether institutional possessions are administered sensibly and efficiently to realise planned outcomes. In addition, auditing improves organisational answerability and truthfulness, enhances operations, and instils assurance amongst stakeholders (Ajam 2014).

The office of the Auditor-General (AG) is an organisation recognised in terms of Chapter 9 of the Constitution, to fortify constitutional democracy in SA and was simply established to audit the public sector (Reichborn-Kjennerud 2013). The auditing of SA public-sector institutions, as well as State Owned Entities (SOE) is obligatory and a condition in terms of the Companies Act 71 (SA 2008), Auditing Profession Act 26 (SA 2005) and the Public Audit Act 25 (SA 2004). It is held by Hay *et al.* (2014) that auditing has lately experienced substantial changes, in response to changing business models, and at times, in response to dramatic failures of key business processes because of fraud and dishonesty.

AG Kimi Makwetu's report of 2017/18 indicated that municipal irregular expenditure had increased from R16bn in 2016/17 to R28.4bn in 2017/18, due to glaring governance, leadership and oversight lapses. The AG further stated that

the prospects of municipalities suffering a financial meltdown have put pressure on national government and triggered violent protests by communities angered by the deterioration in services. This report was in agreement with the Finance minister at that time, Nhlanhla Nene, when addressing parliament in May 2018, who stated that 112 municipalities did not have money to carry out service delivery plans for the financial year 2017/2018.

Moreover, the then Cooperative Governance and Traditional Affairs (CoGTA) Minister, Dr Zweli Mkhize, told parliament in his budget speech that there were approximately 87 dysfunctional or distressed municipalities, with only seven percent of the municipalities that are well functioning in the year ending 2017/2018. It was also highlighted that hardship is occasionally caused by maladministration triggered by political unpredictability, or intrusion, corruption and ineffectiveness. Furthermore, the minister reported to members of parliament that 27 municipalities received a disclaimer opinion from the AG of SA in 2016/17 (AGSA 2018).

Auditing is the foundation of good governance in public entities and audit opinions and or outcomes indicate the efficiency of monetary administration (Sarens, Abdolmohammadi and Lenz 2012). There is a positive correlation between functioning governance and audit outcomes and quality. Public entities with negative outcomes are characterised by regress, with irregular, fruitless and wasteful expenditure increasing by more than 70 percent for the year 2016/17.

According to the AG, this undertaking is unacceptable and has a damaging effect on the degree of trust, as well as assurance civilians have in the public organisation (Sarens *et al.* 2012; Neri and Russo 2014; Kumar and Sharma 2015; Fahami, Pordanjani and Mahmoudi 2016). This is evidence that the custodians of public resources are irresponsible in using public fund resources (AGSA 2011; Maroun 2015).

There is a necessity to build-up support from the general public in audited organisations, so as to corroborate arguments that public agents are answerable and transparent in using public possessions (Griffin and Wright 2015; Kumar and

Sharma 2015). AG Makwetu articulated discontentment with the non-compliance and deliberate disregard of advice from AGs, highlighting that for five years, municipal methods were worsening, becoming unaccountable, with governance problems having continued since 2011/12. The 2011/12 to 2017/18 municipal audit opinion reports emphasised the nonexistence of strong-minded and definite headship to attend to the absence of answerability, by demanding consequences against those who disobey governance procedures (Mailovich 2018).

3.14 King IV Report on Corporate Governance

The King Report on Corporate Governance remains the greatest summary of global practices in corporate governance applicable to all entities (Baker 2010). Although the King code is neither a legal requirement nor a mere best practice guideline, it is a comprehensive international corporate governance procedure. Companies are expected to comply, since compliance is essential to best practice (De Beer and Du Toit 2015). The King Report on corporate governance sets the framework for cooperative governance in SA, providing guidelines regarding financial performance, audit committees, stakeholder interest, and the balance of power and role of directors within the organisation and society as a whole. The framework emphasises accountability, discipline, transparency, and independence, along with responsibility, fairness and social responsibility, as characteristics of good governance (Mbecke 2014a).

To strengthen the principles of the King Report, the MFMA, 56 of 2003, came into effect. Once more, the emphasis was on accountability and transparency in the management of finances. The Act further states that headship must be engaging, consent oriented, answerable, and transparent, as well as responsive, effective and efficient, while also being equitable, and inclusive, and follow the rule of law. Haddon, Loughlin and McNally (2015) concurred, stating that good governance requires effective public financial accountability, good relationships between a country's governing bodies and its executive management, transparent decision-making, stakeholder participation, and ethical practices. Haddon *et al.* (2015) also pointed out that where there are effective relationships of financial accountability, performance is likely to be managed and reported fairly

and honestly. This, in turn, minimises systemic corruption; mitigates fraud, waste, and abuse in the use of public funds; and highlights breakdowns in the rule of law, so they can be dealt with appropriately and in a timely way. Despite all the efforts, the public sector is still faced with dissatisfied citizens about how they are being treated by the main delivery arm of government, which is the municipalities.

The landscape of planning continues to shift, with systems of support and coordination across three spheres of government being inadequate, manifesting itself in the types of interventions the government generates. The notion of ethical headship was deliberated in the King III Report, to the point that guidelines on ethical conduct to corporate leaders were established. The King III Report, in spite of being perceived as a document for privately-owned organisations, depicts various ideologies of good governance vital to the successful application of the public sector legislative agenda (Ramalho 2017). Values of good governance, with ethical headship, certainly influence the accomplishment and operative performance of institutions (Lawton and Páez 2015). Accordingly, there is strong correlation between good corporate governance and ethical headship (Groenfeldt and McKenna-McGruff 2013; Groenfeldt and Schmidt 2013; Lawton and Páez 2015).

Leaders of today are obliged to establish and implement faultless plans and operational superiority. The headship roles give directions through policies, executing them while providing oversight of organisational performance and displaying answerability and openness through disclosure. Honouring the above obligations, coupled with adoption of the King IV code, affords institutions with the essential building blocks for a thorough basis of good governance. It is common knowledge that municipalities are faced with ethical challenges, such as fraud, corruption, nepotism, and favouritism, in addition to bad governance and immoral conduct. These financial veracities signify demands for ethical headship and or role models. This might also be an indication of non-compliance by municipalities with the King report. Watch (2013) maintained that mal-administration in the SA government has opened the floodgates to unprincipled headship.

3.15 Causes of poor municipal performance

Notwithstanding the stipulations depicted in the SA Constitution, coupled with policy actions for municipalities, which have been espoused to deliver a well-organised service, substantial service delivery backlogs persist (SA 2017). Indication of breakdowns in water supply are escalating for various reasons that include a deficiency in political willpower, limited budget, insufficient funding, and lack of capability and competence, as well as inconsistent charges and accounting structures. The failure of municipalities and or WSAs to eliminate the longstanding backlogs is an indication and a determinant of institutional underperformance. The DWA (2016) posited that administrators blame this crisis on the fluctuating climate and regular droughts, with certain of these water snags being intermittent. Although, according to the DWA (2016), the affected water security problems of SA are ingrained in years of fragmented arrangements and administrative bias.

It is reasoned in this research that when WaS services do not accomplish definite obligations, it is an indication of failure in service provision. These requirements include backlogs in water service coverage and infrastructure rehabilitation and maintenance, as well as the standard of water service indicators as per NWA regulations. A study conducted by Ramutsheli and van Rensburg (2015) titled “The root causes for local government’s failure to achieve objectives”, highlighted many possible scenarios, nonetheless, the report indicated in a nutshell that service delivery is a complex issue that needs to be better understood.

In addition to these findings by Ramutsheli and van Rensburg (2015), enquiries regarding failure in the provision of service generally reveal that the tricky part is mainly the design and execution of plans suitable to the desires of the people. Numerous instances of programme fiascos are recorded officially in the literature and individuals communicate them casually on various platforms. SA has experienced a symptom-based management pattern, which primarily emphasises treating the symptoms rather than attending to the core causes.

The DWA (2017b) highlighted the underlying causes of poor performance at municipal level and or services authorities as follows:

- Limited capacity owing to insufficient workforce and fiscal resources to establish the necessary operational infrastructure satisfactorily and sustainably.
- Inappropriate deliberation of strategic management because of headship in water services, as well as the creation of suitable enticements and making use of possessions advantageously to optimise water service operations.
- Planning and scheduling do not apply in real-world scenarios, since policies established are not practical to execute and meet targets. Crucial baseline data are normally misplaced, distorting the goals and causing a mismatch between accessible resources.
- The propensity to focus on statutory conformity rather than on performance.

Fuo (2013) maintained that the WSA has an inadequate capacity of skilled employees, particularly in forecasting and project management. Inadequate capacity at the WSA is demonstrated by maladministration and irregular resource use that continue to be key restrictions on acceptable service delivery. In addition, lack of financial skills in running huge projects, such as water service projects, has been a major constraint in South Africa. Local capacity building could be further improved by placing more emphasis on the balance among local government responsibilities, their existing capacities and contextual realities, especially in the process of identifying and developing the ability of WSAs.

Muller *et al.* (2015) concurred with Fuo (2013) that WaS responsibility was given to municipalities, even though many of these municipalities did not have the necessary capacity and struggle to properly implement and manage these water services. This has led to service protests in many towns. However, Sutherland, Scott and Hordijk (2015) are of the view that the increasing debate in literature regarding the types of water policies and their effects, the roles played by

different actors in decision-making processes around water, the decline of water infrastructure in the light of the recent economic crisis, and the conflicts and challenges around water at different scales, are symptoms and effects of poor governance of water and underlying causes of WSA under-performance. It was further elaborated that there is bound to be some disconnect, because decisions are informed only by local issues, whereas water interests are global matters.

In an attempt to limit poor performance by the municipalities, the national and provincial government generated different types of interventions, with mostly institutional capacity to be implemented in the municipalities. These interventions took account of the potential and competency, or lack thereof, found within organisations. They also included HR's collective individual capacities, strategic leadership, organisational purpose and orientation, along with institutional memory, internal confidence, partnerships, and intergovernmental relations, powers and functions. Resources and support systems, infrastructure and financial abilities, as well as structures, processes, culture and bylaws are also incorporated.

3.16 Intervention made to Local Government

Government intervention strategies are implemented on local government to curtail challenges facing local government. The involvement normally comes from one sphere of the state in affairs of another sphere, to try and improve the adverse conditions, which is recognised and regulated by the Constitution. Section 63 of the Water Service Act states that the minister can request to intervene in a province, in terms of Section 139 of the Constitution, in the event where the WSA is ineffectively executing its mandated duties.

Nevertheless, in evaluating circumstances of whether to intervene, a provincial government must follow the principles of cooperative governance, while considering that intervention might be seen as a plain attack on the municipal institution's integrity and should be utilised as the only remaining option. Moreover, it must be considered that the autonomy of the municipality should not

be disturbed after intrusive actions, such as funding and solidification of the municipality's capacity, in the spirit of cooperative governance.

It is acknowledged that intervention might be needed in case of non-compliance and or when a municipality is unable to accomplish an executive obligation, as per the Constitution or legislation, such as delivering water to the public, therefore, a section intervention might be contemplated. There are different involvements from different spheres of government, such as Section 139, which does not wait for the total collapse of service provision. This type of intervention is warranted when there is failure in one functional area, for example in a unit of water supply, which might warrant intervention although the benchmark for involvement is because of the inability to deliver the minimum standard of service, as agreed by legislature or procedure.

Section 16(2) and (3) of the National Environmental Management Act provides tools, including a notice to rectify non-compliance or conciliation or arbitration, in cases of failure to observe the environmental statute or operation plans. Apparently, the tools and principles offer a platform for national or provincial government to issue notices in cases where a municipality does not comply with its WSDP or other developmental and environmental plans of significance for water services delivery. Should they be failing, Section 16(3)(d)(ii) permits the Director-General (DG) of the Department of Water and Environmental Affairs (DWA and DEA) to demand the appropriate Member of the Executive Council (MEC) to mediate, in agreement with Section 139 of the Constitution. Additionally, when the province fails to mediate, the minister may undertake the responsibility to execute that particular function, in order to continue meeting the critical national standards or to meet the minimum standards for service delivery. This is one of the few instances where the failure of provincial government to act or intervene may, in terms of law, trigger a reaction by national government (Dinar 2014).

The diversity of tools and apparently disjointed nature of legislation relating to intervention raises numerous questions, especially with regards to the

appropriateness of the system addressing deteriorating water supply facilities in municipalities. The hypothesis of authority might open the possibility for a total assumption of responsibility by provincial government, which is not official but it is through the back door. Section 34(3)(b) of the Structures Act does not specify which instrument of involvement must have been founded previous to dissolving the Council.

Where section 139 makes it clear that no intervention may affect the legislative capacity of the Council, the Structures Act provides for the dissolution of the entire Council. According to Christmas and de Visser (2009), this runs counter to the spirit of the Constitution by the grave inroad of section 34(3)(b) of the Structures Act, into the institutional integrity of local government. Additional guidance is required to determine and guide the approach, as well as the tools of intervention to be applied, particularly in the event of non-compliance with the Constitution and regulations governing water service.

3.16.1 Financial intervention

In most cases, monetary assistance is required when a municipality's fiscal difficulties are still correctable, although they may have caused ruin in the municipality, to conform with administrative obligations as per the Constitution or legislation. Fiscal intercession is stipulated in Section 38 of the MFMA. The act specifies that financial support to WSAs may be terminated in the event of serious or continued defiance of measures intended to safeguard transparency and expenditure control, or allocation. National Treasury can, in terms of the Constitution and the Systems Act, discontinue funding when there is a breach of the Systems Act.

The discontinuation of funding serves as a penalty, although it does not address the fundamental problems related to the breach or non-performance. Ruiters and Matji (2016) believed that sometimes the needed help is capacity empowerment and strengthening, as opposed to punishment. The law also allows the dissolution of the council in the case of failure to approve a budget and/or failure to adopt revenue-raising measures, or in appointing an administrator pending

election of the new Council. Section 139(5)(c) orders the Provincial Executive to take on the duties and application of the recovery strategy should the Council not be dissolved. This segment complicates the authorisation in section 139(5), where the Council must be dissolved when there is inadequate cooperation. To date, there are no standards to agree when the mandatory phrasing of Section 139(5) is appropriate.

Financially assisting the WSAs drains other spheres of government, such as provincial and national government, in terms of cash and workforce, while other spheres of government regard this as an unfunded mandate. According to de Visser (2009), government spheres do not have surplus personnel, reserves, institutional knowledge and proficiency to carry out interventions, particularly those associated with technical or financial problems. As a rule, they also do not budget for interventions, and therefore, Section 139 of the Constitution has, over time, demonstrated itself as a directive without funds set aside for its implementation. Generally, when the WSA cannot meet its obligation of providing water supply owing to a predicament of financial matters, there can be an intervention. Nonetheless, it is ambiguous whether the Constitution necessitates a package of basic services' failure due to fiscal crisis, or whether the disappointment of a single service delivery function, such as water supply services, would suffice for an intervention to be instituted.

3.16.2 Other programmes of intervention

The topic considers programmes and methods that have a precise mandate to stimulate struggling municipalities to improve effectiveness, utilise resources, efficiently, be self-reliant and become proactive. There are four interventions namely; Project Consolidate from 2004-2006, the Siyenza Manje Programme from 2006-2009, the Local Government Turnaround Strategy (LGTAS) of 2009, Operation Clean Audit Programme from 2009-2014 and the Back-to-Basics Programme (2014 and ongoing) (Tshishonga 2019). Seeing that municipalities had backlogs and the inability to accomplish their constitutional mandates, the then Ministry of Provincial and Local Government launched Project Consolidate in 2004. The project aim was solely to tackle the ever-increasing complications

of bad service provision. Ultimately, the project allowed provincial governments and crucial private sector partners to find innovative ways of supporting local government to boost service delivery.

Chaane (2014) reasoned that financial assistance, as well as technical means given to support municipalities, were inadequate in scope and insisted the assistance only slightly facilitated in meeting goals and objectives. The issue regarding assistance is that it is inadequate in the transferring of skills to municipal employees. Moreover, Chaane (2014) further maintained it is problematic to fully assess the impact of these assistances because they do not improve fiscal operations, which is an indicator of a functioning municipality. The use of one-size-fits-all was acknowledged as a flaw in support initiatives, with indicators demonstrating that these inflexible methods are guaranteed to fail because municipalities vary, with each performing and having diverse wishes and flaws. While the state was attacking poverty and delivering basic services, numerous households still have inadequate access to sanitation or drinking water.

3.16.3 Back-to-Basics Programme (2014-Current) intervention

The Back-to-Basics programme is a programme that constantly reminds municipalities that their core function is to provide essential services important to the enhancement of the quality of life, especially for communities residing in townships and rural areas (Mogale 2015). The dominant objective of this programme was to advance the running of municipalities to enhance and serve societies by meeting their basic rights.

Consequently, the Department of Cooperative Governance was charged with the duty of developing and strengthening competence and accountability in municipalities, by guaranteeing that essential services are provided. Magubane (2014) emphasised that the programme was anticipated to guide municipalities on the attainment of performing minor matters correctly, such as fixing streetlamps, dripping taps and waste collection. Accordingly, the programme was believed to be an effort intended at breathing innovative ideas into municipalities.

Furthermore, municipalities were reprimanded to stay far from subcontracting essential functions, such as financial management. As explained by Gordhan (2014), the Back-to-Basics approach was in line with the President's vision for municipalities to be at the forefront of improving people's lives and creating conditions for inclusive economic growth and job creation.

3.17 Ethics

The ability and practice of impartial delivery of and access to water for everyone in the 21st century, as a basic human right as well as a global obligation, are the ultimate ethical arguments (Woodhouse 2008; Tewari 2009). There is a recognised international ethical rule that human beings are eligible to have access to water. Accordingly, equity in accessibility of water is a significant ethical subject, with substantial policy inferences. Establishment of water ethics is a vital enhancement to the traditional command and control and economic tools shared in modern water management. Consequently, municipalities are obligated to provide water to everyone.

There are three key values that underpin water management in SA, equity, sustainability and efficiency (NWA, 36 of 1998). In the context of the NWA, the value of equity might be understood as impartiality in achieving the socio-economic requirements of people, and fairness in meeting the needs of the environment. Environmental ethics are now inherent in water policies, regulations and laws. For example, the DWS slogan 'Some for all, forever' expresses the details that are perceived as ethical; to grasp water as a public good, not to be possessed by a few wealthy people in society, and to control water sustainably. Environmental realists claim that environmental ethics must be more concerned with real-world, ordinary circumstances, in which environmental and social desires come into conflict, and with how such conflicts could or should be resolved (Minteer and Manning 2003).

Discussions on environmental ethics in the framework of aquatic and related running of the ecosystem are positioned in various fields including, but not limited to, the users of water, in the field debating organisational structures, and/or in

relation to environmental rules. The above-mentioned areas must not be perceived in segregation from each other, but as features of a multifaceted, interrelated system. However, it must be regarded and looked at through the lenses of the diverse methods culminating in environmental ethics, such as whether the environment is seen as having intrinsic or instrumental value (du Plessis 2017).

Environmental ethics extend a further viewpoint in analysing dealings between the biophysical aquatic ecosystems and their countless users, with a probability of refining ecosystems' organisation through acknowledging these systems are part of large and complex, social-ecological systems, in which values and interests play a significant role. The ethics in an environmental management context are undoubtedly understood in the notion of the "water reserve", whereby a balance exists between the privileges accumulated by aquatic species, as well as to individual household use. By offering adequate water by right, for both ecological and basic human needs, the 'reserve' serves social and environmental justice. All other water is administratively allocated for other uses (Richter 2010).

3.18 Leadership and management

Poor administration and or malpractices in SA municipalities have opened the floodgates to immoral leadership (Watch 2013). Nasomboon (2014) expressed concern, highlighting that leadership is central to fostering and cultivating organisational efficacy. Without principled leaders, organisations, including municipalities, are incapacitated in reaching their objectives, as weak leadership might be the cause of the municipality's collapse, whereas upright leaders contribute to the accomplishment of goals (Havenga, Mehana and Visagie 2011). SALGA (2021) presupposes the absence of leadership without the necessary vision, capabilities and expertise in municipal practices to have had varied results in the past; it has been the foundation of reports of fraud and bad administration. Civic protests are believed to have been prompted by bad administration and infuriated by the weakening of service provision. As reported by Magadlela (2008), voted principals are engaged in dynamic roles in advancing programmes and practices of the municipal agenda. However, they regularly do not possess

the prerequisite expertise in public administration and in particular overseeing the unstable affairs around delivery pressures in their communities.

Magadlela's (2008) assertion might be true, considering comments by the following people. The Minister for CoGTA at that time, Dr Zweli Mkhize, told parliament in his budget speech (2018 May) that there were roughly 87 dysfunctional or distressed municipalities and only seven percent of municipalities were well-functioning in 2017/18. It was further mentioned that political uncertainty, and or unwarranted intrusion, corruption and unskillfulness, remained amongst the origins of maladministration.

The AG report for 2017/18 stated that municipal irregular expenditure was owed to blatant governance, leadership and oversight gaps. In addition to his pronouncement, Nomusa Dube-Ncube, the then KZN MEC, when addressing issues of capacity building, commented that among the 2016 intake of 1 846 councillors in KZN, only 322 had matriculated, with 238 having no matric, while four of the latter had no schooling at all (ANA 2018). Worries mentioned by the minister are about municipalities, particularly in KZN, receiving bad disclaimers or qualified audit opinions, due to councillors not being suitably educated to effectively read documents from municipal officials, which offers a platform for corruption and other bad administration practices to occur.

According to Haddon *et al.* (2015), the stated events define an organisation that is in crisis. An institutional crisis is a small possibility, but a high impact situation that is alleged by serious shareholders to compromise the viability of the WSA, which is considered by uncertainty of cause, effect, and means of resolution. This dilemma can have a distressing consequence on a municipality and necessitates both instant and urgent attention. Other dilemmas are a result of WSA errors, while yet others, such as the worldwide economic catastrophe, are the effect from outward eventualities (Walumbwa *et al.* 2011).

Osborn, Hunt and Jauch (2002) are of the opinion that a common understanding exists regarding assessments of valuable leadership that differ across situations, with no one model for an appropriate leader. Accordingly, to appreciate

leadership, the context in which it exists must be recognised. As explained by Koma (2010), robust, intelligible and transformative political leaders are required to direct the execution of processes in the appropriate course to accomplish organisational goals. Zhang (2014) agreed, stating that headship in the municipal sphere is about effecting prescribed authority and inspiration. The political and administrative constituents of local government must possess competencies, proficiencies and wisdom that suit the requirements of a progressive system of municipalities.

Leadership has been studied from various perspectives, and leadership proficiencies are required in periods of disastrous crises (Van Wart and Kapucu 2011). In this context, robust, decisive headship, characterised by self-confidence, diagnostic aptitude, and preparedness to undertake responsibility, as well as the capability to entrust, was favoured over consultative and transformational proficiencies. It was nonetheless noted that a transformational method of guidance might essentially enhance performance, considering that a transformational principal demonstrates nurture to the welfare of employees and or followers, while it also delivers encouragement by communicating roles in the bigger assignments.

Waldman, Ramirez, House and Puranam (2001) additionally testified in validating the importance of personality and transactional guidance throughout the phases of environmental unpredictability. Their discoveries showed that charismatic headship is associated with institutional performance during conditions of ambiguity but not in stable situations where there is certainty. Van der Wart (2003:214) led an exhaustive assessment of public sector leadership and concluded that, in an age when transformational skills, vision articulation, and innovation are in greater demand, there is a striking need in the public-sector environment for comprehensive leadership models that integrate transactional management and transformational leadership elements.

Moreover, the survey conducted in societies in crisis concluded that members had hopes of both transformational and transactional headship throughout times

of crisis, as opposed to non-crisis periods (Haddon *et al.* 2015). The inclination to transformational guidance was accredited primarily to a fondness for the idealised inspiration subscale, where writers were involved as tools. As a result, the SA public sector seems to be in a constant development of transformation, in that leaders should be able to successfully push transformation, steer individuals, and accomplish performance in their work units.

Thus, the array of skills required for leaders to be fruitful in municipalities has escalated and necessitates transformational headship able to offer eloquent options through the formation of communal values, even though they will be provoking unfamiliar heights of effort from employees to realise this vision. The examination of the literature recognises several and various leadership skills alleged to be imperative in crisis phases. These include truthfulness, intellect, personality, and vision, along with communication, genuineness, inspiration, and emotional intelligence, as well as self-awareness, participative decision-making and a talent in real sense-making.

The complexity theory methods not only interpret leadership as interpersonal encouragement, it perceives leadership as offering linkages to emergent structures in and between organisations. Presentations of the complexity concept propose that the emphasis of leadership must be on how to nurture and quicken the emergence of distributed intelligence, which is a job of strategically appropriate social capital assets and the networked intellectual capabilities of human agents (Baltaci and Balcı 2017).

Kotzé and Venter (2010) asserted that, since leadership efficiency embodies the standards by which leaders are judged, a vital feature of leadership success therefore relays the perceptions thereof, and is assumed by the individuals being led. Employee observations and perceptions of their principal's efficiency inspire motivation to be led, and influence the way they respond to leaders, as well as their conduct. According to Winters, Karim and Martawardaya (2014), public principals must possess a resounding vision regarding areas of operations, including demographics and procedures. Moreover, efficient and deliberate

headship is necessary to take brave and critical actions against mediocre performance and inadequate answerability.

3.19 Relationships between politicians and officials

The MFMA (SA 2003) allows the local government council the maximum control of the municipality, with the control reinforced by privileges to approve and oversee conferred by regional and national government statutes. Moreover, in SA, McLennan (2007) clarified that the system of providing services is designed in such a way that political dynamics, as well as affiliation, frame and influence power relationships between the state, the voters, and the economic direction of the country. This happens to the extent where politics take over the governing and provision of service, causing it to be ineffective, disorganised and impractical. According to McLennan (2007), the problem is balancing efficient service provision, political associations, the obligations for a political party to stay in authority, and good governance. The SA local government experiences problems in confronting issues relating to drawing boundary lines in activities and roles of politicians and official workforces. Ultimately, the political meddling in administrative matters and *vice versa* between some political and administrative staff in the municipalities seem normal in everyday operational running (Twala 2014; Tshishonga 2019).

There is assertion implying that political bearers are inwardly fixated, preoccupied with the affairs within their political territory and mostly the mechanics of office management. Political bearers, municipal senior management and officers are battling to clearly distinguish roles and responsibilities. The intensified unjustified political meddling in office administration increases concerns around the improper rapport between members of the political organisation and its structures and municipalities. Claims and cases exist where political party structures control municipalities by remote control (de Visser 2010; Van der Waldt 2014; Tomkinson 2017). A decent association between leaders of local government and the public carries with it optimism for operative application of policies (Giroux and McLelland 2003; Zhang 2014).

3.20 Conclusion

The convolutions coupled with ambiguities taking place in WaS organisations and its governance were discussed in this chapter, which painted a picture of the underlying meaning of governance as it relates to the organisational structures, processes, rules and conducts through which decision-making power that influences activities is exercised, as well as answerabilities demonstrated and realised. In addition, these structures and processes act as mechanisms to carry out governance activities. In addition the chapter drew a conclusion illustrating that the administration of water is confronted by various issues, such as insufficient coordination within country-wide development plans, a weakened institutional frame, a top-down management approach, and centralisation of powers. Included along with these are the paternalistic attitude of authorities, and the incapability of water users to be involved and continuously participate in the undertaking of all activities, including maintenance of the water system, and safeguarding of watersheds.

Ordinary qualities needed to realise good governance in the water field are believed to be well-functioning organisations within a multi-sector and with a multi-level outlook. This will circumvent key gaps and or duplication of policies, planning and financial resources, as well as designing and application of policies, regulations and principles. Moreover, the clarity of concerns associated with jurisdiction among national, provincial and municipal governance is crucial to the development of facilitating water users to participate in the entire stage, as well as the processes of their own water provisions. It is believed that pending productivity and involvement of regular citizenries in policy negotiations and debates, complexity and ambiguity will dominate the sphere of WaS.

Chapter Three additionally acknowledged that the institutional and governance order of planning, budgeting, financing and adopting resolutions concerning WaS provision, in and across levels of government, act as a key part in constraining effectual distribution of the services by municipalities.

Chapter Four will take advantage of the development and use of systems methodologies in the arena and application of management tradition in current years. Systems methodologies accept that the affairs between the state, societies, including principles and protocols, as well as organisations that are prescribed, and informal relations influence the methods in which governance coordination functions. This emphasises the value of including diverse voices, obligations, transparency and answerability of formal and informal organisations linked in the process. In simple terms, the obligation of generating decisions about water must reflect on the effects that each use will have on others. This will ensure that overall environmental, social, and economic objectives are taken into account (Jackson 2001; Hering *et al.* 2015; Williams and van't Hof 2016).

Applications of systems ideas have been enacted on several organisations for intervention into real-world managerial situations and have been testified to be a success in some countries (Arnold and Wade 2015). In the following chapter, a Viable Systems Model will be developed to offer the foundation for understanding the structure and behaviour affecting the viability of complex systems in the UDM. VSM is usually employed as a theoretical instrument for understanding organisations, modelling them, restructuring, as well as reinforcing change management (Espejo and Gill 1997).

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter captures and unpacks a recommended research framework appropriate to identifying the issues that pertain to viability in water management, which is VSM and SSM; where viability measures the ability of the UDM as a municipality to thrive through change in the internal and external environment. The methodology in this chapter identifies the leverage points and places to intervene in a system, to enable the municipality to analyse and respond to changes in the operating environment, by means of appropriate internal organisational management. The ultimate intention is to demonstrate through systems methodology, how the UDM changes the structure of the municipality to yield additions of what the UDM needs, hence minimising that which is unwanted. The use of a viability concept has been informed by the Systems Thinking research stream, pioneered by Beer (Jackson 2003: 105). However as a precursor, to develop awareness of the stakeholder dynamics, the researcher drew on SSM, an approach pioneered by Peter Checkland and published in 1981 (Checkland and Scholes 2000; Reynolds and Holwell 2010).

A SSM approach was used in informing a model of enquiry because it recognises the importance of understanding peoples' perspectives and how they are embedded in their process of learning. The enquiries put to the participants in the focus groups attempted to establish the following;

- The context of the problem in WaS governance as one of the essential processes in SSM.
- The various perspectives assisted in appreciating the “boundaries” or “frameworks” in which activities occur.
- Why various patterns of behaviour were exhibited.
- Recommend processes of engagement intended to bring about improvements (Fennessy and Burstein 2000; Lopes 2001; Moutinho 2004). These processes form the substance of action research as a research approach.

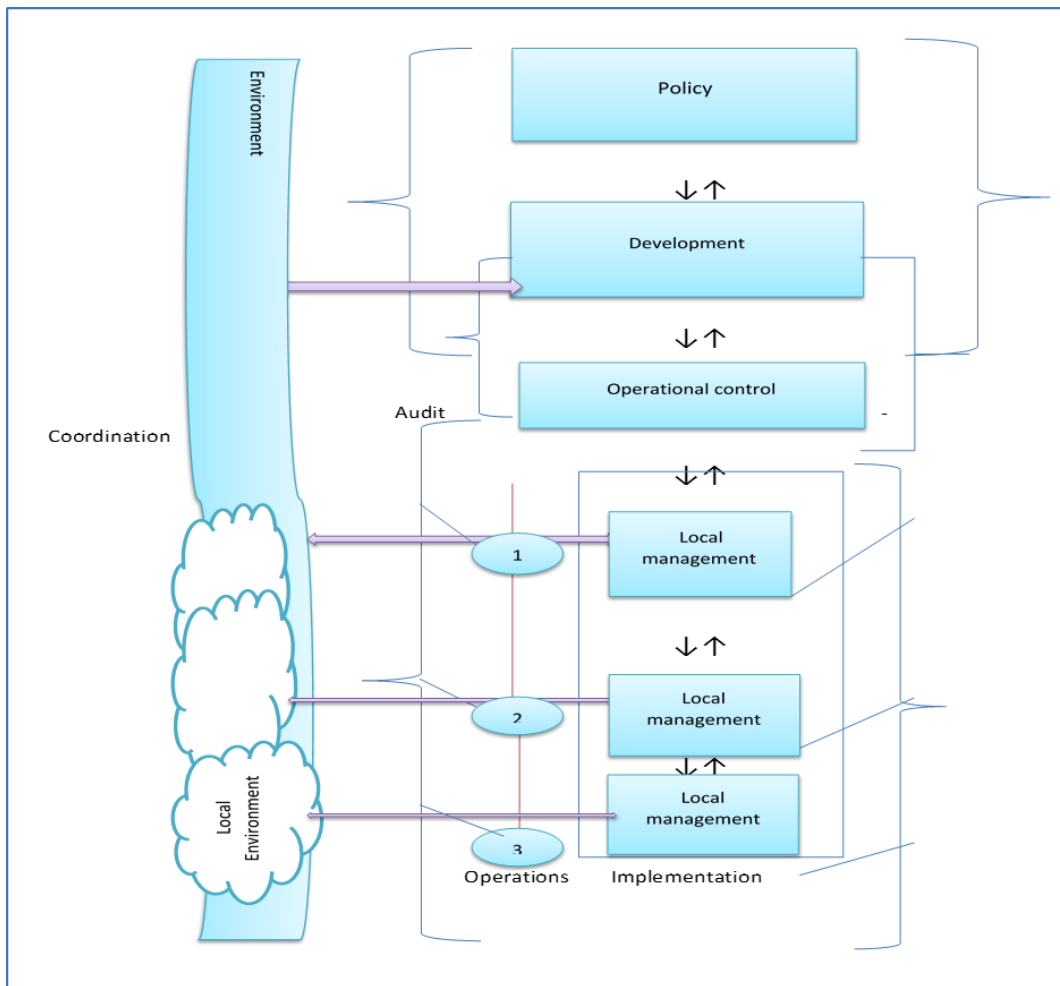


Figure 4.1: Viable Systems Methodology

Source: Schwaninger (2006); Pérez Ríos (2010)

The motivation behind choosing the VSM model is founded on the research objective of this study, to investigate the viability of the UDM delivery system. Jackson (2001) asserted that not only is VSM an influential instrument for organisational design, it is also a proven diagnostic tool. VSM recognises that functionality expresses itself through sets of sense-making relationships, leading to actions requiring vertical and horizontal integration. Sense-making is a process of personal learning and is premised on a constructivist understanding. It should be noted that the study adopts multi-methodologies framed by systems thinking (Schwaninger 2006; Pérez Ríos 2010; Khosrowjerdi 2011; Espinosa 2015).

Therefore, the UDM system was tested and or diagnosed against the above VSM structure and its functioning.

4.2 Research framework

The complexity of WaS provision has been documented in the previous chapters, particularly governance, with the aspirations of this research to find measures to improve the provision that match the societal context. Hence, it made sense for the researcher to rely on the views, perceptions and beliefs of the targeted participants to construct knowledge. Complex issues were thus explained and interpreted using words, as opposed to numbers (Babbie 2013; Creswell and Creswell 2017). Consequently, a qualitative approach seemed highly suitable. The study followed on Mkhungo's (2015) views that social constructivism recognises knowledge is shaped, perpetuated by societal practices and that experiences and social actions intertwine. The same views were expressed by social constructivists (Tuli and Sciences 2010; Mustafa 2011; Jones 2014). In addition, qualitative design advocates an ontological assumption based on the multiplicity of equally valid world viewpoints, depending on the subjective viewpoint of the holder (Levitt *et al.* 2017).

4.3 Context for application

The UDM was selected as the context for application because it was easy to access and obtain the necessary approval. Moreover, using a case study was the ideal tactic for empirical analysis, since it allows in-depth, detailed investigation of 'how' and 'why', as posited by Yin (2018), to gain an understanding of whether local WaS governance practices work or not, in the complex context of SA. The researcher was cognisant of the fact that this was the first study of its kind that pursued to ascertain the level of service provision of the municipality, by means of a viability method, using systems thinking and therefore, venturing into terrain that was unclear. Creswell (2014), Bryman (2015) and Lewis (2015) proposed the use of case studies in instances where the phenomenon under study is poorly understood. In addition, Yin (2018) also advocated for a case study, stating it as a beneficial technique to study complex phenomena and generate a source of ideas about behaviour and an opportunity for innovation, but most importantly, it is also a worthy approach to test theoretical assumptions. The researcher was aware that it is difficult to draw fixed cause-

effect inferences, especially from an individual instance because there is a possibility of bias in data collection.

4.4 The participants

Considering that the population was the UDM and the study was exploratory in nature, non-probability sampling was chosen. It was on purpose that specific middle management officials, from certain departments dealing or fully entailed in the provision of WaS, were chosen. The departmental units selected were the Water Service unit, Projects Management, Treasury, and Corporate services, as well as the Office of the MM, and Infrastructure and Economic Development. These participants were targeted based on their duties and functions held within the municipality and with the assumption that they were experts in their fields. A scholarly perception does, however, exist that expert sampling is sometimes biased to the person's beliefs (Cooper and Schindler 1998: 215; Blumberg, Cooper and Schindler 2008; Graebner, Martin and Roundy 2012; Martin 2012: 139; and Bryman 2015: 418).

To guard against the risk of bias, there was a need to gather and merge beliefs and perceptions of the society serviced by the municipality. Conveniently, the public participation office of the municipality was conducting training of community ward councillors and the researcher requested an hour of their time. Fortunately, ward councillors agreed to participate in the study. The key intention of the focus groups was to acquire qualitative interpretation of the actual situation's circumstances. This assisted in checking whether a gap exists and if so, to determine the level of that gap in terms of their perception of service delivery and triangulate information gathered (Babbie 2013).

Two participatory workshops, in the form of focus groups of community ward councillors (more than 40), were held in the High-flats and Umthwalume areas. Ward councillors were engaged in their capacity of being customers and beneficiaries of the service. Moreover, ward councillors were preferred because they represent communities, and are voted for in a specific geographically-precise area throughout the municipality. Ward councillor duties include that

community concerns related to the ward are communicated to the municipality and mostly, ward councillors are identified to have experienced reliable involvement with issues of service delivery.

The Municipal Structures Act of 1998 requires the formation of ward committees to support councillors in deliberating requests and opinions of society. Councillors function as an important feedback mechanism to keep an eye on whether municipal strategies and programmes are accomplishing projected outcomes; that services are really supplied in an effectual and impartial manner and capital projects are questioned, as perpetrated in the IDP, should they be executed within the timeframe. The researcher, who can communicate fluently in isiZulu, guided the focus group discussions. The rural community was mostly represented in focus groups.

Focus group deliberations were a valuable tool in illustrating experiences, sentiments, vulnerabilities, and insecurities of participants engaging in municipal service delivery (such as consumers, service providers, officials, other interest groups, politicians, officials), as application of policies may be a conflictual phase that might work out quite contrarily in practice from the intended outcome (Mackay 2003; Resnick 2014; Maramura and Thakhathi 2016). Focus group discussions further revealed whether policy formulated for the highly diverse and disadvantaged areas is suitable and applicable to the desires of the population. This was an important means to elicit community dynamics and civil society participation in service delivery, as the beneficiaries of services are best suited to appraise systems and approaches.

In addition, a stakeholder meeting between ratepayers and the UDM was attended in Margate, where the UDM was tabling issues related to water billing. The objective of attending this meeting was to observe and listen to the UDM and water billing account holder's challenges and viewpoints. According to Creswell (2012: 139), observation facilitates enhanced alertness of the study area, corroborates and complements additional data. Observational conduct represented a slight feature in the collection of data. The benefit of this method

of information is that one can conceivably identify a person's authentic behaviour, rather than purely record his or her views or insights. However, behaviours may be problematic to score, and grouping them is an onerous form of fact finding (Simon and Goes 2013).

Bryman (2015) warned that qualitative researchers have to recognise they are engaged in a delicate balancing act, hence, it is crucial to rigorously justify any sample size able to support the research, as well as substantiate the research process. However, during the study, face-to-face consultations were conducted with 17 officials and 60 community ward councillors, in the form of two focus groups and group interviews. In this study, theoretical saturation was reached at 15 participants (Bryman 2015; Creswell and Creswell 2017).

4.5 Application of Viable Systems Methodology

VSM brings a recognised instrument for dealing with varieties of complex systems, hence, has been accepted gradually in several disciplines of inquiry (Davies 2002; Hoverstadt and Bowling 2002; Schwaninger 2006; Sung *et al.* 2008; Awuzie and McDermott 2013). VSM remained utilised to test the viability of the municipality as well as a normative replica to evaluate against the real-world settings and to look for vulnerabilities, limitations, mismatches or misplaced systemic elements that describe the challenges being experienced or with proposed answers. The artificially constructed VSM was compared with the generic VSM to expose the real functionality of current operations (Espinosa, Harnden and Walker 2008).

Applied in its original arrangement, VSM was used to contrast the existing framework of SSDP methodologies that was established to put in place the competency for planning, developing, execution and institutionalisation of service delivery tools, schemes, processes, mechanisms and intervention programmes, with which to rally and institutionalise excellent service delivery for everyone. Particular mention is made that VSM focusses on advising on the features of a municipality that are crucial to viability, rather than on possible municipal structures as typically understood (Espejo 2002; Jackson 2003). Moreover, the

model is insightful in that it considers the municipality in relation to the environment setting.

VSM advocates that the design of the management and control system of a municipality is critical to the ability of the organisation to thrive, or even just survive, in its environment. Thus, it is necessary that the management and control system of an organisation be designed to match the needs of the business environment in which the organisation is operating. The model provided a context for designing a flexible, adaptable municipal system that balances external and internal perspectives with long- and short-term survival provisions.

Interviews were the main data source for the generation of the UDM detailed VSM. Furthermore, the researcher accepted a VSM viewpoint and noted everything of relevance for the VSM diagnosis during her commitment in the fact-finding and in the SSM-based focus groups. The VSM was an influential instrument in surveying and appreciating governance of the municipality by studying its administration functions, their communications networks and appropriateness and changing balances. It also presented a means of gaining both practical decentralisation and cohesion of the whole (Espinosa 2015).

4.6 Application of Soft Systems Methodology

It is important to note that this study used SSM as a framework only, insofar as to identify as well as map stakeholders and engage with them. It presented a methodology to discover, enquire and learn about ill-structured problematic conditions in WaS delivery. The researcher interacted with ward councillors at the first SSM workshop, which was held in May 2019 at Umzumbe. The first step of the session entailed discovering more about the problematical situation. This session consisted of having the participants engage in narrating their stories and experiences and issues of concerns. The researcher led them with questions. The qualitative analysis of participant answers uncovered pertinent questions and current insights about issues. Moreover, the researcher facilitated a dialogue of the societal realism and power dynamics concerns in the studied system. This enabled the facilitator to gain further insight into the problematical context, and,

most importantly, to gather data that could complement initial data gathered from the interviews.

The second session with another group of ward councillors was conducted in the same month, utilising a similar process of finding out. The only difference was that this group's geographical areas comprised mixed urban and rural areas. Model generation implies that the researcher will generate a focussed action model collaborating preliminary discoveries that emerged with face-to-face interview results. The subsequent workshop wanted to highlight as well as compare use of a generated model with the perceived problematic situation to enable a dialogue about appropriate and practicable changes and place.

The workshops intended to incorporate an organised deliberation on tangible improvement options and that resulted in practical measures to change and direct the action methods to accomplish viability. In addition, it was intended to simplify and validates findings. Likewise, qualitative interviews and the investigation added to the improvement of proposals. The improvement propositions that derived from this investigation are potential actions to improve the situation. However, its feasibility could not be sufficiently assessed. Action to improve was originally intended; however, the nature of the engagement prevented the realisation of this intention. This is discussed further in Chapter Six and Chapter Seven.

4.7 Research instrument and data collection

The qualitative design is predicated on an epistemological assumption, whereby it deems the researcher as an instrument of the research and consequently, in terms of assumption, empowers the researcher to use an own value system in the research process (Petty, Thomson and Stew 2012; Ponterotto, Mathew and Raughley 2013; Mkhungo 2015).

Feedback from project participants has been continuously used to improve and refine the information through interviews, participatory workshops, observations, as well as the collection and review of archival data. The initial phase of the project consisted of face-to-face interviews with municipal officials. A semi-

structured interview questionnaire allowed and encouraged participants to exchange their observations, opinions, experiences, and worries along with their perspectives of service delivery. The use of semi-structured interviews was opted for because questions, themes, target issues and their sequence were planned beforehand (Bryman 2015), while the use of various research instruments was informed by the dynamics within research participants, mainly councillors.

The study conducted by Smith and de Visser (2009) on the effectiveness of councillors revealed that there are issues of inter-party competition, factionism, unfair representativity and of politicised ward councillors. It was, therefore, reasoned that open discussion of some questions may lead to answers that are skewed; in that councillors are unable to share personal experiences of his or her ward. In providing the same questions in the form of a questionnaire may have closed that gap, while also ensuring privacy. The questionnaire was developed to complement the limitations of focus groups and observations (McGuirk and O'Neill 2016).

Interview questions also served as an indicator of the generation and applicability of VSM to problems with UDM service delivery issues and provided empirical evidence when VSM gaps were identified. VSM data consisted of an initial comprehensive system map, in which the various manifestations of the organisation were compared within their environment(s) and thereafter, the following steps were considered:

- Management processes operational in each manifestation,
- Explanations of institutional processes of coordination and resource allocation,
- Audit and control mechanisms,
- Information and data management systems, including environmental interpretation,
- Strategic decision-making and the implementation of control measures.

Finally, the levels of recursion and subsidiarity were considered and the communication channels between the operational levels interrogated through analysis of records and interviews processed. Recommendations for redesigning the system had to be socially, economically and politically feasible from a municipality perspective. From the above, it can be seen that the collection of data in a VSM study is a comprehensive process, requiring the researcher to become embedded in the organisation and having access to documentation and key personnel. Considering the researcher is an employee and a resident of the UDM, it was easy to collect information using the above methods and straightforward to attend meetings, both in an official capacity and by attending community meetings to acclimatise herself with the issues.

The last part of the fact-finding was to distribute an evaluation survey form to the participants, to inform them to record their thoughts and observations in writing. This technique contributed to a sequence of similar answers to standard and traditional requests and facilitated a platform to evaluate the impression of the personal and collaborative VSM knowledge processes. In addition, this method saved time, when compared to a structured discussion, and minimised participant bias. Lastly, it presented a platform for triangulation within the entire study, seeking substantiation and constructing interpretations and investigation from the earlier forms of data generation.

Appendix 3 shows the cover letter while Appendix 4 and 5 shows that there were two interview questionnaires for the UDM employees as well as for non-employees (ward councillors), but who are UDM stakeholders/ beneficiaries of the municipal services. Questionnaires comprised two sections, A and B, with section A dealing with participants' biographical information that comprised their age, gender, qualifications and years of service within the municipality. All respondents who were UDM employees had at least a matric education and experience within the municipality for more than two years. Section B was designed to gain the participants' familiarity of the productive tools, implementation approaches and impact on service delivery. There were 16 questions in total that covered areas on the municipality's vision, to ascertain the

objectives of the municipality, challenges, service delivery perceptions, and delivery standards, along with municipal backlogs, service delivery tools and their implementation, as well as organisational performance and decision-making processes in relation to WaS provision.

4.8 Secondary data

Secondary data comprised reports such as research publications, internet documents including facebook pages, policy documents, and internal reports including business plans, project plans and reports on WaS provision, along with municipal processes and newsletters. Case-studies of international, national and local experiences in WaS provision were used as a comparative analysis. The researcher was able to access information from different structures of the municipality, for example, minutes of the management and council committees and internal policies. Secondary data revealed areas that required further probing and enabled cross-checks.

4.9 Data analysis

The researcher was responsible for grouping, probing, decoding, and assigning meaning to information and or statements, guided by the study questions. Investigation was an ongoing process even when questionnaires were formulated. In terms of data collection, the researcher was in charge of determining and ascertaining phrases or participant statements, with the purpose of making sense thereof and or organising facts. The information was later used in the inscription of the thesis in a manner that supplements the essence of participants' individual feelings and language.

Data analysis was created concurrently by deducing from exploring data to evaluate current literature, theories and concepts. The information considered, extracted ideas as well as recommendations that are believed to be appropriate to the entire study. Participant reactions were classified and grouped into emerging patterns and themes and scrutinized and clarified qualitatively to answer research questions. This exercise considered that the validity is not defined in terms of the extent to which the functioning meaning matches with the

construct definition but by the level to which the scholar can put together observations that are credible and convincing for her, as well as the subjects being studied and the readers of the study (Creswell 2012; Lewis 2015; Levitt *et al.* 2017).

Data analysis is initiated by coding, collecting various events into as many groupings as determined and as the examination is pursued and the data filed into classifications. Through the interpretive style, it was critical to explore the senses and understandings in which the participants put forward their reflections on the topic. This enabled description and explanation to the principle's understanding of the use of a systems thinking approach to municipal development. The introductory set of information and or data directed the researcher to minimise and synchronise data and to establish evolving patterns. Moreover, the generalisation, together with inductive reasoning, permitted the researcher to construct new codes and to subsequently merge certain codes to form new groupings. Creswell and Creswell (2017) simplified this stage intricately and it assisted the researcher in acquiring awareness and facilitated managing the task.

Participant reactions were considered to be substantial when they constantly emerged across two or more of the sources of data namely, a) semi-structured interviews, b) focus discussion group, c) reflective journals, and d) document analysis/ review. Certain themes explicit to the identifying, the usefulness, the advantages as well as challenges of WaS service delivery were categorised, predominantly those that contrasted the views of the participants and those not usually recognised in the reviewed literature.

4.10 Data analysis and interpretation

No categorical measurement scale was used for data analysis, however, the role as a researcher was understood in the context of a SSM approach; it was to identify the ill-structured problem and try to improve the problem in a given situation. The main consideration was that the designs of questions were open-ended, semi to unstructured, and were designed purposely to stimulate deep

conversation with interviewees (Leedy and Ormrod 2005; Mustafa 2011; Palmer, Biggs and Cumming 2015). Therefore, data analysis was aimed at a deeper understanding of both officials providing service of water sanitation and consumers of the service. The determination of relevant issues as part of 'Finding Out' and diagnosing the municipality, was done using a VSM structure. In doing so, the VSM lens was applied and considered, given the situation in the municipality. Since the study is diagnosing a municipality, work data were interpreted through the identification of problems within the organisation and the linking of these six problems with structural, communication and decision-making processes. The credibility is in the plausibility of the findings and the logic linking outcomes to six practices in relation to structure, communication, decision-making and control.

This guided the final improvement proposals. The ultimate outcome of the VSM diagnosis, with improvement suggestions, is presented in Chapter Six. Data was analysed immediately as this method informally clarified to the researcher the development and revealed gaps that necessitated additional explanations (Leedy and Ormrod 2005).

Data analysis and interpretation are particularly at the heart of a qualitative research design (Babbie 2013), whereby the design type imposes no bounds to the extent where subjective interpretation is permissible. Explanatory and constructivist practices were applied. A framework for fact finding and analyses, including acquainting, detecting a thematic framework, Indexing, plotting and drawing maps and interpretation, as highlighted, was applied. As indicated, qualitative methods and VSM were combined in an iterative and interactive manner. The hypothetical VSM construction of the UDM steered the initial interview inquiries and the groundwork of diagnosing VSM directed interview questions with the intention to comprehend and present proposals, hence, closing the gap of deficiencies.

4.11 Triangulation and authenticity

It was vital for the researcher to be completely mindful of the matters of trustworthiness, which comprise reliability, dependability, transferability and demonstrability. The fact that qualitative research designs tend to focus more on subjective opinions and are not primarily focused on measurable data, usually cause an erroneous belief that validity and reliability are discarded in this type of design. However, procedural consistency, sample correctness, concurrent collection and investigation of data, as well as linking theoretical and theory development of the study, are the main strategies to ensure all of the above (Leedy and Ormrod 2005; Mustafa 2011; Creswell John 2012; Jones 2014; Bryman 2015; Palmer *et al.* 2015). The researcher is of the view that these three strategies were followed during certain stages of the research, as attested to in the relevant sections.

To ensure authenticity, the researcher collected material in as many different ways and from as many different sources as possible, for example pertinent documents, observations, interviews and focus groups. In addition, the researcher conducted member checks. Data from the study, with tentative interpretations of the data, were taken back to some of the people derived from and checked whether the interpretations were plausible. Given the time and cost constraints involved, the method chosen by the researcher was the one that allowed for communicating the results back to the respondents for confirmation (Leedy and Ormrod 2005: 100).

It is common knowledge that organisations are designed for a specific purpose, and an efficient organisation and management systems help bring about the success of an organisation's goals and objectives. Participants from both the municipality and community and the municipal reports with secondary information, agreed the organisation is not working to its optimum level.

4.12 Ethical considerations

Before the investigation commenced, an ethical clearance certificate (Appendix 1) was issued by the Durban University of Technology, which highlighted the

significance of informed agreement, namelessness, privacy, and voluntary participation, along with the right of participants to remove themselves from the study at any stage without prejudice. Study permission was sought from and formally granted by the collective of the MM and General manager (GM) water services (Appendix 2). Moreover, all the participants signed letters of agreement, data analysis and interpretation.

Prior to commencement of the interviews, a general protocol was followed, whereby the researcher introduced herself and the study, and thereafter read and explained the informed consent form (Appendix 3) and gave all the particulars of the relevant person at the UDM to direct questions to, should the respondents feel the need. Thereafter, the respondent was requested to sign his/her consent form, after which the interviews commenced. Generally, interviews lasted between 25-30 minutes, depending on the level of depth that emanated from the discussions and the distractions that would occur to interrupt the interviews (Du Plooy-Cilliers, Davis and Bezuidenhout 2014: 145).

4.13 Conclusion

This chapter represented a research methodology design, mapped the route taken by the researcher to collect, analyse and write the research report for this study. The combination of systems methodologies and collection of diverse sources of data, with multiple perspectives to meet the objectives of the study, were also established. This approach presented a rich source of data, allowing the researcher to delve deep into the real experiences of respondents regarding WaS governance. The chapter also provided a description of the study area where data was collected, the choice of population, participants, as well as the methodological techniques employed to extract data for the study. The chapter concluded with a brief section on the triangulation of data to check trustworthiness and legitimacy of enquiry. The results developed from this enquiry are biased and somewhat reliant on the researcher's judgement, considering that in qualitative research, there is no unqualified certainty, with genuineness grounded on discernments and knowledge remains created (Ryan

2006). This section of the chapter covered the steps that were employed during the research process to mitigate bias.

CHAPTER FIVE

RESEARCH FINDINGS AND DISCUSSION

5.1 Introduction

Chapter Five presents the research results in line with the methodologies described in Chapter Four. It begins with outlaying empirical evidence and thereafter presents the adapted UDM VSM to identify the gaps. This chapter will basically answer objective number two of the research study, which is: to identify gaps between an ideal VSM and empirical observations in the UDM. At the end of the chapter, the viability status of service delivery of WaS provision at the UDM would have been established, through the interpretation as well as discussion of interview results.

5.2 Empirical evidence of current scenario at Ugu District Municipality

An empirical study is described as research in which deductions are accurately derived from practical and authentic substantiated proof. The empirical facts in this study are a combination of assertions of facts about the UDM society that can be proven by social science or empirical methodologies. With any type of chosen method there are opportunities as well as limitations. There are few limitations in which those inaccuracies and drawbacks directly related to the layered evaluation method, and or built-in limits of empirical research in general (Ryan 2006; Babbie 2013).

5.2.1 UDM Water Resources

The IDP of the municipality dated 2020/21, states that the UDM has plenty of water resources through perennial rivers and groundwater, notwithstanding regular seasonal scarcities. According to the IDP document, there are 42 estuaries within the UDM coastline, however, most of its water is drawn mainly from three river systems namely, Umthamvuna, Umzimkulu, and Amahlongwa. Investigation shows that 45 percent of rivers monitored by the department display poor to moderate levels of water quality (DWA 2015a). The uMzimkhulu river system is also recorded as having higher quantities of heavy metal pollution, such as zinc, aluminium, copper, and lead, in addition to nickel, chromium and

mercury. There is a coastal belt of 112 kilometres, which is sea water that is not used for consumption (UDM 2017).

5.2.2 Groundwater programme

The geo-hydrological elements that lie beneath the UDM are categorised as secondary aquifers, with groundwater existence characterised by aquifers with fractured flow or by aquifers with inter-granular flow. Moreover, borehole yields are generally adequate, except for fewer in the low yield areas, such as Umkomaas North. Consequently, there is inconsistency of the geology, groundwater quantities and aquifer conditions, for instance, hydraulic conductivity and transmissivity in the District. The characteristics of groundwater at the UDM indicate there is no contamination and the groundwater is considered as acceptable, although the depositional environment, as well as the short distance to the coast and industrial activities, severely impact groundwater quality. As a result of inconsistency in elevation across the municipality, the average annual precipitation, and groundwater recharge are erratic (Ugu IDP 2020/21).

The UDM largely relies on run-of-the-river water for irrigation, water provision and for industries. In the absence of big storage dams, the municipality survives on small reservoirs, with storage volumes differing from a few thousand cubic metres to about a million cubic metres, used for water supply, irrigation, and or storage intentions. Two dams exist, with overall storage of less than two million cubic metres. Umgeni WB handles a percentage of infrastructure providing WaS in other parts of the municipality (UDM 2017). In addition, the basic water supply programme at the UDM incorporates boreholes and spring water, supported by a spring protection and borehole maintenance scheme promoting supply to communities, regardless of the fact that most of these schemes failed for different reasons.

5.2.3 Relevance of UDM in the study

The municipality operates and runs waterworks for the distribution and administration of potable water and providing of sanitation. The UDM mandates

include the establishment of water-work infrastructure, overseeing the collecting, transportation, treating and disposing of or recycling and re-using wastewater; and implanting sanitation provisions. Hence, a municipality is a regulator and is anticipated to administer by-laws associated with the building and delivery of amenities, water supply and water-borne sanitation. Furthermore, a municipality should devise investment initiatives, while also formulating a tariff structure linked to the progress in the management of water supply and water-borne facilities.

The UDM IDP states that bulk water is collected from the rivers to dams, then treated at several treatment plants of the municipality, then supplied to households via 42 000 private household connections and approximately 5 000 communal standpipes that generally serve the inland rural societies. The population settlements of the district differ from thick formal urban to dispersed rural settlements and should be considered and treated differently in preparation for the provision of water services.

In the case of a WSA, there are regulated standards that have been gazetted in the NWA of 1998, which the researcher uses as a basis of judging whether the municipality is viable. The discussions with the interviews were guided by the following themes, which were all elements and or indicators and or symptoms of failing water services:

- a) Communities where there is a backlog in WaS amenities;
- b) Inadequate access to water;
- c) Access to scarce water and to low-quality water;
- d) Insufficient infrastructure to supply at least 25 litres of potable water pppd;
- e) Water supply that is more than 200 meters from a household;
- f) A minimum flow of 10 litres per minute (communal water point) or 6 000 litres per month (formal connection) cannot be supplied;
- g) Deterioration of infrastructure providing water supply services beyond the point of regular maintenance requirements;
- h) Infrastructure that does not meet the minimum standards;

The first research question (viability status of service delivery) was answered mostly by ward councillors as representative of the general communities. A focus group guide was developed, and discussion sessions were held with the community ward councillors in and around the Umzumbe area.

5.2.4 Access to water

The 51 ward councillors interviewed all indicated that there are areas in the district where the community still fetches water from the rivers by buckets because there is no infrastructure. Those areas are mostly previously disadvantaged areas. There are also areas where infrastructure was built but water is supplied only during the rainy season. Few councillors from rural areas mentioned that there are standpipes in their areas, but most are not operational and the majority of the time there is no water in the pipes. In some areas where there are no standpipes, water tankers infrequently come, once a week or once a month. One group of councillors agreed, stating: “our communities in deep rural areas have benefited nothing in this new democracy, government is only looking after urban communities”.

Ward councillors in rural areas felt there was unequal treatment of rural and urban dwellers, citing that the UDM usually and simply divert rural water trucks from their scheduled deliveries, to offer relief to urban areas when the water supply is obstructed. Ward councillors believe that the UDM does not prioritise them in rural communities because they do not have water accounts and hence, do not pay. The feeling from the rural community is that the UDM is not doing enough to attend to their needs. Few councillors from rural areas mentioned that there are standpipes, however, these standpipes are either not working or have no water. In their own opinion, they do not have access to WaS, and these results are aligned to Figure 5.1, which shows the UDM water backlog eradication.

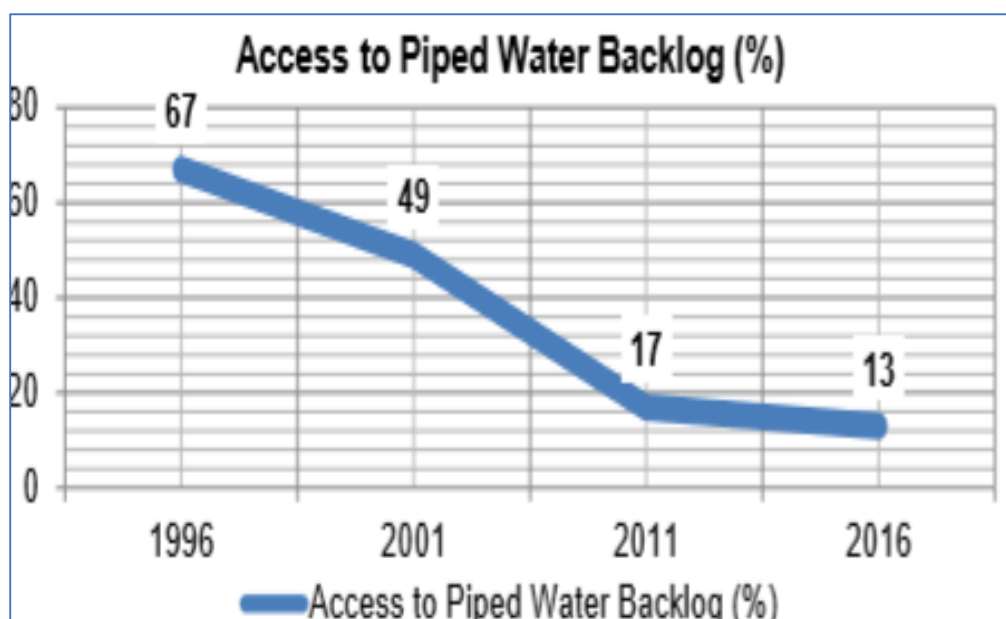


Figure 5.1: UDM Water Backlog Eradication

Source: Statistics SA Community Survey 2016 (STATSSA 2017)

The following extracts are examples of respondent comments:

- “Most people in this neighbourhood are unemployed”.
- “We are not empowered, we lack voices and we are forced to use poor water quality from rivers and wells. People often get sick from utilising river water”.
- “Water from tube wells tastes bad”.
- “Water sources are too far”.

These people have to walk long distances to access water sources, along with concerns regarding lack of reliability. The responses were: “One minute we have water on our taps the next minute we do not have”; “We do not get notified when we will not get water supply”; and “we often have to store water in buckets”.

When the municipal officials were interviewed, they acknowledged that there are limited developments concerning the measures through which services should be provided. As a result, there are discrepancies between the expectations of consumers, versus the service they receive. Hence, the municipality was regarded as useless, incompetent and unproductive. Moreover, respondents

were of the view that the existing water and wastewater infrastructure has gone beyond their design life and should be refurbished.

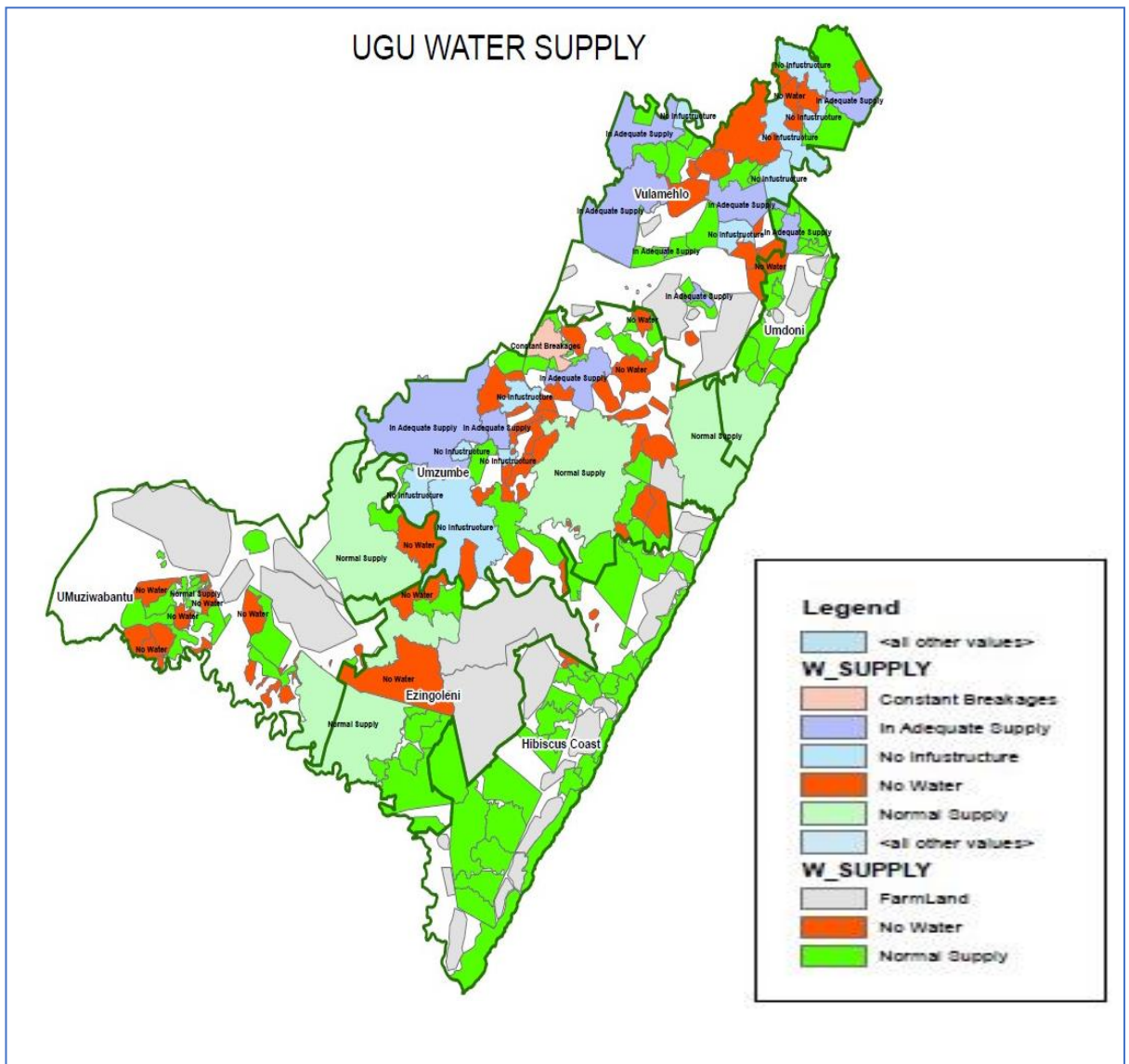


Figure 5.2: Ugu District Water Supply Map

Source: Ugu District Municipality GIS (2013)

Figure 5.2 shows the UDM water supply map. Officials from the UDM who were interviewed also concur with ward councillors in that there are challenges with water provisions. Officials acknowledged that a reliable supply of clean and safe water to communities is not achieved due to inadequate infrastructure. They further stated that their approaches have failed to provide WaS services to the poor because of the inefficiency, non-responsiveness to demands of poor

households and environmentally unsustainable WaS systems. They also conceded that their billing system is flawed, because from 2014 the municipality was forced to change the billing system as per Treasury regulations and move to a system that was compliant. There were many discrepancies in the accounts during the transformation and even by year 2018, they were still trying to rectify the problem.

The UDM 2020/21 IDP also acknowledged that the significant service delivery arguments affecting the UDM area of authority are variations in terms of water provision of varying standards in different areas. The IDP also acknowledged the deficiency and aged infrastructure, water supply stoppages and eradication of backlog. Municipal officials attribute all these problems to the expensive upkeep of water infrastructure, low quality of water pipe infrastructure and low pipe pressures and finally lack of funding. Noticeably, The UDM could not achieve the MDG that needed 100 percent access to WaS in 2014, owing to limited funding and resource capability in HR. However, according to Kings (2018b), "Municipalities are not capable of planning, managing and operating their water operations". Additionally, Njobeni (2019: 8) stated that municipalities are perpetually overspending, have weak fiscal discipline and lack financial management.

The adverse Audit opinion in the UDM AG report for 2017/18 is also an indication that WaS provision is not a winning battle. Some of the issues in the report highlighted that there were no sufficient measures in place to ensure that free basic services reach the intended beneficiaries. It also indicated that there were water projects that had been concluded but with no water coming out of the taps.

These challenges have led to service delivery mismatch, particularly in the inaccessibility of bulk water that set back the construction of housing projects. It was acknowledged that in the countryside, only women have an obligation to fetch water from boreholes, rivers and community taps. At this point, it serves to mention that the application of the constitutional bill of rights, which sets forth the

right of access to water, has not materialised in some societies, specifically in rural areas.

The IDP 2020/21 stated that the UDM is committed to ensuring universal availability of sustainable safe drinking water, as well as to basic, adequate sanitation provision. The municipality acknowledges its responsibility in accomplishing the NDP 2030 vision, drawing attention to the expansion of infrastructure, which is the main stumbling block in ensuring widespread access to clean WaS guaranteeing dignity to everyone in the UDM. The results of the study presented a picture clearly indicating a limited competency in the municipality workforce, which might be true, considering most of the work is conducted by contractors and or service providers. Ward councillors raised concerns regarding the lack and or proper supervision of contractors working for the municipality, claiming that absence of monitoring and direction results in wasteful expenses, and incomplete, substandard projects.

The significance of eliminating WaS backlog was echoed in the State of the District Address in 2018, emphasising the need for the municipality to align itself with national priorities. The address estimated that the cost of backlog eradication was roughly R3.4 billion, promising that huge infrastructure investment will be distributed in the next ten years. The district Mayor elaborated the three strategic programmes that were to ensure successful water management by expanding water infrastructure capacity and encouraging awareness of water proficiency. The infrastructure development backlog is worsened by the financial predicament in which the DWS finds itself. The DHSW&S budget is limited and continues to diminish, as stated by the Minister of Human Settlements, Water and Sanitation, Minister Sisulu. The minister said the government anticipates a R333-billion budget deficit in the next ten years. In addition, the Department has a R59-billion backlog in terms of refurbishment of infrastructure (Mthethwa 2019).

5.2.5 Quality of water

Water quality is assessed in terms of how households perceive the quality of the water they received, and the need to treat water. Respondents were given four

aspects of water quality, namely, is the water safe to drink, is it clear (turbidity), is it good in taste and is it free from a bad smell? Ward councillors felt their drinking water was not safe to drink, especially from the rivers. They also believed that water trucks deliver untreated water to them, because of the smell, taste and muddy colour.

Residents from urban areas took the water issue to social media (Photographs 5.1-5.20), they believe the municipal water they receive is not safe to drink, because at some point, they were drinking salted water from sea water, without any warning, and the municipality was issuing statements that the water was in compliance with laws (Rishigen 2015). Moreover, from time-to-time the provided water is muddy and there is no explanation to consumers (Dlamini 2021a; Mkhonza 2017). Numerous reports and newspaper articles read as part of the study indicate failure or obvious incapability to arrest the current pollution problem that is threatening water security in the country.

5.2.6 Blue and Green Drop Status

In the year 2012, the UDM was graded 7th in the KZN province in terms of Blue Drop status and held a municipal record of 92.55 percent. However, in the year 2014, the overall score for the UDM was 58 percent, which translated into the 4th worst performance in KZN (Blue Drop Report 2014).

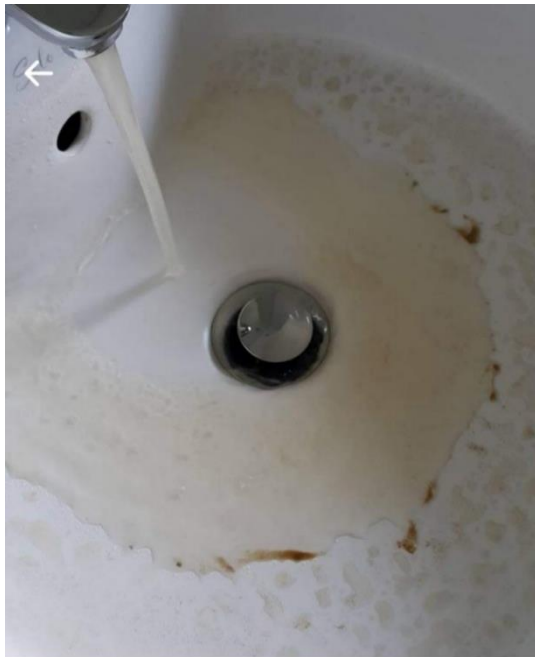
The report stated the following:


- a) The municipality had not maintained a comprehensive water safety planning process since the previous Water Safety Plan was developed in 2011. It is compulsory for the municipality to frequently evaluate and analyse risks associated with preparing drinking water of an adequate standard and to implement remedial actions.
- b) The municipality is required to apply an evaluation programme that conforms with the provisions of SANS 241 (relating to selection points and coverage of the distribution system, frequency of analysis and the determinants that are analysed). A full SANS analysis should be undertaken on the raw and final product and its distribution system, in

order that risks may be identified and to inform risk-based monitoring. The accuracy of operational monitoring was uncertain, due to calibration records not being available for on-site equipment.

- c) Microbiological analyses are currently undertaken by the municipal laboratory, which is not accredited and does not participate in any inter-lab quality assurance scheme to verify analytical results. The DWS highlighted the poor microbiological compliance of water, indicating grave concerns on the poor microbiological quality of drinking water and the resultant risk to water customers.
- d) Budget and expenditure information could not be provided for each water system.

UGU DISTRICT MUNICIPALITY - DIRTY WATER




 **Christine Parkinson**
09 May 2018 · 🌐

Welcome home gift for me... !!!!
THANK YOU UGU ... what next?
Collis Road, Manaba.
Water still dirty after 5 minutes of wasting (dirty) water !

 4

3 Comments



 **Christine Parkinson**
09 May 2018 · 🌐

Welcome home gift for me... !!!!
THANK YOU UGU ... what next?
Collis Road, Manaba.
Water still dirty after 5 minutes of wasting (dirty) water !

 4

3 Comments

 Like  Comment  Share

well i suppose beggars can't be choosers . Dirty water is better than no water !!
WELCOME TO AFRICA

 22

18 Comments

 Like  Comment  Share

Photos 5.1-5.4: Dirty water as reported by UGU water users on social media

According to Ugu IDP (2020/21: 132), the municipality developed an improvement plan which is currently under implementation to improve the risks in the Water Treatment Infrastructure. The suspicions of the respondents (officials and ward councillors) collaborate with the Blue and Green Drop reports. In the year 2018, the municipal laboratory was still not accredited, therefore, there was no need to request drinking water reports. Norms and standards for water affairs states that a water services institution must compare the results obtained from the testing of the samples with SABS 241: Specifications for Drinking Water, or the South African Water Quality Guidelines published by the DWAF.



Yvonne Lawlor
16 Jan 2017 · 🌐

Dirty water in Umtentweni AGAIN. This is after filling the washing machine 3 times in an effort to get clean water. UGU is an absolute disgrace with their service delivery.

🙄👎🤢 15

7 Comments



Like



Comment



Share



Riana Horn Worthmann
21 Jan 2018 · 🌐

Ugu's dirty water on the left and still water (we must buy water now to drink) on the right! Disgusting Ugu! This is Ramsgate and sometimes the water is even worse!

🙄👎🤢 20

11 Comments



Like



Comment



Share

Photos 5.5 and 5.6: Dirty water for laundry and drinking reported by UGU water users on social media

5.2.7 Reliability of water

Occurrence of interruptions of water supplied to the household by the municipality are assessed in terms of the households' source of piped water. Respondents interviewed with access to piped water all had experienced interruptions in their water supply in the preceding six months. Some respondents, who are also officials residing in Gamalakhe (Urban area), said there were occasions when they did not have water for weeks, and in other months they experienced interruptions daily. Of these households, those which had access in their own yard were mostly likely to experience these interruptions. In rural areas, those households who made use of their neighbour's taps or communal taps indicated they had experienced interruptions almost every week in the past six months (2018 June).

Interviews allege that the UDM concentrates on delivering service more to urban areas, because these are paying consumers. Respondents in rural areas believe it is because customers in urban areas pay for the services, whereas in rural areas they are subsidised by government. Nonetheless, this study showed there are water interruptions both in urban and rural areas, with no reliability in water supply, because of burst and leaking pipes. The turnaround times for repairing water leaks and or burst pipes was varied but was long, and not compliant with Norms and Standards for the water department.

All ward councillors who participated in the study allege that it sometimes takes months before Ugu repairs burst pipes. The researcher had undertaken to monitor the Ugu customer care facebook account, as well as Hibiscus Coast Seconds facebook accounts. In these accounts and or pages, it was clear that Ugu customers were complaining, supported by pictures of burst and or leaking pipes reported for some time but not fixed (Nxumalo, 2021).

The following pages contain photographic evidence by UGU water users with regard to their complaints regarding water shortages, leaks, and burst pipes. The posts range from 2014 to 2019 and show continuous problems experienced.

UGU DISTRICT MUNICIPALITY - WATER SHORTAGE COMPLAINTS

UGU Complaints
Like Reply

Jacques Du Preez
1d · 🌐

Leon Labuschagne asked a question
2h · 🌐

Can we get urgent action please
Their is a severe water leak in Melville between the main road and Big Fisherman Road since Subday Water is streaming down Big Fisherman an flowing over the railway crossing
I reported it allready twice to Ugu but no response yet
Lots of water is waisted and couse damage to the driveways and Roads
PLEASE DO SOMETHING

2

1 Answer

Like

Answer

Share

Dale Brice
And people have no water!!! 😡

Like

Reply

Still no freaken water in Shepstone str Manaba Brach!!!!!

👎👎👎

2

3 Comments

Like

Comment

Share

Yvonne Eskelsen Gagiano
1d · 🌐

It is a disgrace . 6 weeks now no water Elizabeth street. And spoke to a lady at Ugu and we were suppose to have water since Friday. Ugu must be held accountable

4

2 Comments · 1 Share

Photos 5.7-5.10: UGU water users post photos and speak out on UGU and Hibiscus Seconds Facebook complaints pages

← S'phelele Ntando Nzimande 🔍



S'phelele Ntando Nzimande is with Vico Ndosi and 2 others.

24 Mar • 🧑🏿

I have been quite on the issues of UGU District Municipality more especially water crisis which now has resulted in the protests.

I'm fully against the burning of infrastructure etc but what I'm noticing here even by Municipal officials and other community members who might not be having so much problems as those that are frustrated by the water shortage is that they ignore pointing out that the municipality has failed dismally to address the situation of water and has even failed to address the residents of UGU District.

I do believe that if the district Municipal officials did consult with the community we wouldn't be where we are and we wouldn't be in a situation that is not only a sign of frustrations caused by the incompetence of the Municipality but also exposes the true colours which expose that Most Municipal officials are arrogant whether they with local municipality or the district they become arrogant n ignorant of the facts that we are where we are today because they failed to deliver and also failed to address community on their failures.

Now you see Municipal officials and arrogant certain community members here on Facebook making one sided posts that are only blaming the community for burning infrastructure and saying nothing about the District Municipality failures

Again I'm against the burning of Infrastructure but as [S'phelele Ntando Nzimande](#) I blame the District Municipality for the situation!!

Warning to Municipal Officials and certain Community members stop with the arrogant posts they are not helping but exacerbating the situation!



Ralph Wortley shared his first post.

👤 • 1d • 🌐

I have read several posts which imply that at some stage there has been mains water recently and it has then gone off. I want to record that in Lynne Avenue, Ramsgate South, neither I nor my neighbours have had any water at all since around 25 May. It had gone off before then, came on for a day or so too filthy to use, then went off permanently. We have had to buy a tank of water and when that was finished, took water from the

← Posts 🔍



Hibiscus Coast Seconds (HCS)

Sandra Reardon • 01 Jan 2017 • 📷

My response to a post on UGU Municipality Talk by uGu's Zimbini in respect of the ongoing water supply & sewage pollution debacles:-

"Although I appreciate your keeping residents informed Zimbini, this post & the entirely unacceptable situation causes extreme anger as it is based on spin, lies & an ongoing, long term lack of proper maintenance & management by Ugu. The reality is that there is ZERO shortage of water on the KZN coast nor has there been for a very, very long time. You have to be both blind & stupid to realise that the water restrictions, outages & low water pressure are a sick joke while the sources of our water supply (two big rivers) have been gushing millions of litres of water into the Indian Ocean all along. Look around too & notice that the vegetation has remained as green, thick, lush & verdant as it has ever been as we have also experienced ample rain! While the Ugu water & sewage reticulation systems regularly experience burst pipes due to Ugu's failure to replace aged pipelines a long time ago when it should have been done & to maintain the valves & pumps etc properly & regularly & Ugu takes its sweet time despite numerous reports & calls to repair these bursts, Ugu itself is a shameful, large scale waster of water while it threatens us with fines & onerous water restrictions & outages. We have now had water restrictions for about a year now!!! Under all these circumstances, it is too rich to consider swallowing 🤢 Furthermore, Ugu's spin & lies about its disastrous record of breakdowns & spillages at its water & sewage pump stations & water reservoirs are ALWAYS, EVERY SINGLE TIME as a result of a lack of maintenance & management despite Ugu's utter lies to the contrary. Our intelligences are insulted with the contents of these lies we are expected to swallow. The pollution by UGU of our wetlands, waterways & beaches through sewage leaks, spills & even deliberate pumping by Ugu is another utter disgrace particularly as Ugu is charged with monitoring pollution & flouts all relevant environmental legislation in doing so. Ugu is literally making people ill through its total negligence & dereliction of its duties. For years, every holiday season, there are an inordinately high number of ear infections as well as diarrhoea experienced by locals & holidaymakers alike because Ugu is polluting our waters & failing in its job to monitor pollution by farmers & commercial culprits. For instance, your extension officer was warned that the sewage tank at Bargain Wholesalers was unstable & about to collapse. He did nothing. The entire tank collapsed a short while later during a storm & was washed into the Inhlanhlinhlu River, Sandlundlu estuary & landed up on the main Port Edward bathing beach. I could go on & on as could many others. Ugu needs to face the fact that it needs serious assistance & guidance by those in the community who have the requisite knowledge & are prepared to give of their time or face being put under provincial administration. This post is not directed at you personally Zimbini - it is directed at the entire management team at Ugu & I would appreciate your bringing my comments to its attention".

👍 Like

💬 Comment

📧 Send

UGU DISTRICT MUNICIPALITY – WATER SHORTAGES AND LEAKS



UGU Complaints

8h · 🌐

Lot 198 Southbroom ave. 198 is a corner lot. So It's just along that lot in rocky lane. Southbroom. I already reported it to UGU Plumbers. – with George Henderson.



3

1 Comment



Like



Comment



Share



Johan Steyn

26 Jun 2014 · 🌐

Wonder how much water Ugu is planing to waste before they want do fix the water leak

2 Comments



Terence Olivier

24 Mar 2015 · 🌐

It seems UGU Municipality thinks that if a water pipe has burst and it pours into the lagoon then we are not wasting water ... Going into day 9 now and no sign of anyone trying to repair it. Pipes leaking all over Hibberdene!



7

6 Comments



Ivan Hanneman

18 Apr · 🌐

Now I know why we don't have water main water pipe between Pumela and Umzumbe. Ugu staff on site standing around talking and doing nothing to repair the leak. Think they are waiting for someone to turn the water off.



34

29 Comments



RNM Ward 2 Community
15 Nov 2017 • 🌐

Ugu Water Accounts

Advisory

I recommend that you send your meter readings to Ugu on the same day each month. Then add your actual usage to the basic charges and that is what you pay. If the amounts differ, then "Declare a Dispute" (use those words) and carry on paying what your readings reflect.

The legal onus is on Ugu to prove that you did use the water and not on you to prove that you didn't. Remember, to adjust the scale if you had an untoward event like a large internal leak, you filled your pool etc.... See More

👍 12

1 Comment



Annemarie Bosman
31 Jan • 🌐

Please help Ugu, despite 3 attempts from Ugu water leak worse now. Link road, Freelandpark, Scottburgh.

👍 1

UGU Complaints
Bertie Strydom • 4h • 🌐

Today I'm totally disgusted with the municipality : Umuziwabantu for doing this. Sewrage is regarded as a pollutant, it is a criminal offence to spill dispose of in this manner. This MM I believe has a case to awnser. Two years ago I lost cattle due to this and at that time UGU was responsible. I'm sick of the lack of knowledge at display here. Ho... See More

😡🙄🙄 6

1 Comment

👍 Like

💬 Comment

➦ Share



👍 Like

💬 Comment

➦ Share



I ugu pump station in Izotsha. This is how those greedy, selfish and lazy ugu strikers damage valves. They have no value for anything. Can ugu not hire private plumbers to sort this out? Hire security companies to guard the stations? Hurts to see this, that our taps are dry and water is just wasted like this.



Megan Geddes
01 Jun 2018 · 🌐

I have been trying so hard to refrain from saying something negative on Facebook about our failing Municipality because honestly the KZN South Coast is indeed a magical and beautiful place to live (and visit) but my patience is absolutely lost. This sabotage is INHUMANE AND UNJUST. At wits end, no water at work...no water at home (5 days and looking ahead without a doubt to a water free weekend). Five days may not seem like a lot to some, but when we KZN South Coasters have suffered past frustrations of even longer periods of water woes, striking and service tampering (without ever actually ever reaching resolution) - 5 days is a lot more than any of us can take. The workers may be striking illegally which is shocking in its own right, but this is not the first time UGU have faced these issues... lets look at the common denominator. Our Municipality is not well run, we are all suffering - when will it end? What is it going to take? Why are the valves exposed? Total mismanagement. Absolutely appalling! Cape Town suffers a water shortage and our water is literally being shot up into the air (into nothing) to prove what exactly? Disgusting.

🤔👍👎 16 2 Comments

👍 Like 💬 Comment ➦ Share



South Coast Fever
04 Jul 2019 · 🌐

Burst pipe leaking for days

WATER was seen gushing from a manhole on Marine Drive on Sunday and Monday this week, and had residents and passersby concerned.

Motorist Dr Jean Peltz, was driving along Marine Drive on Monday when she noticed the leak, she stopped at the nearest store and asked them to call the municipality urgently, but is not sure if there was any response to that request. She said when she got home, she tried calling Ugu Municipality to report the matter, but could not get through. "I received no feedback because no one answered my telephone call, despite waiting for more than one hour."

Another resident said the leak had b... [See More](#)

👍👎 2

Baccanier Hlubikazi Juqu
1d · 🌐

Can someone explain where is water at x 3 Sheffield for God sake one need yo eat the whole week end with no water not even the stupid tanker truck maara why mst we suffer

🤔👍👎 6 9 Comments

👍 Like 💬 Comment ➦ Share

Jhean Maryke Ludick
1d · 🌐

No water Strachan and Diagonal street Ramsgate!

🤔 1

👍 Like ➦ Share

Photos 5.11-20: Water users protests on social media regarding water leaks

A water service institution is obligated, in terms of the DWAF - Guidelines for Compulsory National Standards Regulations under Section 9 of The Water Services Act (Act 108 of 1997), to repair any major, visible or reported leak in its water services system within 48 hours of becoming aware thereof. Ideally, the leak should be repaired within 24 hours but in order to accommodate exceptional cases, the time allocated in the regulation has been increased to 48 hours. These regulations also add that in the case of repairs that take more than 24 hours, the water services institution should make arrangements for alternative water supply services as required.

5.2.8 Pricing, subsidies and tariffs

In areas where there is infrastructure, community members commented on the lack of empathy from the municipality, stating the approximate amount of R2 000 for connection fees limits households from having their own water because it is costly. Respondents living in urban areas believe that the price of WaS delivery is relatively high. Moreover, they perceive the billing system of the municipality as inappropriate and unreliable, arguing that pricing of water is unfounded and prejudicial to the consumer and the institution.

Municipal officials stated that consumers in rural society do not pay for water. Their payment is through national government's equitable share, channelled through local government. However, considering the municipality's population being about 90 percent rural, the defaulters' book of the UDM is mainly made up of underprivileged society causing non-payment ratios with the inability of the municipality to collect income. There are approximately 66 000 water account holders, 6 700 people in the indigent register are listed, out of 730 000 people, which is the population of the UDM. AG reports indicated there were not enough measures in place to ensure free basic services reach intended beneficiaries. The report also indicated that the indigent register included customers who did not qualify to be classified as indigent and the register was not regularly updated. The information was confirmed in the Ugu IDP (2020/21: 253); the document states that the management of indigent consumers has been identified as a challenge in their Revenue Enhancement Strategy.

The financial incapacity of the UDM is accredited to the poor and or collection from paying customers, whereas, UDM officials contend that water charges and subsidies are a causal factor to under-collection. In the report presented to the multi-stakeholder's forum in May 2018, the chief financial officer (CFO) said consumers owed the municipality over R400 million, up to June 2018. Apparently, there were errors in billing and faulty water meters that they were aware of and, as municipality, they attempted to remedy the situation. The media statement from SALGA on 30 June 2021 on the 2019/20 audit outcome, states that one of the biggest challenges confronting local government over the past 20 years is that of consumer debt. The reports continue to state that about 63 percent of revenue shown in the books will never find its way into the bank account of the municipality. Moreover, National Treasury highlights that the aggregate municipal debt stood at R230 billion as at 30 December 2020 (SALGA 2021).

Ugu official respondents believe water utilities, such as Umgeni Water, do possess the means and competency to deliver proficient services, with the notion that charges could be cut down should services be handed over to WBs (Umgeni). It was asserted that should water charges be reduced, services will be affordable, facilitating people to pay, thus increasing the possibility of the UDM recovering more money. The following statements were received from respondents

- The municipality must be assisted by Umgeni water
- Ugu consumers have been demotivated by the bad service they receive from us
- Department of Cooperative Governance and Traditional affairs must just intervene and take over the municipality, put the municipality under administration.

It is not uncommon that the Department of CoGTA intervenes to improve cooperative governance across the three spheres of government, in partnership with institutions of traditional leadership, to ensure provinces and municipalities carry out their service delivery and development functions effectively (National

Council of Provinces 2021). It was later also verified that Ugu and Umgeni are going to assist each other in improving service delivery at the municipality (Kubheka 2021). In the year 2014, UDM was amongst the eight municipalities requiring intervention by CoGTA (Ugu IDP 2020/21).

This research project revealed that the UDM does not definitively indicate the price of producing and or delivering a kilolitre of water, either in urban or rural societies in monetary value, and to make matters worse, there were communal standpipes without water meters. In addition, water consumption trends showed individuals who obtain water from standpipes are not restricted and or limited to 200 L per day, as per legislated allocations, and that standpipes are continuously dripping day and night, with limited maintenance. Contrary to the legislation, members of society consume more than 200 L in a day. The perception is that some people use more than 200 L of water at no charge, while others are overpriced and yet others are totally deprived of water services.

5.2.9 Efficiency and effectiveness of the UDM

Municipal officials and non-officials both agreed that the municipality is ineffective and inefficient, because they do not provide adequate services. The municipal officials also believed that the UDM is failing dismally to plan for the increase in population, stating that people experience water shortages as more houses are erected. Officials believed that, in the absence of planning for population increase, demand will constantly surpass supply.

The municipality will be deemed ineffective and inefficient when there are disparities of service delivery between rural and urban areas. A scourge of dissimilarities was most noted in the previously disadvantaged areas that endure being marginalised. Likewise, urban consumers testified that water infrastructure was old and constructed as far back as 1948. This information was established through interviews with members of the ratepayer committees. In summary, it means enhancements in productivity and efficacy are not sufficient. This information was also verified in the UDM infrastructure audit document.

5.2.10 Water Conservation/ No Drop Assessment

The No drop Assessments report indicated the status of water losses, water use efficiency and non-revenue water in municipalities (Wegelin 2018). A high authorised unit of consumption could be an indication of inefficient water use, often because of excessive internal plumbing leakage, or paying consumers who do not value the scarcity of water, or effective metering and billing systems. A low authorised unit of consumption could be an indication of unmetered consumption that is not included in the water balance or a large quantity of unauthorised consumption or theft.

the UDM acknowledges that it experiences water losses, mostly from leakage on transmission and/or distribution mains, leakage on service connections up to point of consumer meter, as well as leakage and overflows at the utility's storage tanks. The most common causes for commercial losses are, however, unbilled unmetered consumption, unauthorised consumption, customer metering inaccuracies; and high internal plumbing leakage on private properties, as well as inefficient garden watering and household water use. The UDM AG report for 2016/17, as disclosed in note 5 to the financial statements, indicated material water losses to the amount of R29.59 million (2016: R27.14 million) that were incurred, which represents 25.19 percent (2016: 25.99 percent) of total water purchased because of technical and non-technical distribution losses.

5.3 Viability status of service delivery at the UDM

The first research objective was to investigate the viability status of service delivery at the UDM. Viability is basically understood as the ability of an organisation, through its internal processes, to learn how to survive through changing contexts. The design of the management and control system of an organisation is critical to the ability of the organisation to thrive, or even just survive, in its environment (Jackson 2003) Thus, it is necessary that the management and control system of an organisation be designed to match the needs of the business environment in which the organisation is operating. Themes in this chapter offer the necessary insight in understanding the state of the current municipal service delivery model, its performance and mostly, the

extent and possibility for the municipality to improve its delivery system using systems theory.

Moreover, a thorough examination and judgment as to the extent to which the UDM has met its obligation and or addressed the underlying issues of universal access to WaS, as well as reviewing the quality of service it provides to its community. In doing so, this section will offer the necessary understanding of how the municipality is undergoing transformation and how it functions within a very dynamic environment. Data collection was achieved by means of different techniques and through primary and secondary methods, where the following took place:

- Interview questions were constituted, and interviews conducted;
- Document reviews were conducted;
- Meetings were attended where the UDM was engaging water account holders on issues pertaining to billing.

The data collected through multi approaches were merged and presented in a multi-dimensional context, under which this research was undertaken. The discussions are based on the institutional approach, interventions and implementation experiences of practitioners and other stakeholders involved in the provision of WaS at the UDM. It has been established that the survival of municipalities, as a self-governing sphere of government, will be determined by how victorious they are in realising the constitutional order of being an agent of service delivery and growth.

5.3.1 Explaining VSM

Drawing on human neurophysiology, Schwaninger (2006) observed the arrangement, as well as functioning of the human brain, such as the manoeuvring of muscles and organ tissues within the entire nervous systems, in relation to the external environment. He then postulated that those conditions and circumstances can be applied to any institution, regardless of size, type and or country. In VSM, five levels are divided into the 'Operation', translated into the muscles and organs that are the parts that perform essential primary activities.

The second level 'Metasystem' and or the brain and nervous system, which is the part that ensures coexistence of various operational divisions in a cohesive, balanced manner, considering that the duty of the Metasystem is to hold and stabilise the entire entity and regulate fluctuations of outside environmental settings that affect the operations of the municipality (Walker and Espinosa 1991; Leonard 2007; Khosrowjerdi 2011; Chatzimichailidou and Katsavounis 2012). According to Chatzimichailidou and Katsavounis (2012), the five systems, according to human body functions, are presented below:

SYSTEM 1 (S1): the muscles and organs responsible for critical operations of the body.

SYSTEM 2 (S2): The sympathetic nervous system that regulates the muscles and organs and ensures their interaction is kept stable.

SYSTEM 3 (S3): The base brain, which oversees the entire complex of muscles and organs and optimises the internal environment.

SYSTEM 4 (S4): The mid brain, the connection to the outside world through the senses, future planning, projections, forecasting.

SYSTEM 5 (S5): Higher brain functions, formulation of policy decisions and identity. The match between the human body systems and an organisation is tabled (Table 5.1), showing the neurophysiological basis of the Viability Status Model, as set out by Chatzimichailidou and Katsavounis (2012).

Table 5.1 :The Neurophysiological Basis of the Viability Status Model

S Number	S Identification	Brain analogy
S 1 (S1)	Primary activities.	Skeleton, Muscles & Organs: operations (1)
S 1 (S2)	Stability and conflict resolution.	Autonomic Nervous S: regulation (2)
S 1 (S3)	Internal regulation and optimisation, synergy	Pons & Medula: internal control (3)
S 1 (S4)	Sensors, adaptation, planning, strategy development, forward planning	Diencephalons: sensory input and planning (4)

S 1 (S5)	Policy, identity, goals, ultimate authority	Cortex: higher mind/brain functions (5)
----------	---	---

The viable system invariably contains many operations that, individually, have an interrelated management purpose, and functions in its own environment, identical to a municipality made up of different departments (Cooperative services, Treasury department, Local economic development (LED)) and subdivisions, for example human resource, budget, and informal trading, respectively (Jackson 2003; Reynolds and Holwell 2010).

The design of a system and or the municipal structure must facilitate the flow of information and materials between all operational components. For the municipality to be viable, departments and sub-sections will have to co-operate with each other and maintain a proper state of balance amongst themselves. In municipalities, co-ordination is accomplished by establishing production plans, usually referred to as the SDBIP, with high-ranking officials that direct the operations of departments and subsection responsible for a certain part of SDBIP. They also monitor the use of resources with control by an internal regulation unit. The manager for an operational unit must be mandated to execute his or her duties, hence, is given resources such as capital and or operational funding, manpower and other provisions, to enable the delivery of service.

The bargaining resources institute is an influential attenuator of the varieties an operational administration might cause. It must be noted that managers account for all resources given to them in various forms, such as monthly, quarterly and annual reporting and to various committees. Accountability is also a controlling attenuator of the variety to which the municipality should comply. Moreover, senior officials devise standard measures to ensure operational management achieves municipal and legislative obligations.

This highlights the point that management must regulate operations mostly by guiding and directing activities and must not only conduct ad hoc monitoring. In addition to the monitoring of management, it is significant that communication

channels pose the needed variety to handle transmissions. Policies and instructions must be efficiently communicated to individual operational management, in order to be interpreted into tangible action plans. The operational units should effectively feed its environmental setting, responding to the needs of water consumers; failure to communicate at any level might lead to futile achievement (Hoverstadt and Bowling 2002; Golinelli *et al.* 2011).

The above aspect projects a time element into municipal communication channels. Communiqué in the networks need to be fast enough to retain the rate at which variety is generated, otherwise the stability of the municipality will be threatened, although it is acknowledged that the stability of the municipality is dynamic, not static. Therefore, when there is a memorandum that crosses a boundary, it should be “translated”, so that it continues to make sense. The entire movement is termed transduction. Thus, when the transducer does not have requisite variety, the communication becomes distorted or vanishes. In addition to the five operations in VSM, the municipality must be able to support and adapt to environmental conditions and or change, while maintaining stability in its behaviour; that is a true definition of a viable municipality.

5.3.2 A Viable System or municipality

There are basically five essential functions for a VSM and for the municipal institution to be viable, it must have five key sub-systems in place, in order to pursue service provision and delivery efficiently in its environment. The critical functions are namely, Implementation, Co-ordination, Control, Intelligence and Policy. Therefore, traditional municipal interactions between departmental units, standard operating procedures, execution and compliance with laws, regulations, informal agreements, customs, and norms that shape and direct the socio-economic actions, must all interact, obeying the VSM’s motion of movement.

5.3.2.1 System 1 or primary operations

System one (S1) comprises primary activities that cooperate directly with the existing environmental condition, which comprises the society, as well as political and natural environments. S1 is equivalent to the autonomic nervous system and

or sympathetic nervous skin system, with its main function to incite the body's fight-or-flight reaction, it is nevertheless, continuously active at a basic level to sustain homeostasis. S1 regulates the inner environment by directing smooth and cardiac muscles and the organs of the gastric, cardiovascular, excretory, and endocrine systems (Jackson 2003).

The S1 of the municipality is made up of the numerous sections associated with the implementation/ carrying out of the responsibilities/ purpose of the institution. Primary activities produce and or deliver core products or services of the municipality, in which the municipal uniqueness is at the core of the recursive model of WaS delivery. Although municipal services produced at various stages of aggregation by its embedded primary activities and the value chain of the municipality applies the overall purpose through the UDM project management unit (PMU), including water service and water operations. An individual subsidiary (or part) of S1 is connected to the wider management system by the vertical command axis. Moreover, each part of S1 duty accepts a degree of coordination and control by S2 and S3, which are aimed at facilitating the current interaction as performance of all divisions. Since there are more than one S1 activity, S2 operational duty is therefore to quiet the oscillations, so that shared resources and support services are administered effortlessly and proficiently.

It has been mentioned in the previous paragraphs that operations comprise of the production sub-departments (S1), which are essential to deliver and distribute WaS, which is the municipality's fundamental function. S1 of the UDM encompasses Operations, Water services, Project management services and the Planning Department. A devoted and semi-autonomous municipal unit rules each unit-department. S1 departments are dependent on material as well as other flows provided, and suppliers situated within and outside the municipal environment. These include water tankers, honey suckers, contractors associated with WaS provisions, the DWS and local municipalities. Internally, departments are interacting, through the SDBIP, different committee meetings and other flows (vertical arrows), and according to the specific municipal structures and regulations and arrangement of the municipality.

5.3.2.2 System 2 or co-ordination

The autonomic nervous system in the human body (which is S2 in the municipal settings), controls the internal environment by directing smooth and cardiac muscles and the organs of the digestive, cardiovascular, excretory and endocrine systems (Sporns 2007). System 2 is a coordination function. A viable municipality has a S2 level to co-ordinate the interaction units that add value and the administration of primary sub-units. Simply put, the well-matched commands from higher management must make sure that the assorted roles of S1 of a municipality work in harmony. Although in an emergency, sub-units of S1 will attempt to operate on their own paramount benefits but built on only local information. It is S2's role to oversee these relations and to stabilise the condition to obtain a balanced response from S1. It sends feedback to the localised management of S1 to re-establish synchronisation, calling if required, upon the resources of S3.

The co-ordination level S2 is frequently inappropriately used as a substitute term for top-down direction and control in today's management vocabulary. The logic is to make use of the term co-ordination by combined adjustment between support functions and between autonomous units. This is an area where Information Technology (IT) (S2) can be useful in avoiding more direct and disturbing human intervention, provided they are designed with the accurate ideologies in mind.

Key workflow and or business activities, as well as restructuring, are to pay vigilant consideration to the necessity of co-ordination amongst value-adding and support functions, over the design of actual two-way communications and mechanisms for common adjustment. The corporate monitoring centre obtains information of the various activity subsidiaries that will avert dangerous oscillations arising in the municipality, shaped by all the subsidiaries. A list of the services in a complex municipal dynamic that could be derived in S2 comprises: entrance for incapacitated persons, accounts payable and or receivable, Certifications, and Computer/ICT, in addition to auxiliary services, employee assistance programmes and benefits, insurance coverage, procurement

scheduling of generic facilities for WaS, and human resource, current training practices, and so forth.

The common dispute about S2 tasks is that they do not contribute in monetary terms, however, executing these tasks competently can save money and enhance performance. S2 works much as a timetable does at school, managing timeframes, subjects, and all related activities. It is important to note that a timetable does not differentiate the performance of the teachers or school, although abiding by its principles it adds value to a school. In addition, relying on conditions, a municipality of any size will mostly be engaged in the greatest of them. When these activities have been established, they do not need many resources or attention from executive leadership, except when there is a fundamental modification in institutional operations. They are administrative and exist so that things run smoothly. Some are mechanical, some administrative, some physical, some formal, and some informal but together, they absorb much variety, so that people do not have to reinvent the wheel.

Lastly, neither of the activities are viable as S2 for the municipality, although in times of subcontracting, delivery of certain services s security and housekeeping might be viable as S2 in other institutions. The objective of S2 is to improve all municipal properties, such as growth, stability, diversity, flexibility, and sustainability, regardless of whether they are effortlessly evaluating or not also assist in inspiring the strengths and structures that benefit the system to run itself.

S2 of municipality processes comprises production scheduling, SDBIP, accounting protocols, and IT services, along with Disaster management, auxiliary HR and Work Procedures (standard operating procedures) that support the harmonious interaction of production departments or water services and ensure cohesiveness. The lack of S2 in the municipality will cause chaos and destroy the entire municipal institution. In the event where the UDM faces a technical problem associated with IT and wishes to go offline, or when there are disasters with an actual scheduling process, will ensure that the rest of the departments are notified on time and operation is not seriously affected.

The Co-ordination role also deals with the "soft" issues of the municipality, such as ethical standards and management of culture. If such aspects are not to be "commands" they must be handled in this way. The infrastructure that supports primary activities of S1 units is a fundamental S2 purpose. Some of the infrastructure is physical, such as water pipes, trucks, electricity, and telephone wires or towers, as well as roads and other infrastructure.

5.3.2.3 System 3 or control

The medulla oblongata and or brainstem also has a structure called the pons. Its function is in homeostasis, coordination of movement, and conduction of information to higher brain centres. It is involved in the control of breathing, sensations such as hearing, taste, vomiting, balance, and digestion (Sporns 2007). Espejo and Gill (1997) and Leonard (2007) described S3 as management activities that allocate resources to operations and ensure the optimum performance the municipal requires, which is normally explained as 'managing services'. In the S3 level, resources including tools of trade are negotiated, direct instructions issued (on an exception-only basis) and accountability reports flow upwards to keep the meta-level management in touch with operations.

Other methods of minimising the use of direct instruction involve crafting a decent 'exception reporting' system. 'Management by purpose' also plays its part in preventing too much direct interference by management in the running of operations. S3 is tasked in making rulings on how to distribute resources and or tools of trade that have been agreed should be distributed per the needs of the collective. However, another important channel is used as an adjunct to directly control the monitoring channel, due to the control function requiring an assurance that the accountability reports it receives are indeed an accurate reflection of the status of primary activities. Habitually, the information given in accountability monitoring reports must mirror personal prejudices and other natural communication difficulties. There is thus a requirement to substantiate the information with an alternative foundation. This is achieved by developing a monitoring channel that runs directly between the meta-level management and the operations of the sub-units, by-passing the sub-units' management.

Gianpaolo, Gandolfo and Federica (2013) maintained there are three categories of information systems that converge on S3. First, S3 is on the vertical command axis as part of corporate administration. It transmits detailed interpretations of policy downward and transmits information from the divisions upward, coalescing it into corporate information. S3 acts to send vital information upward extremely quickly. Second, it receives and acts upon information from S2 (coordination). It might send instructions downward on the basis of this or consult upward. Finally, it responds to information received from S3*, advising on the fate of particular subsidiaries (Jackson 2003).

Examples of S3 are financial audit and performance audit, an IT compatibility audit, a study of customer complaints and others. Sporadic employee satisfaction surveys and needs analysis are other examples. One of the toughest S3 responsibilities is matching the sometimes contradictory internal and external commands placed on the municipality. The commitment of autonomic management represents the internal demands to optimising ongoing operations (Espejo 2002).

S3 auditing must be periodic, as opposed to a consistent anticipated proceeding. The auditing should be intermittent so that it neither jeopardises or discourages the administrators, nor the confidence bestowed in the running of the sub-section, although it is a transparent session for everybody involved because the aim is not punitive or to prove incompetency using mysterious tactics or tricks. It is to comprehend and be aware whether processes are being abided by. It is important to substantiate information so that the entire process communicates a point of thoughtfulness to the staff performing day-to-day operations, without causing distrust from the in-between managers. It is essential that the evaluation level links adjacent levels of recursion, checking the exploiting of resources, investigating the levels of corruption and the integrity of the entire institution.

This subsystem's task is to harmonise the apportionment of various kinds of resources through internal leadership, and of creating synergies to augment the performance of primary units. The S3 is immediate internal functions of the

company presented sporadically, according to the required system variety. It manages the overall performance of operations, by creating synergy. S3 ensures the entire system works better than the operational parts working in isolation. This is done through the production/planning process, by specifying performance goals to respective service divisions.

Importantly, S3 manages activities such as budgeting, procurement, acquiring HR and distributing work schedules to departments (money, materials, employees and machine services) that are essential for the achievement of the set targets. Seeing that the performance of any sub-unit (or any system) is dependent on the resources on hand, therefore, the set targets and resources must be mutual between S3 and S1, in what Schwaninger (2006) referred to as resource bargaining.

S3 should have information on the set targets of each sub-unit, for instance, via standard performance reports, for example, quarterly reports, annual reports, audits department and finance. This process will define the expected output performance, as well as efficiency indicators, in relation to resources provided, including data, such as cost per litre of water supplied to both rural and urban areas. Beer (1985, cited in Reynolds and Holwell 2010) called this process the accountability loop, which is backed by the autonomy of operations when effectively applied. In addition to performance reporting, S3 needs an alternative, more reliable view of operations, which is done through quality and financial audits, and staff, community surveys that intermittently offer direct evidence on the position of service units, without obstructing local administration (Reynolds and Holwell 2010).

5.3.2.4 System 4 (S4) or Intelligence

S4 is comparable to the Diencephalon and or thalamus. It is a key input point for sensory data and or information moving to the cerebrum, as well as the main output point for motor information exiting the cerebrum. The information received from various senses is organised via the thalamus and directed to the cerebral for additional processing. Blood pressure, water balance, childbirth, appetite, and

sleep all are bodily functions, with each controlled in part by the diencephalon (Jackson 2003).

Heckroodt (2012) stated that the important feature is the assortment and synchronisation of essential information from external and internal corporate environments. For example, the WSA might want to gather information on climate change and its effect on water availability, which is then methodologically prepared for the future, in terms of policies and action plans. The core intentions of collecting information are to remodel external future scenarios, while offering insight of the business's internal competence to handle as well as adapt. This processed information offers a WSA with clues of probable dangers and prospects, where the external situation and conditions are concerned, and of internal strengths and vulnerabilities.

Martin, Brannigan and Hall (2005) and Dominici, Basile and Palumbo (2013) concurred that organisations require aptitude to predict the future with certainty and put measures in place. The real-world S4 function is the advancement of the institution, by acting as "switch or knob" for the entire institution. It swings commands and information up and down from S5 (the policy maker), to other lower units and switches upward, from S1 (implementation units) to S5 to develop strategic pronouncements. Moreover, S4 decodes and depicts the overall pertinent information about the entire environment of the institution, whether, the institution will be viable and operative, because at any point the institution has to, by some means, balance the variety of the environment it finds itself in (Jackson 2003; Leonard 2007).

Variations in surroundings, including the societal, financial, technological and political systems and their interfaces, should be recognised, and its circumstances prepared for the institutions to survive. Activities related to staffing, employee development, benchmarking, and market enquiry, as well as raising awareness, are associated with adaptivity and learning and affect the outside and future of the institution. Therefore, research associated with water

supply, calculated development scenarios, and pricing plans should be applied to put together internal amendments for future anticipation.

S4 or Intelligence is a tool to visualise the future for threats to be circumvented, and opportunities seized. Generally, in WSAs, this includes mapping customer preferences and service offerings, recognising innovative technologies and considering new structural approaches and succession plans. Countless businesses have experienced problems in realising very late that their operative plans were outdated, or that they were not ready for huge transformation, whereas the circumstances demanded change. The question that is relevant is whether WSAs are ready for the 4IR.

Dominici *et al.* (2013) affirmed that decent strategic choices depend on matching current proficiencies of the institution with the demands and circumstances of the future. With changes in the environment and as demands vary, the variations need to be identified, or projected, and carried through the strategic discussions. This should ensure that strategies are founded on a precise state of the existing organisational background.

In the municipal environment, S4 is partly the IDP. Although the failures of the UDM IDP as a plan are well documented, especially in the work done by Mbili (2015), as well as Dlamini (2013). The recruitment process in the municipality is initiated by each department as the need arises. This means that recruitment is not a business strategy, but rather a reactive move, supported by motivation from a GM of that department. A research and development unit does not exist in the municipality; therefore the political, social, environmental and economic changes are not catered for in municipal planning.

Espejo and Gill (1997) noticed that S4 is consistently ineffectual or non-existent in WSAs. Moreover, WSAs are frequently overwhelmed, trying to deal with immediate challenges, disregarding the need to plan and planning resources to deliberate about the imminent future. Furthermore, in instances where there is that inadequate S4, when there is looming disturbances in the municipality, S4 activities are repeatedly the foremost function to be eliminated. This is really

threatening the long-term survival of the WSA, for reasons that ought to be clear by now.

5.3.2.5 System 5 or policy

Taking the cue from the brain, System 5 is comparable to the cerebral cortex, which is involved in various roles, such as shaping intelligence, perception, awareness, and memory, along with personality, in addition to planning and organisation, touch sensation, as well as processing sensory information. The cerebral cortex is characterised by its capacity to configure and discharge upon information obtained from various sources and subsequently, rethinking and making decisions. The aptitude of the cerebral cortex is that sensory data need to be assessed and options taken (for example, how and when to act or refrain from acting), based on the evaluated information at that time. It is a critical part of the body, considering that some decisions are multifaceted and necessitate extended deliberations, while others are plain and instinctive. Moreover, the simplest choices include an interaction between sensory input and existing knowledge.

In a municipality, S5 is deemed policy-making level. It distinguishes and amplifies the vision and values of the municipality by means of adopting and implementation of policies. Understanding is provided by policies with regards to the direction, principles and purpose of the overall municipal design, interpreting the conditions for municipal productiveness. The choices and pronouncements taken by S5 level and or policy are sporadic, however, they represent the core and the utmost rationality check in the direction, values and intentions of the municipality. Various researchers (Espejo and Gill 1997; Martin *et al.* 2005; Leonard and Trusty 2015) explained that S5 comprises sets of management activities that ensure the organisation functions as a system, specifically that a balance exists in decision-making, between S3 (internal regulations) and S4 (strategy adaptation).

The authors also maintain that an organisation's identity and activities undertaken should be consistent with acceptable practice, and that is normally

called governance. S5 is obliged to be exceedingly selective in the information it receives and considers, as discernment is mostly achieved through the behaviour, activities and interactions of the Intelligence and Control levels (S4 and S3, respectively). The municipal circumstances of productiveness are associated with the way Intelligence (research and development S4) and Control level S3 are systematised and interconnected.

S4 and S3 advance corresponding perspectives in the interpretation, adjustment, and implementation of the municipal unit's uniqueness. In other words, policy is formulated on the basis of all the information passed to it by research and development (S4) and communicated downward to S3 to be executed by the sub-departments. Particular decisions and or choices must be considered and weighed solely by the policy-making administrator because decisions that are prejudiced by either category, are probably both detrimental and futile. Most importantly, they must be very interrelated, so that all the evolving Intelligence and Control problems can be cross-checked regarding the other filter, before reaching the attention of the policy function. Only by designing these processes with reference to a good model of how the organisation works, can the policy function and effectively discharge its mandate.

According to Reynolds and Holwell (2010) and Espinosa (2015), S5 provides closure to the entire organisation and creates the identity, ethos, and ground rules under which everyone operates. For example, all members of the municipality should respect the UDM's visions, mission, and relevant policies. In municipal entities, such as the UDM, Municipal council, and executive council, the MM and GMs are usually responsible for S5 processes. S5 is responsible for the highest decisions of the system through the definition of identity and purpose of the organisation; it is the municipal integrated plan. Worth noting is that there is limited operation of S4. This balance determines the course and strategy of the whole organisation.

Finally, operations may face emergencies that could threaten the viability of the entire company, such as a salt-water intrusion in rivers, oil spillages, drought and

heavy rains. In these situations, a fast intervention from S5 is usually needed, which would have to bypass the slower intermediate processes between S1. A direct emergency connection between S1 and S5 is therefore needed.

5.3.3 Organisational environment

VSM advocates that the environment in which the organisation operates is vital for the viability of that organisation (Reynolds and Holwell 2010). This implies that changes in the external environment have an impact on internal environments. Thus, it is taken for granted that organisations are aware of organisational environmental uncertainties and thus, are doing something about that, however, this is not always the case. Many organisations are limited to their ability to know and learn from their environment and their actions are often symbolic or habitual, rather than prospectively and technical rational. Heckroodt (2012) argued that ambiguity is pervasive in the organisation, objectives are inconsistent and ill defined, cause and effect relationship are poorly understood, as are particularly linkages between organisational actions and environmental outcomes, while history is difficult to collect and interpret, and patterns of attentions and participation in the decision process are extremely fluid.

Decisions, instead of the outcome of rational processes of bureaucratic procedure or political bargaining, “may be a result of garbage can processes”, where problems, solutions, and participants are linked together at a point in time by choice opportunity. Decisions and goals may be emergent, not the direct intentions of any of the party at the outset. Furthermore, choices may be based on intuition, or tradition and faith, as opposed to a rational calculus linking consequences to objectives. Organisations are likely to change their decision-making and goal-setting to meet the demands of stakeholders.

Faced with technological and environmental levels of uncertainty, organisations are limited in their ability to plan and execute actions to achieve desired ends. In most instances, the resource exchange relation is taken as a primary source of uncertainty in the majority of organisations. In the case of the UDM, clean water as a resource is not certain (drought and climate change) and the organisation is

subject to legal and regulatory sections at local and national levels, in professional and trade associations, as well as the political advocacy group, which can place tremendous normative pressure on the organisation. Macro environment changes (legislative changes), changes in social norms and expectation affect the way firms are organised (Rant and Rozman 2008). Organisational strategies for coping with the uncertainty that surrounds exchange relations can be limited or facilitated by government. Hence, uncertainty is one of the features of the environment and a good deal of the organisational behaviour consists of adoptive responses to environmental uncertainty.

Heckroodt (2012) is of the opinion that unpredictability in this context purports that those who make decisions do not have appropriate data with regards to certain environmental aspects, and experience difficulties in forecasting external changes. Uncertainty increases the risk of failure for organisational responses, according to Heckroodt (2012), making it difficult to compute costs and probabilities associated with decision alternatives, therefore, organisations need to have the right fit between internal structures and the external environment. Simply put, organisations must cope with and manage uncertainty to be effective.

The patterns and events occurring across environmental sectors can be described along several dimensions, such as whether the environment is stable or unstable, homogeneous or heterogeneous, concentrated or dispersed, and simple or complex; in addition to the extent of turbulence; and the amount of resources available to support the organisation. These dimensions boil down to two essential ways the environment influences organisations: (1) the need for information about the environment, and (2) the need for resources from the environment. The VSM structure shows the environment that characterises the UDM and the environmental conditions of complexity and change that create a greater need to gather information and respond, based on that information. The organisation is also concerned with scarce material and financial resources and with the need to ensure availability of resources.

5.3.4 Environment that characterises the UDM

The interpretation of the UDM environmental settings will be explained using the Resource Dependence approach. The basic point of departure is that the existence of the UDM and its operations depends mostly on the availability of natural water. Therefore, the municipal reaction and or responses must be in line and consistent with factors such as drought, climate change, water regulations, political economy and so forth. Moreover, responses must be able to satisfy various consumer needs, as well as eliminate backlogs, considering the other availability of money and HR.

It must be noted that most of the municipal funding and grants come from the outside environment, namely the national department of treasury and skilled, competent workers and contractors. The complexities of the external conditions do influence the arrangement of the municipality. The approach argues that the interrelations of municipal officials, in addressing external interested parties that are receiving services, are directly correlated to municipal achievement or performance.

The uncertainty or unpredictability of natural water as a resource is detrimental to the survival of the municipality. Moreover, the deficiency of resources, such as money or personal undesirability, affect managerial autonomy, municipal performance, and the continued existence of the municipality. In trying to demonstrate the above point, the researcher will use the following example: when there is sudden drought, more money and personnel are pumped into initiatives with the aim to recover adequate water, with that money taken from other services, thus, the stability of the municipality and autonomy of municipal resources are affected and vulnerable.

Overall, the deficiency of crucial resources that are outside the municipal control, be it natural water, a competent pool of labour force, demographics, and politics severely influence municipal vulnerability in service provision. The approach also adds that municipal configurations must take the immediate settings into account

and be dependent on the resources from the environmental surroundings to influence the external constraints and restrictions to their advantage.

Ordinarily, the more the difficulties of physical characteristics of the environmental settings, for example natural water, the more the level to which control and authority of the environment are widely disconnected from the municipality, confirming that the availability and or scarcity of any type of resource weakens or strengthens the interconnectedness, and increases the pattern and linkage or connections among the municipality. Organisational characteristics, in turn, govern the relationships among societal actors, in particular the level of conflict and interdependence present in community practices (Seo 2011).

According to Senge (2014), when an organisation responds to changes in its environment by adopting its strategy and structure to fit the new contextual demands, it is exercising well-oriented behaviour. Similarly, when an organisation responds to changes in its environment, it seeks to match the leaders, structures and supporting systems to demand direction coherence of its new strategies, thus, both internal and external feedback loops in the integrated model are stabilising or balancing loops. The organisational processes and structures use information about the environment.

Rant and Rozman (2008) stated that in an unpredictable environment, the design of municipal structure must accommodate the potential necessity for sudden adjustments. To proficiently react to predictable and unforeseen shifts in environmental situations, the municipality needs to approve a flexible and easier to reconfigure municipal structure, in moving to a new organisational fit designated by greater efficiency and effectiveness. The key design principle should be an organic organisation. To mutate into a living and responsive organisation, the municipality must run a range of automated adaptations of the work practices and planning activities, such as enhancements in IT, the decentralisation of decision-making, co-operation, and converting business processes into automated systems to reduce human error, with substantial horizontal and vertical communication networks. Applying these changes to the

entire municipality creates an organisational configuration that permits resourceful, dynamic and practical reactions to unforeseen environmental conditions.

The literature has established that decision-making is profoundly correlated to authority and centralisation, meaning that there is a challenge posed by unwarranted interferences of political leadership in the day-to-day running of the municipality, which complicates the understanding of knowing who rules over municipal matters on various levels. Centralisation is understood as the level of control that the municipal leadership holds. Likewise, in a centralised municipal arrangement, different heads of municipal departments possess authority over others, in the sense that managers regularly own the right to make decisions regarding significant municipal matters. Employees in a municipality share responsibilities and authority, therefore participating in decision-making is supported in a decentralised establishment.

Current literature supports that the level of authority and centralisation is mostly restricted by in-house managerial influences. Moreover, the Regional Development Programme (RDP) adopts that decision-making is restricted to prearranged societal circumstances, such as that the certainty pressures municipal decision-making practices. The societal background that a municipality deals with might greatly shape the practices of goal setting and attributes of municipal objectives. Municipal objectives are not static; however, municipalities adjust their resolutions and operational territories to rework to the circumstances of the environment. The RDP presupposes that direct management of essential possessions initiates power problems associated with autonomy, reliance and interdependence between the municipality and its environmental background.

Public departments, such as municipalities, which are largely reliant on government, are prone to cumbersome official administrative practices, as well as civic scrutiny and are expected to demonstrate a great degree of answerability with responsibility (Seo 2011). It is further posited that municipalities are subjected to red tape and extra hierarchical (bureaucratic) forms of structures,

notwithstanding other opposing research. It is noted that government funding involves “exacting adherence to minute details, intense monitoring, and prolific reporting”, for example the MFMA of 2000, at the UDM.

In this vein, municipalities are ruled and governed by various laws, procedures, regulations, and protocols; this is attributed to the fact that they acquire resources and assistance from various departments, applying a diverse legislated mandate through the municipality. With a degree of formalisation with pyramid structures, municipalities usually have little autonomy and control in decision-making matters. Furthermore, municipalities generally shy away from delegation of power to their subordinates, to restrict MMs in decision-making, autonomy and flexibility, compared to managers in the private sector. Rainey (2009) warned that formalised, highly regulated, and bureaucratised municipal arrangements are unsuitable for adapting to multifaceted, disorderly, and unpredictable environmental fluctuations.

The environmental variations instigate a mis-fit in the municipal position, affecting productivity and efficacy to collapse below the objective stage. Thus, re-working of the approach, technological types, as well as the municipal arrangement, is with the intention to drive the municipality into a modernised fit. This is a typical cause and effect relationship (Rant and Rozman 2008). The authors found that municipal arrangements founded on teamwork, extensive communication networks and partnership, decentralisation of decision-making, and a flattened pyramid, permit the municipality to perform similar to a living organism. Changes in the municipal environment cause the mis-fit and municipalities are shaped and influence the circumstances in their environment. They can be active as well as reactive to the environment. Though proficiency emphasises the internal procedures of the firm, efficiency addresses the municipal positioning vis-à-vis environmental conditions. The topic of organisational environment is to emphasise and support VSM as the other operations/sub-units of VSM continue to unfold.

5.4 Interview results for service quality of Water and Sanitation provision

A summary of the responses gathered from participants that are relevant to the VSM is shown below.

5.4.1 Purpose of Ugu District Municipality

Question 1.1 - In your own understating/knowledge, what is the purpose of the Ugu District Municipality?

Depending on the department at which the employee/ respondent is placed, when answering this question, some UDM employees stated that the purpose is to provide WaS. However, for employees placed in other departments within the municipality, for example at Economic Development, in responding to this question, they said their purpose was to provide jobs to people of the UDM. It was clear that although the UDM has a mandate and a purpose of providing WaS, it was however, not necessarily apparent throughout the various departments and or levels of the organisation. The danger is that, in the absence of clarity, employees can act at cross-purposes, with differing and even conflicting ideas about goals and how to achieve them.

5.4.2 Mission of the Municipality

Question 1.2 - In your own words what is the vision of the municipality?

Most of the study participants were aware that there was a vision and a mission but could not remember what it is. The few employees who tried to articulate their vision and mission statements from the municipality responded incorrectly and offered differing statements that were far from the truth. Consideration should be taken of testimonials being tactical tools meant to guide and benchmark the day-to-day actions of a municipality, over short-, medium- and long-term targets, to accomplish the objectives set by the municipal council. In light of diverse account delays, the municipality's ability to bring proper service delivery successfully and proficiently, is compromised.

A well-crafted purpose statement must be concise, well defined, and realistic, and it must also communicate a descriptive representation of the future, whereas

it must be empowering and attractive to workers, consumers, and the larger society. Prudent leaders understand the value of constructing a crisp, well-formulated statement of purpose, engaging several role players in its conception, and constantly collaborating its relevance throughout the municipality. Leaders who can clearly interpret the municipal purpose into a personal, merging vision develop a much better chance of getting the employees focused and moving in a shared direction.

5.4.3 Irrelevant Municipal Departments / Non-core functions

Question 1.3 - Irrelevant Municipal Departments / Non-core functions

The UDM is legislatively a WSA; as a result, other local municipalities within the UDM do not perform services provided by the district, as this would be a duplication of functions. However, the interesting feature identified within the UDM, was the existence of additional departments that were a duplication both in local and district municipalities, such as a youth office, LED and Special programmes. Legislatively, these units are all non-core functions and irrelevant units and not necessarily supposed to exist there. Moreover, although these units are also operational, they are not involved in the delivery of WaS.

The respondents from these sub-units understand that their mandate has nothing to do with the primary purpose of the municipality, which is WaS. Perfect examples were when employees from the Economic Development department were asked about the objectives of the UDM, with the answer to increase the employment rate in the district and make non-functional community projects start functioning to alleviate poverty. This was the case with all non-core departments, which shows that even though they are UDM employees, in their opinion, it is not their function to deliver WaS, they have nothing to do with WaS, and to top it all, they are not even aware or well informed of water service department programmes. This was an indication that there is no alignment between the departments; they all work in functional silos.

The reality is that the addition of these units automatically increases budget and ultimately minimises the impact of the money allocated to the UDM for WaS

projects. Moreover, this also diversifies the vision of the municipality, which dilutes the overall performance of the organisation because they are focusing their resources on non-core functions. Jackson (2001) highlighted that the existence of municipal characteristics, in conformity with the VSM, are extra and irrelevant to those mandatory for viability arrangement, likely to hamper the municipality in striving for efficacy, and may ultimately threaten its capability to survive. These inappropriate features should therefore be dispensed with.

5.4.4 Culture at the UDM

According to Aktar (2021), the vision, mission and values of an organisation deliver a common logic of purpose, its uniqueness, as well as long-term intention, and connect internally and externally with the organisation's stakeholders, in addition to asking about mission and vision. The following question was asked

“Culture is a set of the most predominantly shared values in an organisation. Of the following, please mark in an order of importance the following values, where 1 is the most important and 5 is least important. 1. Respect, 2. Openness, 3. Teamwork 4. Leadership and Excellence. According to the Ugu website, Respect, Openness, Teamwork, Leadership and Excellence were the values the municipality subscribed to. Considering the study dealt with the municipality, those values were tested to evaluate/gauge which was a priority and important to respondents and the reasons thereof. With a show of hands, the order of importance was Respect, Leadership, Openness, Teamwork and Excellence.

What was established in their answer was that, respondents were unhappy with the conditions they operate or work under and highlighted that they need credible leaders, primarily because the municipality presently operates in a vacuum. They also said they felt disrespected, and respect is important to them. Decisions taken about them that affect their work are unknown to them, as the management leadership is not transparent. Their responses are as follows:

- We feel that there is no open communication channel in the municipality, the management does not consult or listen to us. They just do things without involvement of staff members that sometimes

backfires with small issues becoming big issues because of lack of communication. In most cases, the management talk to staff with the intentions passing instruction from higher authority.

- Communication in the municipality happens vertically from the top down. There is not much that happens from the bottom up. If it does, it is probably stopped somewhere along the line in the hierarchy. People do not feel included or heard. They are not informed.
- The difference of opinions is probably fuelled by the lack of communication that members of staff perceive makes it difficult for management to put measures in place to improve the situation.
- You can see Ugu staff are always protesting, which is an indication of lack of transparency and teamwork.
- Because of the bureaucratic structure by the time information comes to the bottom or top it is so distorted. You have to do damage control because it is being interpreted in a totally different way.
- Most municipality staff members who were interviewed were not satisfied with the way the municipality is managed. They felt that managers do not have experience, lack leadership skills, and cannot guide and or provide leadership properly. Managers are very weak set of managers/ do not have a backbone and cannot don't manage proactively but only manage reactively and finally the overall management is autocratic.

Ogunbodede and Tolu (2018) believe that public sector survival depends on good governance; which is the adherence to principles of accountability, participation, transparency, and the rule of law, along with responsiveness, efficiency, effectiveness and equitable distribution of resources.

5.4.5 Decision-making at the UDM

Question 1.5 - Thinking about the municipality, in your opinion, who makes the following types of decisions, please tick in the relevant box:

		Political leadership	Municipal Manager	General Manager	Managers	Other, please specify
1.	Strategic	X				
2.	Operational	X				
3.	Staffing	X				
4.	Service delivery	X				
Please support your answer						

The research understands that decisions in an institution are made at different levels. Thus, to gauge a general feeling from stakeholders, the above question on decision-making was asked and answers were evaluated qualitatively. Most respondents, including officials and non-officials, were adamant that certain individuals, based on their motive at a particular time, but mostly in the ANC factions, make all decisions, either strategic or operational. Politicians make all decisions, up to the level of recruitment of staff doing apprenticeships. Even simple things such as burst pipes result in quicker responses to areas where there are councillors deemed to be influential in ANC structures. Respondents believed that municipalities are politically charged entities and it made sense to councillors that decisions are made by the ruling party. Karper (2020) wrote an article in the Mail & Guardian newspaper titled "Political battle drains coastal taps". The article basically insinuated that water problems at Ugu are a result of political issues.

Concerning strategic decisions, respondents bluntly said that there is no strategic direction at the municipality, however, local government legislation is forcing the UDM to act on matters without having to strategise about them. There is a management committee (MANCO) that is supposed to take strategic decisions,

yet politicians continue to interfere at every level, dictating to the administrators (Mngomezulu 2020). An example is that the UDM is always overcommitted in terms of budget.

Research participants precipitated topics associated with the apparent blocks to improve the status of water improvising in every society, including the underprivileged, low income, and medium to high-income society members. The topics were categorised into reasonable cost, limited direction from community leaders, inadequate WaS infrastructure, and insufficient knowledge, along with inferior water quality, constraints, reliability constraints, and inadequate arrangements or inappropriate effort made to advise society in the event of water stoppage; restricted free quantity and lack of ownership. Ward councillors believed that there are no strategic decisions being taken by the leadership of the municipality. In their response, they allege the infighting and or factionalism in the region. The participants mention that in 2012/13 Ugu received a disclaimed audit opinion and in the year 2017/18 an adverse audit opinion. In their opinion, this reflected leadership with no strategy (AG reports 2012/13 and 2017/18).

The question on decision-making was asked, understanding that the survival of institutions hangs on the way leadership make decisions affecting everyone in the business, including short- and long-term decisions of committing resources that ultimately impact performance. The inabilities of some leaders in developing good policy standards, knowledge, basis, protocols, environments, and skill that incorporate support and optimal decision design for their organisations is troubling and have caused instabilities and mismanagement (Ejimabo 2015).

The forensic report commissioned in terms of Section of 106(1)(b) of the Municipal Systems Act, concluded and tabled by the KZN MEC for CoGTA office on Ugu, investigating allegations of fraud, corruption, maladministration and statutory non-compliance (CoGTA 2020). The report revealed failure to follow adequate procurement processes in the awarding of tenders, nepotism and paying suppliers for incomplete work (Duma 2020). Section 106 of the Municipal systems Act enables the Minister to conduct an investigation into

maladministration, fraud, corruption, paying suppliers for incomplete work and any other serious malpractice in a municipality. Wadesango, Mhaka, Chikomo, Wadesango (2018) identified political interference as one of the reasons for poor administration conveyance in local governments. AG (2021) reiterated a call for transparency and accountability in public service as they combine to galvanise effective service delivery.

5.4.6 Transparency and the BPP

During a group discussion, ward councillors were asked about municipal transparency and efficiency of information flow. They said:

- “We are always on the dark, even if you call Ugu call centre, they do not answer.
- “The contractors working in our areas are not monitored, as ward councillors we have no knowledge of what is expected from them.
- “If we were given enough information, there won’t be many protests. Because what stops protests is the political leaders updating protestors only.
- “There is no public participation and or information sharing.”

The municipality must be transparent in its procedures, as well as transparent and honest with consumers, although it has been observed that it is a lacking and painstaking process. Findings from the ward councillors indicated that the existing practice of stakeholder engagement is meaningless and unauthentic and does not contribute to empowering the disadvantaged and underprivileged society. It was also demonstrated that limited community engagement in planning processes undesirably impact the execution of IDPs. The izimbizo’s (public meetings), formerly designed as an idea and form of engagement contribution, have been condensed to seasonal features of involvement from above, rather than a genuinely engaged and autonomously driven method of local involvement.

Ward councillors are of the opinion that public meetings are held to ensure that certain performance conditions are met, not as a treasured tool to engage with the masses. Fieldwork assessment has concluded that consultation is “uneven

and inconsistent'. People are intimidated in public participation meetings and questions are limited to certain numbers. Concerning implementation plans, as representatives of communities (ward councillors) they are unaware of what is going on. In some cases, you see a contractor working in your area, and in a few days that contractor is gone, having created a bigger mess of things.

Seemingly, the limited community engagement in policy-making, as well as the application or evaluation phases, threaten the accountability of the municipalities to the empowered communities. The study presented that the application of BPP, as well as other social contracts, is limited. Respondents in the rural areas dispute that the district municipality consult them regularly on the subject of WaS. Community involvement in the municipality necessitates radical improvement.

All the councillors interviewed identified themselves as the main contact between the public and the WSA. However, the study on community perceptions of ward councillors demonstrates that communities do not believe in the benefits or capability of ward councillors (Mhlanga 2012; Molefe and Overton-de Klerk 2019). Most of the respondents believe the private sector can assist WSAs effectively and efficiently. The literature advocates that governance supports two fundamental values: inclusiveness (ensuring participants of the group receive equal treatment) and accountability (to ensure that those in authority reply to the group they serve if things go wrong and are credited when things go well).

Ndebele and Lavhelani (2017) encouraged municipalities to develop procedures to guarantee community engagements in policy formulation, implementation, monitoring and evaluation of decision-making. They believe that the adoption of an inclusive approach, fostering stakeholder participation, including strategies intended at removing obstacles, in particular of marginalised groups, will empower communities to work together with the municipalities.

5.5 Conclusion

The survival of the municipality is dependent on the ability to serve, as well as sell WaS to its residents. Consequently, when the product is not reaching its intended market or not satisfying its customers, the business existence will be

volatile. The study found that the municipality is, on the one hand, experiencing challenges to satisfy water consumers; those who already have WaS amenities are not pleased with the low quality of water and regular water stoppages, while the rest disapprove of the high charges for water. On the other hand, rural communities are amongst those maintaining they are being neglected and never provided with services. The municipal officials conceded that service facilities lack resources such as human, financial and technology resources.

The absence of leadership proficiencies and a lack of oversight are seen as the key motive for inadequate, unproductive and incompetent service delivery. The municipal organogram is said to be bloated and financial resources are scarce, therefore, it is safe to assume that the degree of autonomy is constrained. This may explain the lack of autonomy and autocratic style of the management. However, the municipality consistently attributes its failure to lack of resources, hence, they cannot afford to be flexible in their management.

Population growth is forcing the UDM to frequently revisit their stakeholders and the social contract, in order to plan sufficiently. Political uncertainty inside municipalities, dishonest councillors and employees and limited dedication overthrow the determination of balancing the requirements of means for service delivery, to the point where UDM consumers do not believe the district is doing enough to plan for population increase. Local municipalities proceed with development in the form of low-cost housing, without the UDM planning for WaS requirements. As a result, the UDM finds itself continuously in a battle with the local municipalities, as they have to stop development in anticipation of problems where demand will exceed supply.

Audit results for the UDM have seen a Disclaimer in the year 2012-2013 that improved to a qualified audit during the year 2013-2014. According to the UDM audit report for 2015/2016, municipalities do not set measurable standards, fail to collect relevant information to substantiate results reported and indeed, fail to report altogether on progress achieved. The AG has stated that annual performance reports are not useful and/or reliable. It suffices to conclude based

on the evidence that have presented, that the current UDM delivery system is not viable because service is not being provided at an acceptable level or according to the VSM method.

CHAPTER SIX

APPLICATION OF A VIABLE SYSTEMS MODEL

6.1 Introduction

The study sought to investigate the viability of systems used in a selected municipality, in particularly UDM, whose legislative mandate is to provide WaS and is, therefore, a registered WSA. Chapter Six presents the outcome of the VSM diagnosis of the UDM, with the diagnosis outcome of the VSM interpreted and subsequent gaps identified.

Chapter Five presented empirical evidence and answered the question very generally of whether the UDM is viable. Chapter Four postulated an understanding of the research process that is framed and reasons for the use of a qualitative approach, illustrating its combination with systems thinking, particularly VSM and SSM. Chapter Three investigated contextualising municipalities as water service organisations. Moriarty *et al.* (2004) claimed that the core problems of the WaS crisis is poor management and governance, as opposed to the lack of water as a physical resource. Chapter Three probed the manner in which government arranges itself to provide WaS service access, in terms of institutions and governance, and the challenges thereof. Also included in Chapter Three are current municipal service delivery models, their performances, along with local government concepts and theories that were tested to investigate whether there is a need for government and its stakeholders to improve delivery systems using systems theory.

Chapter Two captured some of the essential elements involved in delivery and management of WaS and presented dynamics and complexity confronted by organisations providing the service. In Chapter Two, as an introduction, the researcher drew out a systems map, to gain a better understanding of the complex scenery involved in providing WaS. This provided the researcher with a tool to obtain an overview of relevant sub-sections, as well as an appreciation of a complex interaction, including exploration of inter-relationships.

Chapter Six will draw particularly on the VSM that has been applied as a design model and a simulation to do checks and balances in the municipality as an organisation, its operation and its surrounding environment, on the contemporary as well the future; between horizontal sovereignty and vertical authority, and between the system, meta-system and sub-system, to support a framework for future orientation. Hoverstadt and Bowling (2002) maintained that Stafford Beer developed VSM to assist in the real-world process of diagnosing problems in human organisations, facilitating the improvement in their functioning and redesigning them (where appropriate) and or supporting the transformation in the management when necessary.

It must be noted that the idea is that the municipality must be able to manage in a fluctuating and evolving domain. To assist with this process, VSM identifies five subsystems that make up the operations and the meta-system that are necessary (and sufficient) for ensuring the organisation's viability. These systems elements are denoted as (S1, S2, S3, S3*, S4, S5) communication channels. Therefore, in the process of investigation, it will be crucial to confirm whether all the elements exist in the municipality, that this ensures it does have the capability to conduct its function and lastly, if it does what it is supposed to do.

Considering that VSM language is not a common language and the fact that there are many features of the VSM (S1 to S5), communication channels (C1 to C6), a snippet of what is in the literature review will reflect in this chapter as a reminder and for the chronological order of writing. VSM advocates that for the municipality to survive and be viable, it should understand the environment in which the municipality operates under, because the external environment impacts internal environments.

Although it is taken for granted that organisations are aware of organisational environmental uncertainties and are thus doing something about that, this is not always the case. The literature review indicated that stakeholders operating in the municipal sphere, and in WaS at large, have different and or competing interests, responsibilities, interpreting of laws in support of their objectives,

information, plans. As a result, objectives are inconsistent and ill-defined, cause-and-effect relationships are poorly understood, particularly linkages between municipal actions and environmental outcomes, and knowledge management is difficult to collate and interpret, while patterns of attention and participation in decision processes are extremely fluid. This is partly because of the uncertainties in the external environment.

6.2 Municipal environment

It is vital to comprehend the environment under which the municipality operates, since this will give an appreciation of what the municipality is dealing with. For the municipality to survive its environmental complexity (variety), the environment is divided into sub-environment units, and these into sub-sub-environments, and so on. The municipality reduces the variety of the environment by grouping customers and other stakeholders into market segments, and in turn, management reduces the variety of the organisation by grouping complex tasks to be done by different departments.

6.2.1 Stakeholder groupings with levels of water and sanitation provision

There are different levels of WaS provision by the municipality, customers in urban areas are provided in their houses using bulk water infrastructure and reticulation pipes, customers in informal settlements and some of the rural areas are provided through community standpipes, some through water tankers, boreholes, and the rest, especially rural dwellers, fetch water from the rivers. 2020/21 Ugu IDP states that there is 31 percent of backlogs for access to water which that collaborate their assertions. The study found that most municipal stakeholders are not satisfied with the type of services they receive from the municipality. The main issues were related to reliability of water supply and backlog in water infrastructure.

Their dissatisfaction is made clear through WaS service delivery protests, local newspapers distributed in the UDM (The Herald and Ugu South Coast Fever), through written petitions (for example, the Democratic Alliance), and social media interactions between the municipality, their customers and community meetings.

The following table depicts the picture of protests between August 2020 and March 2021, as recorded by the municipality.

**Table 6.1: Water Service delivery protests at UDM –
August 2020-March 2021**

No	Dates	Local Municipality within Ugu District
1	3 August 2020	Ray Nkonyeni municipality (RNM)
2	3 September 2020	Umzumbe
3	5 October 2020	Umzumbe
4	26 October 2020	Umdoni
5	03 November 2020	Umzumbe
6	24-25 March 2021	Umzumbe and RNM

Source: Rapid Response Public Protest Database 2020/21

The Regulation of Gatherings Act 205 of 1993 recognises freedom of assembly and protest as democratic rights and seeks to ensure that they are practiced in a peaceful manner. However, the protests that occurred on 24-25 March 2021 were violent, with municipal fleet vehicles and a ward councillor’s house burned by angry protesters claiming no water for three weeks and more (Nyathikazi 2021). The dissatisfaction of services is seen and witnessed on facebook pages of Ugu Complaints, Hibiscus seconds, as well as in local newspapers. The studies show that the primary reason for service delivery protests in SA is dissatisfaction with the delivery of basic municipal services. According to The Herald (2015: 1), poor service delivery at local government level is underpinned by corruption and the lack of accountable public officials.

Community ward councillors who participated in the study are of the opinion that the municipality is not responding to their needs, as they do not take and or respond to customer views and complaints. Municipal officials who participated in the study acknowledged problems within the organisation have led to protests and labour unrest, partly because employees are not happy with the “tyrant” nature of running the municipality (as stated by a respondent). This has led to the

disruption of the provision of WaS to the community as reflected by the news on television (news24.com March 2021).



Photo 6.1: Water protesters barricaded the N2 on South Coast and torched vehicles

Source: News24.com – 24 March 2021

6.2.2 Institutional arrangements and regulations

Regulation of the municipality itself and of WaS at large is fragmented and cumbersome, which causes decision-making to become a conflicting and a complex matter. Owing to overlapping legislative mandates and obligations, various decision-makers, resting with different administrators in the water related sector, the result is opposing interests, inequitably distribution of resources, as well as societal and environmental effects, together with ambiguities about the future in a more connected and speedily transforming biosphere.

In these contexts, it has been established in Chapter Two that the administration of decision-making over various implementations of water management campaigns, is a challenge. In ensuring the sustainable development of water supplies and their reliance on people and environments, there is a gradual recognition of the need for the development of improved approaches to assist inter-organisational or multi-stakeholder decision-making in the water sector.

To bring overlapping legislation into context, there are more than five departments that have a say in WaS matters. These comprise the National and Provincial government of water affairs, National Treasury, CoGTA, and the Department of Human Settlements, as well as the Department of Minerals and Energy, the Department of Education (DoE), National Department of Forest and Fisheries, and the Department of Economic Development, along with Environmental Affairs, and relevant local municipalities. The implications, therefore, force these departments to exercise integrated planning in service delivery, incorporating governance, administration, and municipal finances.

Moreover, the above-mentioned departments enforce their different acts and policies, which are normally not in line with those of the municipality. It is crucial for WaS to strengthen relationships with other service delivery water-related sector departments for aligned planning, informed decisions and excellent execution. These examples only mention a few departments, however, there are actually many players, including privately-owned companies and structured communities. For the municipality to group these stakeholders according to their needs, use of intergovernmental structures as stipulated by the intergovernmental relations framework Act is recommended, coupled with other forms of partnerships.

It was established in the previous chapters that water has no boundaries, however, institutional arrangements do have boundaries. The consequences thereof are that the municipal council can only make decisions in compliance with their water use license (abstraction to distribution), although it is difficult to focus their plans, considering the functionality and quantities of water in the rivers that fall outside their mandate. Geographical area, mandates, powers and functions constrain the municipality and there is a need for the municipal council to be involved in national and provincial decision-making structures. The allocation of different powers and or functions to different orders of government calls for both vertical and horizontal coordination.

6.2.3 Water as a natural resource

It is impossible to talk about the municipal environment without mentioning water and its availability. The availability of clean water as a natural resource is not certain in the municipality due to drought, climate change and topography (National water security framework 2020). Moreover, its extraction and distribution are subject to legal and regulatory sections at local and national levels, in professional and trade associations, as well as political advocacy groups that place tremendous normative pressure on the municipality. Environmental authorisation, such as acquiring a water use licence and environmental impact assessment (EIA) for WaS projects, are normally a very lengthy, specialised and expensive process, managed by two different departments; the Department of WaS and the Department of Environmental Affairs in the province or at national level, depending on the scope of the project.

Officials stated that the process is long because, firstly, they have to deal with red tape of the overseer for example, in Economic Development, aiming to shape the activity of another (in other words, Environmental Affairs trying to issue licences for the WaS Department to construct certain water projects). Secondly, a departmental separation between a regulating authority and the regulator, with the regulator external from the direct line of authority; this trait segregates intra-organisational controls from distant oversight by another department. This relates to the case where the mandate of the official as the “regulator” is to scrutinise the behaviour of the “regulatee” and seek to change it. The operational and compliance enforcement of the regulatee, in terms of money and time, is somehow further exacerbated and the municipality is forced to respond to an environment of being over-regulated by all provincial and national departments. The above illustration has not even begun to mention the diversity of NGOs operating in the same space and environment with their various, opposing interests.

In addition, there are environmental and natural conditions and factors that include global climate change; drought, and or diseases, as well as demographic variations; economic advancement, transnational influences such as the

international financial plight and the increase of food prices, along with the necessity to redress access to water for all, the risks posed by ageing and poorly-maintained infrastructure and decreasing water quality. Furthermore, contractors and or service providers, businesses, the lack of infrastructure and skilled personnel, funding, as well as cost of financial capital, and the indigent policy are all drivers that further complicate institutional capacity to deliver services. According to Heckroodt (2012), the increase in ambiguity in water management intensifies the risk of municipal response failure and makes it tougher to determine the costs and likelihoods associated with decision alternatives.

6.2.4 Political factors

The SA government officially recognises the right to water that warrants all citizens access to suitable, safe, physically accessible and reasonably priced water for personal and housekeeping use. However, political discontent over water is currently a reality because of lack of service provision to many residents of municipalities, including the UDM. Concerns exist that government is not inclusive, transparent, or accountable in its systems. For communities, accountability and transparency determine how interest groups influence policy makers, their knowledge of decision-making processes and whether their range of interests are catered for. The respondents indicated that public service provision is continually becoming worse, due to the poor quality of policy-making and decreasing productive efficiency, which is a result of poor accountability and transparency.

Rant and Rozman (2008) stated that, in an unbalanced atmosphere, municipal structures ought to be built for change, so as to competently respond to predictable and unforeseen changes in the environment. It is critical that the municipality implements flexible structures that are simple to re-engineer in moving towards a new fit, designed for enhanced efficiency and effectiveness.

Table 6.2: Overview of municipal operational units

S1 op = S1 operational units		
S1-Operations	Water and sanitations operation management	Water extraction points including rivers and dams. Umzimkulu, Umthamvuna, Mhlabatshana dams, BhoBhoyi Dam. Water Purification Plants; BhoBhoyi, Vulamehlo. Water Distribution including all operations, pipes, water trucks, boreholes.
S1-Operations	Project management Unit-	Construction of water and sanitation bulk infrastructure.
S1-Operations	Control centre and call centre	Manages the functionality of reservoirs, dams, pipes, pumps stations, waste water treatment plants, etc.

Table 6.2 sketches the recursive partitioning of the municipality, which defines the scope of the organisational system.

6.3 Operational Units – S1

Question - Is the municipality delivering service?

S1 is concerned with implementation, hence, comprises the parts that carry out the tasks the system is envisioned to accomplish. S1 of the municipality is judged ultimately by its ability to provide WaS to the community. To illustrate, the UDM S1 consists of water services units (its processes include water abstraction, water treatment, water distribution or reticulation and its infrastructure), a water demand management unit, PMU, and a call centre and control centre units.

The 51 ward councillors interviewed in the study all knew of villages and or in their area of jurisdiction had settlements within the municipality where the community still fetches water from rivers by bucket, because there is no infrastructure, be it bulk water infrastructure or water tankers. In some areas, where there are no standpipes, water tankers come infrequently, maybe once a week or once a month. There are also areas where infrastructure was built, but there is no water coming out of the taps since infrastructure was built, better yet,

some taps are seasonal. Both in urban and in rural areas, there is no reliability in water supply, because of burst pipes and pipe leaks (Nxumalo, S. 2021). The Councillors who participated all attested to the issues of burst and leaking pipes as a contributing factor to no reliability of water supply. In addition to the utterances of participants, the cries of communities are clear to facebook under Ugu complaints, Hibiscus Coast seconds. Moreover, the matter was reported to and discussed in parliament (Nair 2020).

Municipal officials attribute these problems to poor management quality, very expensive water infrastructure repairs, low quality infrastructure and low pipe pressure. The emerging essence was recognised and represented the perceived barriers to healthier water supply to the underprivileged, as well as medium to high income groups. This encompassed affordability; poor community leadership, poor WaS infrastructure, and lack of awareness, in addition to lower water quality, availability constraints, reliability limitation, as well as inadequate arrangements or little effort to caution the public in cases of service disconnection; and limited free water quantity. S1 was analysed in three stages, namely municipal structure, municipal accountability and identification of non-core sub-systems in the municipality.

6.3.1 Municipal structure

The disturbances and or dysfunctions identified in S1 are seen as an indication that the overall system (UDM) is not performing to its specified purpose or to the required level. In VSM, system units are supposed to be logically, rather than hierarchically driven, while the management of the municipality is hierarchical, as are most government institutions. The implications of having a hierarchical structure are normally a fatal flaw because it lacks flexibility. In addition, respondents stated that the management style is autocratic in nature and in most cases, sub-systems of S1 are not aware of the decisions made by other operational systems. As a result, there are no negotiations between S1 and management, but rather only unexplained instructions from management.

There are few officials stated that the municipal lack of resources and the culture of corruption are the underlying causes of all their problems and hence, the municipality cannot afford to be flexible in its administration. The resource bargain ascertains the level of autonomy, which is an element acceptable within the constraints of the broader system to which it belongs. It is perceived this may be the reason for the lack of autonomy and autocratic style of the management. The details contained in Section 106(1)(b) of the Municipal Systems Act about Ugu concluded in 2020 may substantiate that resources are mismanaged, thus affecting the autonomy of the structure.

6.3.2 Municipal accountability

One of the methods of diagnosing S1 is to study in what way answerability for resources is exercised and to specify the means for evaluating performance. The lack of accountability is dealt with in the VSM through the "Regulatory Centre", which exists as a service to S1. There is evidence suggesting that municipal S1 is lacking or to a certain extent, not accountable.

The following were the statements from the participants;

- “This reflected to the way employees mishandle fleet and other operational tools
- “Ugu employees are always on strike
- “the time it takes to respond to burst pipes, sometimes it takes up weeks and months to repair a leak or burst pipes
- “It also reflects in a way contractor perform their jobs or services, they are not accountable to the communities or UDM officials. UDM contractors working on sites are not managed properly, officials do not come to check if work was done to at least minimum required level, contractors leave an area of without paying local labour and the municipality fails to do a follow-up.
- “There are areas where water infrastructure such as pipes were constructed, but there is no water coming out of the taps”.

The AG report, ending year 2018, highlighted that there was over R280 million unauthorised and irregular expenditure. The labour unrest at Ugu resulted in the dismissal of nine shop stewards and more than 100 employees (Dlamini 2021b).

It was noted in the literature review that SA is a water scarce country, with Ugu municipality not exempted from water scarcity. Ward councillors were conscious of the scarcity considering limited rainfall. Another point to be noted is that the UDM is categorised as a water scarce municipality. However, councillors did not believe that it was important to the municipality, because they did not know of;

- Anyone that had been taken to court for wasting too much water;
- Any municipal gadgets installed to monitor the use of water to residents, other than water meters;
- Initiatives on the management of illegal water connections in the district;
- The established implementation of an administrative penalty system, infringement notices and trial are non-existent.

In their opinion, the limited updates and explanations on the status of water supply consistency, particularly in rural areas, indicate the unaccountability of the municipality. Whereas it is argued that there is also an element of WDM, calling for various role-players across governance structures, technical expertise and a cultural mind-shift, to recognise the importance of water and the cumulative impact of individual use on each other and the water source. The aim is to minimise loss and waste, to protect the water resources and to use water efficiently and effectively (National water security framework 2020).

6.3.3 Irrelevant municipal components

Jackson (2001) pointed out that the presence of additional municipal features, which according to the VSM are add-on and irrelevant to those required for viability, are probably going to hinder the municipality in attempting effectiveness and may, ultimately, impede its capacity to survive. Hence, the proposal is that those irrelevant features should thus be removed.

The UDM is legislatively a WSA (its fundamental purpose), and its core function and identity are the provision of WaS. That is the sole reason other local municipalities under and or within the district do not perform services of water provision. It is expected that the district municipality should not duplicate mandatory functions of local municipalities, however, this is not the case at the UDM. Some of the units, such as the Youth management office, LED and Special programmes are all irrelevant and non-core units, because those service are not necessarily required by the UDM to accomplish its goals. Nonetheless, local municipalities also perform those functions. Even the respondents from these sub-units understand that their mandate has nothing to do with the primary purpose of the municipality.

The point of departure is that the functions between local and district municipality must not be duplicated. However, should the municipality choose to have those units, their functions should be aligned with the overall purpose of the institution. An example is where a respondent working at LED was asked about the objectives of the UDM, and the answer was “to increase the employment rate in the municipality and make the non-functional community projects start functioning to alleviate poverty”. This was the case with all the non-core departments, such as Special programmes, with this scenario showing that, although they are UDM employees, it is not their duty to deliver WaS, they are not responsible for WaS and they are not even aware or well informed of the water service departments’ programmes.

The addition of these units automatically increases budget and ultimately minimises the impact of the resources allocated to the UDM for WaS projects. This also diversifies the vision of the municipality, which actually dilutes the overall performance of the organisation because it is focusing its resources on non-core functions.

6.4 Squiggly line – C3: Operational linkages and relationships

Operational sub-units have their own channels of communicating with the environment and its local management. The surrounding environment of the

municipality specifies and or demands information desirable to function effectively, hence the municipality must respond accordingly. The inter-relationship between operational units of the municipality was labelled as inadequate and sub-standard. Most respondents felt that both strategic and operational decisions are made by certain individuals, based on their motive at that particular time. Hence, there is a communication and transparency deficit in operational sub-units. Furthermore, integration between the municipal departments is absent, which results in the duplication of resources and increases fragmentation.

The municipality uses various means to communicate with the stakeholders, through for example, suggestion boxes, notice boards, toll free numbers, and newspapers, along with face-to-face dialogue at their office points, as well as electronic and social media. Operations are supposed to interact constantly with the environment and there should be feedback between these two elements. However, there is very little feedback in this case, as stakeholders initiate most of the communication the municipality relies on and that provides operations with feedback.

The municipal call centre unit is practically dysfunctional, “ask any Ugu resident”; all participants agreed on that. A consumer logs a call to the call centre about a leak or burst pipe and is given a reference number, after a week, however, the pipe is not fixed and this can last for up to three months. In some cases, a complainant is told it was fixed, but in fact, as a community member and a person who logged a call, you know for sure it was not fixed. Respondents mentioned that it is almost impossible to get through to the UDM call centre. It is evident that there is a communication failure in the system and secondly, the operations department may be overwhelmed by demands from the environment.

A call centre agent who participated in the study said: “There are a lot of unsatisfied consumers whom we cannot trace and help to resolve their complaints. Complaints are managed, even though there are still challenges regarding non-compliance by the municipality and the quality of service rendered

is still questionable". Complaints-handling procedures revealed that the reaction and evaluation of consumer fulfilment is low, to the degree where consumers are plainly unhappy. The management of complaints is not fully centralised and signifies a need to develop and interconnect suitable standard operating procedures, with faultless service turnaround periods in handling consumer complaints.

Ashby (1991) explained that management has lower variety compared to operations, since it is unreasonable for administration to know every little detail about the circumstances in the operating system. Moreover, processes have a smaller variety than the environment. Operations cannot understand all the wants and preferences of the market and or environment. The reverse is also correct, with the variety of the environment significantly surpassing that of the operation it provides in exchange, exceeding the variety of the administration that controls it. However, VSM strives for balance in the sense that high variety is attenuated or screened, and low variety is strengthened or heightened to the number of likely states that the receiving system requires and can strive to strike a stability.

In VSM, it is the information that holds a system together because it is understood that delayed, biased, scattered, and or missing information is generally the cause of feedback loop malfunctions. The diagnosis indicates no balance in terms of the communication and awareness that takes place between local management and operations. The municipality needs to create more open communication channels between management and staff, while also fostering integration of all departmental units within the entire system.

To further illustrate the point of information breakdown within the municipality, during the time when the research was conducted, a new cycle of IDPs were being developed, however, official respondents were not aware of those developments and its implication to them as employees. The feeling was that they were not included, or it is a continuation of working in silos. It must be noted that some of the respondents were employees and occupy positions in middle management, thus, for this calibre of employees to have an 'I do not care'

attitude, is absurd. They nevertheless say “they think that there must be a new vision and mission but we’re not sure of what was that vision or mission, because there were no reasons for them to know and understand”.

There are different committee forums between the PMU, Water services unit and water demand management unit, as they are all operational units. However, it was established that the effectiveness of those forums was questionable, because it has been repeatedly mentioned in the management meetings and quarterly report meetings that a delay exists in the implementation of the resolutions of these forums. It was observed from the study that there seems to be all these tools for communication between operations and local management, but all fail dismally. The variety of the environment significantly surpasses that of the operation it serves, which will in turn, greatly exceed the variety of the management that directs it (Beer 1985, cited in Reynolds and Holwell 2010).

6.5 Coordination: S2

The primary activities mentioned above, such as those performed by the PMU, water services unit and water demand management unit, share resources within the organisation. They share HR, IT, and SCM. Since they share resources, the primary activities become interdependent. S2 acts as a planning and coordinating system for the primary activities, allowing for disturbances that might result from this interdependency. S2 comprises the control parts of SI associated with the controlling centre. The control centre receives data or records of diverse operations and can prevent threatening fluctuations arising in the system. It conveys feedback to the localised management of SI to re-establish harmony, calling if necessary, upon the resources of S3. S2 is the general sub-system that links all regulatory activities of the distinct elements to each other and to Senior Management.

The VSM method necessitates that perception of the interested and affected parties of S2 at operational level, are identified to ascertain the level of facilitation or danger. It has been recognised that S2 is inadequately represented or has been replaced by "instructions" on the command channel.

6.6 Diagnosis of System 3 or control

For any municipality to be viable, its main activities must influence the entire viability of the organisation and in order to manage contribution of the main activities, a third system is required, which is the S3/ control system. Therefore, S3 is designed to regulate all the activity of the S1 aspects, while maintaining the maximum autonomy at operational level and being consistent with systemic interconnection. The Treasury unit, PMU and auditing unit were identified as S3 and S3*. The audit in the municipality is a very relaxed process, with departments or units planning their work in the absence of the auditors, implementing their plan and at the end, submitting what they want to be audited to the auditors. Hence, the internal auditors have no technical or theoretical understanding of what the units' responsibilities are.

6.6.1 Treasury

The municipality received an adverse audit report from the AG for 2017/ 2018. The Report stated that the municipality did not take any measures to curtail unauthorised spending, while also highlighting that no effective measures existed to prevent irregular expenditure. Moreover, management do not face any consequences. This means that unauthorised, irregular and fruitless and wasteful expenditure caused by the municipality remained uninvestigated to establish whether any persons are responsible for the expenditure.

Municipal officials who participated in the study concurred with the report, adding that in most cases, the municipality will underspend till the 11th month of the financial year, and then dump money during the last few weeks of the financial year. These allegations of poor spending were confirmed in the municipal 2017/18 Service Delivery Budget Implementation plan (SDBIP). The project officers interviewed were quoted as saying, "we spend the municipal infrastructure grants during the last 4th quarter, hence there is no progress in most projects".

In the local labour forum meeting held in May 2019, the UDM CFO stated that revenue management of the municipality was in a dire state. In his own

statement, the CFO declared that in April 2018, the municipality was owed more than R400 million. A valuable system of internal control for debtors and income was not in place, as stipulated by Section 63(2)(a) of the MFMA. The municipality does not have a policy provision for debtors with impairment, and the auditors have raised this finding for years.

6.6.2 Performance Management

In VSM, according to Chatzimichailidou and Katsavounis (2012), more attention is placed on the infrequent nature of an efficient audit, a "routine" audit unlikely to expose anything of value, "...standard and consistent audits surrender a large chunk of the variety they generate to no purpose". In the municipality there were no sporadic audits, as units pre-plan what they want to be audited on.

According to the respondents, the AG report and service delivery protests for WaS, the overall performance of the municipality, in terms of service delivery, is poor in both rural and urban areas. Additionally, the PM system in the municipality is limited to top management who are assessed to receive performance bonuses. It is implemented to some employees, middle managers, and officers and on coordinators level, it is only submitted to HR for compliance purposes, with no assessment and or evaluation processes. There is no PM system from level 5 to level 18 of the organogram. This shows the inefficiencies of audit function.

Research participants confirmed that there was no noticeable proof corroborating user input and feedback being received by departments, nor are these systematically channelled to improve service delivery. The engagements processes appear to be applied mechanically, with little focus on the correction and or findings that are genuinely driving change. Max (2015) believed the PM system can be used as an instrument to advance the provision of service, although recommendation has not been implemented, and PM unfortunately has not been adapted to the level of regulating service delivery in the municipality. PM is practised only for compliance reasons, in order that reports will show intent, however, the impact cannot be measured. Max (2015) concluded that service

delivery impact is minimal, however, should the PM system be utilised appropriately, it might be a valuable instrument to rally service delivery.

Numerous committees and or portfolio committees, regulate the administration of operational units by instituting rules and regulations, monitoring their fulfilment and supply resources, including the MANCO, Extended MANCO, different portfolio committees, and Executive committee, along with the full Council, policy review committee, labour forums, and so on. These committees all exist only for compliance with different legislations.

S3 is further accountable for the transmission of thorough interpretation of policy from senior management downward to SI (operations), in ensuring policies are applied in the precise manner and serve the objective for which they were created. The study found that the responsibility of S3 is not firmly in place in the municipality. The respondents indicated that:

- implementation lies with staff members, however, UDM policies cannot be followed realistically. “We are not really aware of the policies, because they are not followed, they choose employees”.
- People are generally trusted to implement policies, “but we are not monitored”.

Due to there being no mechanism in place to ensure staff members implement policies properly, staff members merely perform their duties the way they deem fit. These were some of the answers regarding control and autonomy measures in the municipality. Respondents were quoted as saying:

- The source of all evil is lack of control. Although monitoring and managing resources department is there, it is useless. The municipality is unable to control municipal resources because of political leadership interference. In addition, there are no consequences in the municipality, employees are doing whatever they want because of lack of control.

- It is an open secret that employees were selling diesel and they were never fired or disciplined. Illegal connection of water is out of hand in the municipality and people that are connecting are UDM plumbers. The plumber and his team will take pipes from stores and go to do illegal connection and when back they will claim overtime. Control is same as non-existent and in some cases not consistent. People steal diesel but are not fired. People go to jail for years but come back promoted to supervisor position. General workers sell their protective clothing and their tool kits.
- There is lack of control, water leaks everywhere not attended to as a matter of urgency and no followed-up plans. Staff are lazing around, and employees are facilitating the breakage of pipes so that they will earn overtime.
- If there are controls, people are scared to implement them. Up to 3 weeks the pipe is leaking but has been reported, at the end no consequences. No one is being charged for that. You will hear GM complain to MM that employees are not being disciplined.
- Control in theory is there, control is in paper, but not implemented and political leadership fail to play an oversight.

It was not the purpose of the study to verify statements quoted by respondents, however, it was understood as respondents suggesting chaos is prevailing in the municipality. Nonetheless, the dismissal of more than 120 employees, nine shop stewards and the MM in 2020 and 2021, violent protests, forensic reports as mentioned before in the study may be the symptoms and indications of various wrongdoings within the municipality.

6.7 UDM officials' perception of the state of Governance

The respondents working with water believed the institution is confronted with administration constraints, however, they vary in some respects. Human Resource coordination is controversial; this is evident because client/employees are not happy with HR and a HR practitioner said, "I do not think we are meeting their expectation/standard", and "I have witnessed the way in which employees

are mistreated". Employees are not happy with recruitment as well as placement procedures, which are not implemented fairly. The mass dismissal of 131 employees affected operations and ultimately service delivery but the employer does not care".

Decisions of staffing are made by politicians, regardless of skills or qualifications up to internship level. Nepotism is vast in the municipality. In the municipality, coordination between departments is minimum, the costs of overtime is uncontrollable. There are inconsistencies in the application of laws including disciplinary actions against employees. The adoption of VSM will regulate constant interaction in the system, in that when a message is received, the system is able to activate a decision-making process and to convert perceptions into actions. One of the important features of VSM is to control and harmonise all the organism's functions, and to be adaptive and proactive to the surrounding environment. Moreover, the models support that each level makes certain types of decisions.

The number of cases referred to the arbitration and bargaining council, and frequent strikes by employees, as well as dismissal of over 130 employees, are an indication of breakdown and labour unrest that may be impacting and or adding to poor service delivery. The UDM is initiating a process of reorganisation in compliance with an instruction from the provincial government. The province is convinced that service organisations and or municipalities are not designed appropriately to deliver the excellent service quality required to satisfy the public. Research participants agreed with the province, citing the absence and or lack of capacity of strategic management of the UDM. Furthermore, they stated this gave rise to non-coordinated activities, triggering unjustifiable wastage of limited resources and under-spending.

The limited support and oversight functions from the state department has further led to opposing policies that defeat state purposes, which relates explicitly to halting development at the time, where the national goal is set to eliminate poverty.

- The indiscriminate decreasing budgets to squeeze expenses to balance the budget constrain the level of service;
- The current pricelist rules and arrangements applied by the WSAs does not necessarily attend to the real problems connected with the requirement warranting justifiable and monetary viable services, diverse water standards, and water service levels, as well as the usage of intergovernmental monies to meet basic services.

6.8 Diagnosis of Human Resources

HR coordination is questionable in the municipality, this is evident because clients and employees are not happy with HR. An HR practitioner expressed, “I do not think we are meeting their expectation or standard”, and “I have witnessed the way in which employees are mistreated”. It must be placed on record that all participants or employees interviewed were not happy with recruitment, as well as placement procedures, maintaining that placement procedures are not implemented fairly. There were speculations that politicians make decisions of staffing regardless of skills or qualifications, up to the level of employing interns.

In addition, inconsistencies exist in the application of laws across all departments and inconsistency in disciplinary actions instituted. It is alleged that there were inconsistencies in disciplining employees. The mass dismissal of 131 employees raised more questions and added to current employees’ workload (Dlamini 2021b). The findings of the forensic report conducted by the KZN provincial CoGTA substantiated information nepotism, adding that there were also ghost employees in the municipality (CoGTA 2020). It is always mentioned that the Ugu organogram is bloated, over-staffed by more than 20 percent. The high number of cases that are referred to the arbitration and bargaining council, and frequent labour unrest by employees are an indication of S2 breakdown.

6.9 Diagnosis of Supply Chain Management Unit

The SCM unit was also identified as a coordination unit and weakness was identified. Respondents bemoan that the procurement unit is inefficient and not effective, they do not provide feedback to the units they are servicing, they do not

respond to emails, or phones, and you need to physically walk to their offices. They do not seem to understand the importance of what they are supposed to procure every day, especially for departmental units such as fleet and water operations. Neither do they appreciate the urgency and importance of their work. The SCM policy is not updated to include the requirements for infrastructure procurement as per treasury requirement.

When asked whether the coordination departments have enough resources, this is what members of the SCM and IT staff had to say:

- “It will never be enough. Not in a million years;
- “It will always not be enough because there are things that we would like to have but because we do not have money, we cannot get those things”.

Concerning diagnosis of the IT unit, IT was identified as a coordinating department that is doing better in terms of efficiency and in being effective. However, IT staff complaints were concerned with limited resources that hindered the unit in being effective.

6.10 Resource provision and bargaining in operational units: Channel 2

Channel C-1 and Channel C-2 are channels that assist to convey corporate commands to the operational units, probe their answerability and participate in resource bargaining, while C1 is mostly a corporate intervention channel. It enables the transmission of instructions and corporate norms from the meta-system to the functioning administration. C-2 contributes to providing and bargaining of resources between the operational units (S1) and management (S3) and for answerability principles.

The municipality S2 uses organisational policies, statistics, periodic reviews, reports, and meetings, especially the financial and committee meetings, to track the use of resources and to coordinate matters within the municipality. However, according to the AG report, the deficiencies in the HR unit are deep-seated. The report mentioned that some employees were paid after termination, with WaS

bylaws not updated as they refer to the relation to the Ordinance Act of 1949 for the charging of water rates.

In summary, issues such as ethics, morals and culture that are addressed by S2, are negatively impacted due to the breakdown of S2. The extent of damage will require an all-together separate study. In the municipality, C-2 is insufficiently used for respective discussions, especially in the area of mutually agreeing on decisions or informing S1 of the reasoning behind decisions taken and cascading that information on time to S1.

6.11 Communication between S1 and S3 called C3

The audit and communication functions offer direct operational access to S1 by ensuring the policies, instructions and regulations issued by S2 are observed to S3 and also gives direct command, rather than a mediated authority using the subsidiaries. C3 sends instructions downward from senior management and passes information upward from operations. Although there are various management meetings held in the municipality weekly, biweekly and monthly, which are supposed to be a means of communication for municipality staff, this is generally not the case.

Officials were asked to comment on the internal flow of information. They were quoted, saying “there is no flow of information, the general staff meeting with all staff members is held only when there are issues, threats of labour unrest, or when there is an introduction of a new mayor”. The statements suggest staff do not feel there is an open communication channel in the municipality and are of the view that management does not consult with or listen to them. According to them, the situation was made worse by the dismissal of their nine shop stewards (Dlamini 2021b). The following are some of the statements from employees:

- “They just do things without involvement of staff members that sometimes backfires with small issues becoming big issues because of lack of communication. In most cases, the management talk to staff with the intention of passing instruction from higher authority.

- “Communication in the municipality happens vertically from the top down. There is not much that happens from the bottom up. If it does, it is probably stopped somewhere along the line in the hierarchy. Employees do not feel included or heard. They feel a sense of exclusion. They are not informed.
- “The management team of the municipality has different views on communication from those of municipality staff. This difference of opinion probably fuels the lack of communication that members of staff perceive and makes it problematic for management to put arrangements in place to improve the situation.
- “Because of the bureaucratic structure, by the time information comes to the bottom or top it is so distorted”.

These were the respondent’s comments about the C3 function in the municipality. Officials interviewed were all not satisfied with the way the municipal information is managed. They also felt that managers do not respect employees, have no experience, lack leadership skills, and cannot lead properly.

According to the VSM, management require additional data to ensure it functions successfully, in addition to the information supplied during meetings and through reports. S3 must directly examine the operations of SI to ensure it is well-organised. Moreover, S3* monitors by sending task teams to different sub-units to conduct spot checks in the form of auditing. However, a sporadic audit function is not performed at all. This leaves management relying solely on information received through reports and meetings, with this information not enough to provide a clear and thorough understanding of what is happening in the municipality on a daily basis.

6.12 Intelligence: S4

S4 works through the primary actions, coordination and the control systems, so that a viable system can maintain its existence individually. However, to be viable a system similarly needs to be adaptive to fluctuations in its surrounding environment, its desires to be able to change its mode of operation or its identity.

For this purpose, a fourth system is required which is called intelligence S4. To assess the presence of S4, it was vital to consider who is responsible to determine potential future trends and external conditions and then analyse the capability of the system to adapt as per the changes needed. S4 is the strategic subsystem that put together external information and assessing their bearing to the municipality, interpret it into strategies and action plans for future activities. The focus is preparing for the future with long-term guidance, and the proficiency to easily adapt to future occurrences.

Jackson (2003) argued that a fully effective S4 needs to be realised in the form of an "Operations Room." He advised that all the different factors affecting the future of the organisation can be displayed and the different units can engage in dialect debate, while the research and development department coordinate or facilitate the results. There is, however, no research and development and or formal partnership with higher education institution established with the municipality for research purposes. The incidents of salt water ingress made residents believe the reason why, at some point, consumers were drinking salt water from the sea was because there are no studies done in their water resources or any other environment. As a result, the municipality does not understand the interactions and or relationship between the Umzimkulu estuary, and the sea, and abstraction point (Carnie 2015). An Ugu spokesperson issued a statement in 2019 acknowledging the problem, adding that as part of the municipality's long-term solution, a feasibility study was to be conducted to construct a permanent weir across the Umzimkhulu river to avoid saltwater ingress and enable abstraction during drought periods (Zama 2019). One Ugu respondents went to the extent to say there is no centre or office that can tell you with confidence how much water the municipality needs in the next five years or what the plan is, or whether water will be available in the next five years because of limited S4-intelligence.

Areas exist where there is municipality-built water infrastructure, but no water is coming out of the taps because of poor workmanship and poor planning. Moreover, the municipality is focused on building reservoirs whereas there is

drought, which means they are hoping that God will provide rain. Moreover, a municipality should have information of the life expectancy or cycle of its current assets, yet that information is not available.

S4 is the sub-system that enables the learning and adaptation considered essential to viability. Research and Development, Market Research, Strategic Planning, Personnel Development and Manpower Planning are units that continuously and systematically scan the total environment of the organisation to identify relevant patterns of change. Then, using a model of the organisation, they consider whether and how it should adapt to cope with those changes. That person/S4 distributes this environmental information upwards to people making policies or downwards (S3 control system), according to its degree of importance. Without S4, an organisation is capable of dealing only with immediate concerns and is unable to look to the future and prepare for it accordingly.

It was noted with concern that the information is fragmented in a sense that each departmental unit collects its own information for a particular project planned at that particular time. Respondents said although each department is doing its planning for a year, what is lacking is integrated planning of all units. It is important to note that almost all the strategies and plans it is legislatively required for the municipality to have, are most likely available in the municipality, shelved somewhere for compliance purposes. In some cases, some plans are done twice, just because they cannot remember that it had been done by an employee who has left the municipality.

When respondents were asked whether they had ever received information that enabled them to anticipate problems before they happen, and asked if there is an intelligence centre, some responded by saying they could not think of anything;

- No intelligence hence, reactive measures. The UDM is behaving like Eskom in 2008/11. The whole country was affected by load shedding. If the UDM had an intelligence centre, they would have known that there will be drought (2015/16) and all plans would have been aligned

with alleviating drought, for example, through a desalination plant or water demand management focussing on water saving principles. In the absence of the plans, there are negative cost implications, thumb-sucking of information leads to irregular expenditure. The way things are done now is not sustainable. The gap will always be misleading to the municipality.

- There is no intelligence, as a result each department is doing their own thing, when they have a problem they develop a policy, hence, no alignment. We are responding only if it is happening now and only if there is a budget or money, for instance, during drought period, different departments set aside monies to give municipalities and suddenly municipalities were seen to be active.
- Pipe replacement project is done haphazardly, and it only started recently because there were more leaks and water interruption.

The statements seem to convey no coordinated planning and or focus. Summarily, the actions associated with S4 are conducted amongst the various individual operations, rather than being collectively accomplished across stakeholder groups. The mentality of sections or sub-units to function independently is a major S4 limitation, to the point that S4 is unable to handle external and or a projected future with accuracy, such as the life span and capacity of capital assets, when to replace infrastructure, and a water demand management approach. Some stakeholders' lack of awareness about future considerations further illustrates the necessity to strengthen S4.

S4 scans the organisation's relevant environment and initiates plans for innovation. In order to elaborate these plans and to increase their feasibility and probability of success, intelligence and control need to discuss the plan for innovation; in this discussion, each of these systems has its own role. Intelligence brings in its knowledge about the outside and then control brings in its knowledge about the inside and now, of the organisation. This means that in addition to its contribution to the functioning of the viable system inside and now, the control

function is involved in the adaptation of the viable system; in the shaping of the future.

6.13 Normative Management – S5

The question of whether a resounding vision with a precise course of action is available must be addressed, to ensure an appropriate diagnostic of S5, since the responsibility of S5 is to promote and harmonise the discussion between intelligence (S4) and regulator (S3) regarding the future of the municipality to merge the results. Moreover, S5 is supposed to answer whether everybody is participating in the system. At governmental level it ought to be expressed as "the Will of the People", hence, systems must be designed to ensure its functionality. Value systems, views, awareness of every applicable participant, both internal (mostly the workforce) and external (mostly consumers), are required to be valued and allowed to establish a clear identity and policy of the municipality. S5 is comprised of the Municipal council, MM, and GMs. The ultimate authority rests with them.

The feedback from the research participants regarding S5 was that there was no clear vision. The vision written in the municipal IDP is not known, to either internal or external stakeholders. In addition, the municipal IDP document is not implemented properly, in their opinion, it exists only for compliance purposes.

It is generally known that when organisations are doing well or achieving their vision or purpose, the credit is given to the leadership of that organisation. What is happening in the municipality in terms of service delivery is inferior and it is manifesting itself openly in the local newspapers, and on Facebook pages, with reports on burst pipes everywhere, service delivery protests, petitions, and backlogs, along with poor access of water in other places, salt water coming out of consumers' taps, and consumers receiving bills that are not correct or no billing. Therefore, the response as to whether the municipality is fulfilling its purpose is clearly NO.

The research findings from the ward councillors also indicated that presently the only method of community involvement is through IDP processes, which are often superficial, unauthentic and do not impart information to or empower grass roots individuals. Ward councillors were of the opinion that limited involvement in planning processes adversely influence the execution of IDPs. They further highlighted that izimbizo's (community consultations), which formerly shaped the aspirations of mass participation, have been weakened to sporadic features of involvement, as opposed to constant engagement and autonomously driven methods of resident engagement. Izimbizo are conducted to ensure PM standards are met, instead of being exercised as a treasured period to involve and engage with the masses. The councillors reported that the community becomes intimidated in IDP consultative meetings and asking of questions is limited to about two per person.

The implementation plans of the municipality are not communicated to the community ward councillor. Furthermore, in most cases, municipal contractors working in the community areas are not accountable to anyone. There is, moreover, limited engagement of role players in policymaking, application or evaluation stages. This research determined that community engagement is "irregular and inconsistent".

In diagnosing the municipality, it was established that restrictions are forced on policy creation by the subsequent higher level of recursion, which is the process of public participation. Involving role players in the development process of the municipal policies will allow a better assurance to its implementation. Government legislation directs and inspires the scheduling and implementation processes of municipal IDPs in a way that provides the local sphere of government with appropriate policy strategies, facilitating the capability of local authorities to successfully plan and implement, more precisely to recognise, prioritise and meet, the basic desires of the marginalised society (Fuo 2013).

The respondents who were municipal employees stated that UDM officials do not question whether their fundamental methods are suitable for serving the

stakeholders, and they do not, as a matter of necessity, query their approaches to determine the consequences of their actions to the consumer. Because they are egotistical and proud that they are doing what is desired. There is an incoherent supposition that the strategy role, stipulated by the requisite data, has enough freedom to act in the interests of the system. However, any one viable system is, by definition, nested in a chain of viable systems and Policy is constrained by its embodiment as an Implementation Management unit at the next higher level of recursion. Simply put, policy cannot merely act in the interest of its own level of recursion, since there would be no assurance of interconnection with its own meta-level. It should be stressed that the segment ought to be engaged in the improvement of the corporate culture and strengthening the team spirit and cooperation between the workers will be beneficial to the municipality.

Lastly, as for the identity level (S5), engagement is recommended to encourage larger stakeholders to share in influencing the distinctiveness and articulation of appropriate WSA strategies, which might inspire more active application of the approved plans. Moreover, the reputation and or advancement of appropriate business values, reassuring discipline, self-control, and solidifying project teams, as well as collaboration and focusing on the interests of the whole, rather than the interests of its individual parts, are a necessity. In reality, a holistic understanding of the municipality is essential, so that each part is regarded from the viewpoint of the circumstance that it belongs to the whole.

6.14 Summary of gaps identified

VSM permits the investigation of the systemic dysfunctions in the municipal set-up. In other words, it allows for the diagnosis of the organic arrangement, the municipal HR, information and communication technology and the measures to manage, while it also allows assessment of the quality of the resources and relations producing the organisation.

The shortcomings of the system showed no or limited local autonomy for operational units. Four of the respondents said that the MM holds all the powers

in the administration realm, from the power to issue payments to the management of petty cash. In meetings, he is the only one talking and screaming at management and anyone who is attending a conference or meeting requires a signed memorandum by the MM before any procurement. All decisions have been centralised to the MM, although there is a CFO, different GMs, senior managers and managers. The VSM diagnosis exposed fundamental inadequacies, such as insufficient autonomy of municipality management, requirement to improve potential in the coordination system, the weakness of the management and control system and the lack of a genuine culture and or identity of the system.

Given the information and analysis of the municipality, the researcher concluded that there is no S5 and there is no S4, almost everyone who is in management or leadership is in S3, because that is where there are resources, and all they want is to control resources. The power that leadership has, manifests itself in S3, hence, there is chaos. Even a simple decision, such as where a water tanker is or should go, is normally dictated by the politician because there are blurred lines between administration and politicians.

6.15 Fragmentation of Information Systems

The information that is present in the municipality is disjointed, with limited or non-existent connections between sub-units, resulting from a deficiency in main communication channels. Specific, mandatory communication channels that should connect various functions do not exist, or, where they do, they are either ineffectively designed or work improperly.

C4 is responsible for communications with the environment and deals with the interactions between the environments of the different operational units; C4 exists but has been poorly designed for its function or does not work properly. An investigation to check C4 revealed that newspapers and Facebook correspondence highlighted that the UDM is constantly trying to 'put out the fire'. It was evident because there are continuously areas with no water, burst pipes, milky/muddy water, and low pressure, with labour unrest, as well as different

Environmental departments serving the municipality with different notices, along with directives threatening to jail MMs because of non-compliance. Should C4 have been working properly, operations would know their deficiencies in time and communicate a plan of action with the environment (surrounding) and then implement that plan of action. C5 guides coordination activities by linking S2 to the operational units (S1) and the management control system (S3).

Upon perusing the minutes of different local labour forums, a breakdown was noted between the employer and the employees, and employees were not happy about the decision made by the respective levels S1-S5. The frequent labour unrest in the municipality may be the result of failed communication between S2 and S1.

C6 gives S3* a direct link to operational units to conduct audit and regulate activities (Chatzimichailidou and Katsavounis 2012). However, it has been established above that weak auditing was inherent in the system, such as that auditors audit the information given to them by departmental units. In addition, resources are not used optimally and there is no auditing of resources. Had there been auditing, somebody would have realised that the municipality is buying the same working tools, such as spades, because employees are selling these tools, going to the police station to do affidavits and pay a police officer R30. The existing, although vulnerable S5, suggests a substantial improvement possibility. The inadequacies of S5 cause a deficient two-way communication and reliability problems and harm the functioning of other sub-systems, specifically S2, S3 and C3.

When the communication channels in the municipality and its surrounding environment do not match the level of information flows required, the viable system is flawed. Therefore, these channels must be wisely considered for the rapid transmission of information, as well as about how the system is doing, in terms of the three directories of performance. There are several sources of uncertainty in the environment, and organisations must respond in order to be effective. Considering that municipalities are reliant on the input from the larger

environment, they should be able to monitor and survive the uncertainty of the surrounding environment. Within the municipality, sub-units must manage solving problems related to coordination challenges that are associated with specific tasks and with various tasks interdependently.

6.16 Conclusion

It was noted in this chapter that there are risks that threaten the continuity of the entire system, such as non-supply of WaS to other communities, especially in rural areas, the massive drop in the water supply service or increases in water bills, along with poor communication within and or with outside stakeholders, as well as uncoordinated sub-systems, and the non-existence of S4. Overall, it is the inadequacy of signals that draw the attention of the entire system, in cases where an occurrence endangers its viability. No signal seems to act as an algedonic (pain causing pleasure) signal and thus induces the congregation of an emergency committee.

The municipality must supply, and deliver WaS to communities in an efficient, effective, reliable and affordable manner. There are clear indications of gaps in the way the municipality meets the demands of the community. While the model being used to highlight those gaps, the recommendation is that adoption of the model may assist in closing those gaps. The model also points out discrepancies at each sub-level between what the environment demands and what the municipality is offering. However, the reality is that the municipality is not providing services according to the minimum standard. The reality on the ground includes unprotected dug wells, unprotected springs, tanker trucks, surface water (river, dam, lake, pond, stream, canal, irrigation channels) and a bucket toilet system. It is acknowledged that the municipality is not viable because it does not offer what it is purported to offer. The following chapter will provide recommendations on how the municipal system can be improved and be a viable organisation.

CHAPTER SEVEN

RECOMMENDATIONS AND CONCLUSIONS

7.1 Introduction

The study was aimed at understanding various interwoven questions. The main question that this thesis wished to answer was how can the UDM arrange itself to be a viable organisation, taking the principles of Beer's model of a viable organisation into account. The idea is that an organisational system is viable only when its structure meets requirements as specified by VSM. According to the theory of VSM, any deficit of the structure will compromise the viability of the organisation. Therefore, recommendations of improving the provision of WaS within the UDM are derived from rectifying the structure and functioning of VSM.

This chapter proposes recommendations and suggests design for change ideas of the researched UDM. The research is based on the VSM methodology and researcher experiences in applying the methodology, as well as discussing WaS governance. The discussions in the previous chapters revealed that there were soft issues identified, such as the perceptions that water is a natural resource and that provision of water should be free to community members. These communities have the right to clean water. It was also noted that the municipality is characterised by alleged sabotage of water infrastructure by officials, with conflicts between water users, and self-centred behaviour, particularly on the side of leadership, along with limited public participation, poor communication, low transparency and lack of trust, as well as labour unrest. Chapter Six highlighted the interrelationship of cause and effect and how some issues can be interpreted in different ways and belong to more than one category. Consequently, some issues may be interpreted from various points of view and belong to more than one category.

7.2 Requisite variety

VSM is working through Ashby's Law of Requisite Variety (Ashby 1991), which states that to efficiently adapt, the internal complexity of a system must match the external complexity it confronts. An adaptive organisation survives to the extent that the variety it generates matches that of the environment it finds itself

in. In other words it says “only variety can absorb variety”, where variety is a measure of complexity and or the number of possible states of the system. Therefore, when a municipality demands six varieties of services and can deliver all, the municipality has “requisite variety”. However, should a municipality only be able to deliver five or less, that means the municipality does not have “requisite variety”. The UDM is supposedly providing WaS to urban and rural houses with different standards such as inside taps, water tanks and standpipes.

The point of departure is that the UDM is still faced with a backlog in WaS, with communities that are not being serviced totally. Furthermore, UDM services other communities through water tankers, including schools and clinics. Respondents highlighted that services through water tankers were meant to be a relief in cases of emergencies because they are not sustainable and mostly the topography is not suitable for water tankers to be driven every day. The simple version is that the municipality does not have required variety. It was evident that discrepancies exist in operational demands between managers and municipality endorsed processes. As a result of this, a systems view is required when there is evidence of unmanageability owing to different stakeholder perspectives and expectations.

The number of the municipal varieties needs to be reduced and constricted, to be manageable. Reconciling what is a fundamental set of imbalances is what the VSM is all about. The balance can only be achieved by amplifying management’s variety and attenuating that of the organisation and by amplifying the response of the organisation to the environment whilst attenuating environmental variety. Typical attenuators are to standardise and group management groups’ complex tasks into divisions and departments and treats them as production systems with common reporting standards, not as individual tasks.

The broad environment the UDM faces includes economic, political, social, and cultural factors with many varieties, although with limited amounts of “counter” variety in operations, particularly management. These environmental factors influence municipal effectiveness and increase complexity of the organisation. For example, potential stakeholders have different needs, challenges and

attitudes in identifying solutions, water purchasing power, and understanding the complexity of WaS. In addition, other challenges that influence the municipality include government legislation, climate change, the economy, and political instability, as well as environmental disasters. This research shows that UDM managers are overwhelmed with variety and as a result, the interests of internal and external stakeholders are not met.

7.2.1 Municipal water charges

The water price is quite sensitive, especially to the general society of the UDM. It was evident that consumers (respondents) and suppliers of water have different ideas on water tariffs. Research participants stated that they demand clean quality water at an affordable and stable price, which is contrary to what they receive. They alleged that they receive high bills, poor water quality and quantity, for days or months at a time. Then again, community ward councillors expect WaS services to be free, highlighting unemployment and affordability issues.

UDM officials acknowledged the bad services they sometimes provide but maintained that the price of water is very low, considering they need to cover costs, as well as build a stable revenue base. Further to this, officials also highlighted that, for a very long-time, rural communities did not pay, even though the municipality provided water. They added that rural consumers received water free of charge because water is considered a necessity, and a comparatively inexpensive and abundant resource.

The inference from the participants was that when water is priced as an economic good, its financial worth will differ depending on consumer and vendor willingness to pay. Whereas, when the notion of social good is pragmatic to the pricing structure, then water would be affordable to the underprivileged, furthering the largest number of people. In general, the price of water is a contentious issue between all stakeholders, including WSPs and consumers, and its pricing must be analysed in consideration of many strategies and in acknowledgement of the complexity of the socio-hydrological relationship. Therefore, there must be a balance between sensible pricing structures, with an objective of cost recovery,

while concurrently ensuring access to safe water for the underprivileged, at the same time considering the ecosystem.

7.3 Recommendations to adopt a recursive structure and flexibility in the Municipality

Recursion, in summary, relates to the repetitive attributes of VSM, in the sense that each operational system must stand as a viable unit. It is worth to explain the idea of recursion on which the model depends. Therefore, recursion refers to the fact that the structure of the whole model is replicated in each of its parts. The subsidiaries of an organisation should be treated as viable systems in their own right and must, therefore, possess their own Systems 1 to 5. A municipality is a government structure that is autonomous and is led by the MM, with different departments headed by the heads of department and sections led by managers, The drive, as well as the decision to structure and or arrange the municipality recursively as autonomous parts, is entrenched in the necessity to appropriately handle complexity (Jackson 2002).

The breakthrough in developing the VMS model is the understanding that this could only be achieved with a fractal (recursive) layered structure. Furthermore, at each level, the pattern of the regulation of the variety of possible activities must be fractal. A municipality such as the UDM must be arranged in a way that it addresses challenges that are too big for an individual or a few persons to deal with. Since municipal tasks are multifaceted; the setting in which these tasks are to be executed is also complex, encompassing multitudes of consumers, suppliers, regulators and government departments. The task would seem impossible for municipal officials who, as human beings, have a limited capacity to oversee complicated situations. Hence, group activities are recommended, in addition to customers having recursive units that regulate complexity and facilitate manageability. Espejo and Reyes (2011) stated that should the municipality want to be viable, its administration needs to handle complexity, therefore, it must develop suitable reactions to the challenges stemming from all facades, in a way that allows the municipality to continue achieving its obligations and goals.

Managerial problems encompass everything that deals with handling coordination, control of everyday events, operational matters, and decision-making, assignment allocation, as well other management functions. The adequate autonomy of the municipality will result in municipal excellence, reliability, and synchronisation of the areas where problems comprise insufficient water provision and weaknesses in the municipality operations. Moreover, recursion will facilitate the flow of information that was mentioned as another managerial problem.

Appropriate flow of information is vital for the success and growth of the organisation and it is the duty of the system's management to cascade information to internal and external stakeholders and to develop the needed communication architect. Although the above issues may be regarded as soft issues, they normally create conflict and discontent when they are not resolved. This paragraph attests to the fact that there is a relationship between the organisational structure and flow of information and that a recursive structure will harmonise this relationship.

7.3.1 Autonomy versus Control

The complex relationship between environment and operations shows some disparities, as does the complexity equation between management and operations. This is reflected in poor service delivery. Currently, municipal sections are clustered together, decisions centralised at the top and limited autonomy that ultimately negatively impacts servicing different customers with different needs. However, as matters stand, not all stakeholders are satisfied with the doings of the municipality.

The expectation is that organisational modification must be made to balance the essential problems of matching environmental complexity with a suitable operational response that must endure the complexity of market stresses. In the same vein, increasing operational complexity demands an increase in administration response and this response should be self-sufficiency. Failing to match environmental complexity renders organisations as failed in meeting what

the world demands. Consequently, the mismatch between organisational complexity and administration capacity translates to the fact that management will not be able to manage successfully, and takes uninformed decisions. The problem is that the complexity of the environment is theoretically infinite, so one must be selective as to which aspects of the environment are to be considered. Similarly, the organisation is more complex than management, as management reduces the variety of the organisation by grouping complex tasks into divisions.

Organisations reduce the variety of the environment by grouping customers into market segments and according to the service they receive. General attenuators are to regularise as well as group consumers into market segments, although the UDM treats them as if they were all the same. Likewise, management groups multifaceted tasks into divisions and departments and deals with them as production systems with joint reporting standards, not as individual tasks.

Normal amplifiers consist of the legal mandate given to the WSAs, but the most important is undoubtedly mastering the autonomy of operational units to address differences in demand. The level of knowledge of environmental problems that is required to be absorbed offers a practical idea as to the level of autonomy needed for an organisation. The balance between sub-systems autonomy and system interconnection is crucial in the VSM. Management amplifies its own variety by increasing divisional autonomy, therefore, decision-making should take place at different levels, such as that of GMs, managers and middle management.

Municipal operations are supposedly designed in such a way that the senior executives operate a tightly controlled regime. All decision-making is centralised, including detailed operational and resourcing decisions. However, according to the respondents who are municipal officials, they believe the current practice at the UDM is that management are given instructions from individuals that are politicians. The respondents are of the opinion that there is a “command and control culture” coming from outside of the municipality. Mngomezulu (2020) conducted a study of political interference in the administration of service delivery

and posited that it is becoming a serious problem that is negatively affecting service delivery.

Consequently, when employees notice that the arranged process is dysfunctional and where they could, they exercised the autonomy officially denied to them and go outside officially recognised processes. Evidently, procedures are repeatedly ignored, and processes altered, steps omitted, and others introduced, and this was executed notwithstanding administration's decree. The disruptions, complaints, and protests by employees stating that management was disregarding laws and procedures were all mentioned in the forensic report - Section 106(1)(b), conducted by the KZN MEC (Duma 2020). Following that report, the MM was suspended in 2020 and finally dismissed in 2021 (Magubane 2021).

There is a distinction between a hierarchy and a VSM as far as structure, autonomy and control are concerned. The core distinction is that in the VSM, it is well-defined that different levels of the organisation deal with different features, as well as different forms of complexity. This means that from the inception of a WSA, when it is established as the primary key function, there are distinct roles and emphasis in the administration, separating types of decisions at various ranks. Usually, the decisions made in the ranks above differ from those taken in the ranks below, including the types and ranks in the officials.

The recognition and discouraging of interference amongst ranks of officials and or managers is central to the VSM model. Common practice is that a manager and a GM have different powers and therefore, rule on various decisions, levels and competencies. This is contrary to the practice of a hierarchy, where it is presumed that senior managers in higher positions are more knowledgeable than juniors, with regards to the entire operation. VSM presupposes that managers are not more knowledgeable than a person doing the job at that time.

It is anticipated that when managers apply VSM in their portfolios, they will be able to decipher complex issues (both organisational and of the surrounding environment), be in a position to react appropriately and it will be easier to

converse between organisational levels on how to proceed on matters of concern. VSM application will assist the UDM in avoiding a situation in which a decision taken on one level, destabilises decisions at other levels, to where that might lead to the total collapse of the municipality. This however, does not imply that one level is subservient to another, but it needs to be proficient in the specific environment and be coordinated to the whole.

The VSM approach is contrary to the hierarchical model, in the sense that hierarchy concerns authority, it is about who has the power to take decisions and carries with it the assumption that higher in the hierarchy means better prepared to take decisions on behalf of employees on the lower levels. Furthermore, VSM carries the assumption that managers in different parts of the municipality will be best placed to make decisions about units they are heading in the organisation. Neither hierarchy nor anarchy, VSM offers an answer to the perennial debate about autonomy and hierarchy.

7.3.2 Additional non-core function

The researcher recommends that the municipality dissolves departmental units that are not in its legislated mandate because, Jackson (2003) cautioned that the existence of an institutional portfolio, which according to the VSM is additional and trivial to that required for viability, will probably hinder the municipality in striving for efficacy and may eventually threaten its ability to survive. In this study, core functions of each government institution are stipulated in Sections 156 (1) of the SA Constitution. Those are duties of local government and constitutionally assigned to local government in terms of Part B of Schedule 4 and Part B of Schedule 5.

According to the Municipal Standard Chart of Accounts (MSCOA) guidelines, certain functions such as LED are not legislated functions of any municipality and should thus be considered non-core for all municipalities (Jitsing *et al.* 2019). As Steytler (2003) explained, the model emerging in local government is the one that sees district municipalities becoming direct service providers, instead of merely coordinating and supporting local municipalities to perform their functions

effectively and efficiently. Division of duties as per the SA constitution and Systems Act, means that the UDM is a WSA. The absence of the LED function in the schedules has resulted in it being viewed as an unfunded mandate. According to VSM, these are irrelevant units and or features and should, therefore, be eliminated.

In addition to non-core functions, there are municipal departments that seem to duplicate the same functions, such as Customer relations, Public Participation, Community Services and the Communications office. Remedial action must streamline those mentioned departments and they have to receive due attention. Systems 2 and 4 are specifically identified as characteristics that are normally weak in the organisation and it is also true for the municipality (Espinosa *et al.* 2008; Espinosa 2015).

Issues raised by the AG in the year 2012/2013 still appear in the year 2016/17, specifically the issue of leave forms and overtime. In addition, there are issues raised by employees as far back as 2009, which were only resolved in 2017 after employees resorted to labour unrest. The issue of inconsistent application of policies across all departments should be resolved to strengthen S2.

7.4 Recommendations to adopt strategic leadership

One of the observed limitations in the municipal VSM structure is the absence of strategic leadership. This was reflected by limited interconnection between departmental units, the absence of a conventional culture, identity, and vision, as well as direction. Consequently, this speaks to the inadequacy of S5 (Policy), where top strategic pronouncements are taken to guarantee the survival of an entirely viable system. Decisions are made at the top level, are strategic in nature and made to enhance the desired future of the organisation, taking the risk, opportunities, benefit, and practicality of cost, along with the variety of offerings into consideration.

Components of strategic leadership have been understood as a process of setting organisational vision, instilling integrity and thinking broadly. An important aspect of this level, is that it simplifies and guides direction of the organisation by

influencing and building the organisation's culture. Strategic leadership in the municipality needs to ensure that the entire hierarchy is functioning properly, the services are delivered, and rules are being followed. Leadership scholars believe that leadership should have a purpose and a goal. S5 functions as the highest order of decision making at a level of organisational recursion. The failure of one part of the organisation can cause a chain reaction throughout the rest of the system.

The highest policy making body within the municipality is the Council. However, the research also detected that there is no designated S5 personnel and no stakeholder group to accomplish S5 functions. Although the UDM is an ANC-run municipality, with different factions in the ANC, there is conflict. Moreover, boundaries are blurry between the administration and political leadership. Councillors interfere with everything in the running of the municipality, from recruitment of staff to procuring and payment of service providers.

The study also underlines that with the current conditions, the formation of an appropriate S5 is even more vital as the development of a personalised S5 will facilitate the level of municipal improvements and cohesion of the leadership. The municipal council structure needs to exercise its authority to ensure that not only is good governance attained, but a deep sense of viable sustainable culture is created. The council ought to determine, in discussion with management, the strategic direction that the municipality is to abide by and then align the various rules, procedures and values, which will be entrenched in the municipality.

Heikkila (2017) posited that the lack of governance success causes a flaw in strategic decision structure, which goes overlooked for periods of time, pending the environment changes, which then causes an abrupt disaster in the operations and subsequently an immediate collapse of the institution. Heikkila is of the opinion that in the event where governance is feeble and or only targets the matters of compliance or on internal control, there is an expected death spiral catastrophe in most institutions.

According to Duursema (2013: 22), strategic leadership is essential at an institutional point of interface with its surrounding environment, regardless of the belief that the success of leadership cannot be measured only by the internally oriented efficiency. In this respect, S5 should ensure that the municipality adjusts to the external environment, while upholding a suitable degree of internal balance. S5 should signify the critical qualities of the entire system to any broader system of which it is part, acting in this capacity simply as the localised management of a particular part of System 1 of the wider system.

Ilemobade, Adewumi and Van Zyl (2009) maintained that as institutions internally grow in complexity, they will operate in an increasingly ambiguous and turbulent environment externally. As a result, failure in the central role of governance increases the failure levels of institutions. The purpose of the policy is to normalise, by regulating the dispute of the opposing pressures coming from these sub-systems, to attain homeostasis between them.

Accordingly, the researcher decided not to adopt the word “policy” used by Espejo to identify this S5 role (Espejo and Reyes 2011) but instead, used the term “governance”, which the researcher believes better explains the comprehensive role of this sub-system, whether in a formal or informal, implicit or explicit way. Since S5 is the brain of the institution, formulating policies, that information is passed to S4 and subsequently, communicated downward to S3 for execution by the sub-units.

Godard (2004) cautioned that the culture of many organisations does not facilitate a highly motivated and committed workforce, no matter how much management would like to believe otherwise. Employees either do not trust the organisation, do not feel they are being treated fairly, or are confused about the company's goals and objectives, all of which hamper creativity or innovation in being truly unleashed.

Under the right circumstances, human beings have the potential to achieve levels of productivity and creativity that are often surprising - even to themselves. Hence, the researcher purports that the personality of the municipality is

supposed to come from or be presented by the leadership, in other words, council and top management, and this should filter down to the lower levels of staff. It is recommended that the municipal management be conscious that it provides the organisation with its image and personality, and that should it want a good work ethic and responsibility to prevail as characteristics of this personality, the management itself must display those characteristics. Therefore, it is imperative for leaders to ensure resources are deployed correctly to increase the distribution of services to prospective recipients. Leadership must ensure no beneficiary is better-off, while another is worse-off because of unfair service distribution. The costs of service delivery must also be kept as low as possible.

Effectiveness places emphasis on the so-called desired result. When something is regarded as effective, it means it has an intended or expected outcome. Precisely, effectiveness also has to do with the degree to which objectives are attained and the extent to which targeted problems are resolved. Leaders must ensure all service delivery strategies and programmes lead to the attainment of desired results, and ensure service delivery related problems faced by communities are addressed. In addition, leaders must ensure allocative efficiency. This has to do with allocation of resources to the right things. Scarce resources must be allocated to desperately needed service delivery areas in a prudent manner, to ensure that it does not retard access to services by other areas.

Level 5 of the governance connection is specifically to maintain the balance between System 3 and System 4 in formulating strategy. The governance connection into lower levels of recursion in the organisation ought to hear alarm bells that levels of management might filter out level 3 and the connection to the wider system within which the system-in-focus is embedded. Part of the System 5 governance role is to be able to hear these messages from deep in the organisation that things are not as they should be. External whistle blowing and or public protest is a sure sign that this function is not being discharged.

7.4.1 Leadership role

It was established that water service is mainly dependent on strong capacity, a substantial knowledge base and awareness at all levels, mostly of the institutional individuals, the water sector institutions as well as surrounding environment factors. Notwithstanding the fact that it is not easy to prevail on all levels to operate in a systematic manner, it calls for visionary leadership. Effective leadership will mostly focus on the elements of imparting a sense of purpose, establishing a common vision and goal, as well as aligning synergies with the resources (Morgan 2014), thus releasing the motivation and talent and improving collaboration between institutions. This type of leadership upholds the principles of transparency, improves internal and external accountability, consequently minimising some underlying problems contributing to (and resulting from) poor governance. The BPP will be demonstrated by leadership and reduce the irregularity in socioeconomic conditions, along with access to information, and increase the level of advancement of different stakeholder groups.

It was established in Chapter Two that water management is directly proportional to economic growth, with studies showing that opportunities for improving water governance may be greatest in areas where economic growth is rapid, education has become more widespread (especially for women), and where urbanisation is occurring at a fast rate. Moreover, political willpower is central to water governance, however, it does not arise automatically on its own. In the end, it all points back to the role and importance of leadership in the municipality. Political will in the SA context is demonstrated by the changes made by the democratic government in 1994. In summary, the recommendations include several areas for improvement of public leadership, to enhance the strategic alignment between different departments and within the organisation executive and service delivery levels.

7.4.2 Ethical leadership

Respondents believe that immoral leaders represent one of the most serious examples of managerial delinquency in municipal settings. Their perspective is that the municipal service protests in 2017 and 2018 symbolise conflict between

local government officials and municipal residents, in the case of allegedly failing to discharge their responsibilities, and have abused public trust. Stories and allegations of unethical behaviour and corruption in the UDM are well-documented, including reports of a municipal labour unrest where UDM officials and communities marched with accusations of financial mismanagement, levelled against the Mayor by SAMWU. The interaction and relationship between operational units was described as poor, with most respondents of the opinion that certain individuals, based on their motive at that time, make both strategic and operational decisions. Hence, there is a communication and transparency deficit in operational sub-units.

Additionally, the AG reports also point out that there are many irregularities in financial management. The accusations support the statement made by Madonsela (Watch 2013), stating that maladministration in SA municipalities has opened the floodgates of unprincipled leaders. During one-on-one interviews, it was apparent that immoral leaders destroy the morale of employees in the water sector. Employees reported feelings of anxiety, powerlessness, frustration, and low job fulfilment, as well as mistrust toward their leaders and related adverse consequences for private lives of employees, and these were caused by unprincipled leadership.

The values of governing principled leadership contribute positively to the achievement and efficient performance of the municipality. Thus, there is a strong connection between good business governance and principled leadership, as reflected in the King IV Report (Mbecke 2014a). Business ethics literature has testified that administrative leaders in higher positions set the proper tone of ethics in the municipality and hence, shape their prescribed and informal ethical values. This kind of leader has been found to inspire, communicate moral values and use rewards and punishment to reinforce normatively suitable behaviour. Moreover, senior management's interest in ethics has been presented to encourage an organisation's values or compliance-oriented style to ethics management and its integration of ethics into everyday activities, such as performance assessments.

Principled behaviour in municipalities is essential in order to place this local sphere of government under greater scrutiny, and so induce this institution to become more socially answerable and liable. As has been generally detected, principled practices boost the society's trust in its leadership, which in turn, enhances social development. It can be summarised by iterating that integrity in everyday practice generates and guarantees leadership that is just to all, ensuring trust in the municipal systems, and that management supports and encourages full commitment to principled actions from everyone.

The capability of leaders has also been raised in the context of morals and ethics, stating that the determination of capacity comprises two components, what that individual leader can do, but also what that leader should be able to do when met with a situation that necessitates a decision on the part of being a leader. Hence, the issue of capacity as being central, as this enables the leader to drive municipal success. In this context, it has been realised that the leaders in municipalities are not entirely capacitated to provide service delivery. For instance, leaders have not positioned their municipalities to take advantage of the rewards of good governance in the delivery of WaS.

Moreover, there are leadership challenges regarding levels of citizen participation. For instance, residents in the district present the leaders within the UDM with poor levels of participation. The political leadership of the UDM does not see the significance of the participation of their people in decision-making. Respondents stated that in some cases, participation is viewed as having many negative impacts, such as delaying decisions that have to be taken, as it calls for consensus among all parties involved. This alienates the residents from the planning and implementation of service delivery programmes. There were also issues of power dynamics in leadership. The power dynamics serve as a stumbling block in attempting to attain inclusive decision-making, where poor people who need access to services are excluded. Powerful leaders take decisions without considering the impact of such decisions on the prospective users of the services, while participation is reduced to powerful stakeholders, at the expense of the service users.

7.5 Information transmission in the municipality

Systems thinking assists in thinking about communication inconsistencies, as well as enhancing the research process by allowing an analysis of problems in the layers operational in the system of interest, observing the root causes, main variables and sub-system inferences. Mapping the municipal structure to attain an optimum capacity to deal with job-related uncertainty involves two discrete issues. The first is structuring the sub-unit along organismic or mechanistic lines to obtain anticipated intra-unit information processing capacity. The second is fashioning synchronisation and control mechanisms that link units to obtain the desired inter-unit data processing capacity. The basic design problem is to balance the costs of information processing capacity against the needs of the sub-units' work. Too much capacity is redundant and costly; too little will not get the job done. The municipality will be effective when there is a match between information processing requirements facing the municipality and information processing capacity of the organisation's structure.

In summary, the municipality must develop information-processing mechanisms capable of dealing with both external and internal sources of uncertainty. The most basic purpose of an endorsed municipality structure is to create the maximum appropriate configuration of work units (as well as the linkages between these units), to facilitate the effective collection, processing and distribution of information (Golinelli *et al.* 2011).

Operative information processing includes the gathering of suitable information, the movement of information in a timely manner, and its transmission without misrepresentation. Effective information processing also implies the ability to handle needed quantities of information according to these criteria (Giroux and McLelland 2003; Förster *et al.* 2017). Viable organisations are characterised by an increase in the ability to learn and to perform according to changing contingencies in the environment.

The key issue to note is that there are elements that influence the way municipalities categorise the environmental settings and the way municipalities

manage a system of interaction. Therefore, it is important that at each level of subsidiarity, the municipality must have an alignment interpretation that is viable and practicable. The municipality needs to revisit the processes in an enterprise because they are the dynamics of the interaction between the causes and effects amongst the various states (and state changes), through which the purpose of the enterprise is implemented.

Beer's model states that the channels linking the systems must have a greater capacity to transmit information than the demands placed upon them. The discussion of management control cannot be comprehensive when it does not refer to information processing. Information flow in a communication network is the lifeline of a business enterprise. Wang and Feeney (2016) further noted that the question of whom to transmit information to, lies at the heart of the managerial control process and has consequences for the organisational structure. It was found that a set of relationships between the units does not consistently support the models postulated, although it is difficult to describe the communication channel involved, due to many units claiming communication. For instance, there is a call centre unit, Control centre, Public participation unit, as well as customer relations units and a Communications department. Moreover, all other municipal departments communicate their own respective mandate to the public. Due to the indirect method of determining channel capacity, the measure may also reflect the discrepancy of the sender and receiver concerning the amount of information communicated through the channel capacity, with correlation results providing a conflicting set of relationships.

The other explanation for the lack of consistent results lies in the limitations of the measure of channel capacity. A major problem associated with structuring an organisation to effectively process information, is that the transmission of data across levels increases liability to error, since each time a bit of data is transmitted, it is in danger of distortion, omission, queuing, or error. According to Wildavsky (1983), this problem is a result of limited channel capacity, and the inability of the transducers of the next system to see that what is information for

one level, is data for another. Checkland (2000) noted the importance of the structure of the information control system.

Schwaninger (2006) asserted that the information timeline (Beer's third principle) states that the information flowing through a system should be timely. The finding that timely information among the members of a system (municipality), concerning WaS supply, was negatively associated with adaptability and overall effectiveness, and is contrary to what one would expect and is intriguing. The specific answer from the respondents was that the staff is "always kept in the dark" by the management. They rated the flow of information as poor.

Information overload has been a recurrent problem in organisations that has implications for structure and control, such as the UDM. Information overload is defined as information inputs so excessive as to exceed the capabilities of the human information processing system. Nyarko, Dorkenoo, Semordey and Agbanu (2016) stated that information overload was the main problem facing managers today. Overload can be viewed as a violation of the law of requisite variety, and as such, is an important concept covered in the design of Beer's model.

According to Shalley (2012), a good model should increase our understanding of the relationships between an organisation and its stakeholders in an original and ground-breaking way. The author quotes Campbell (1990), who described a model as finding the important variables that specify interconnection, while also identifying suitable conditions. The researcher believes the VSM theory has the potential to improve government's method of re-engineering, which is repeatedly needed to put better-quality service and value-for-money practices in place that will lessen waste and duplication, creating an effective water consumer experience. This theory will add to the initiatives currently in progress that validate how, in the right circumstances, efficient public service delivery models can be established by combining the complementary capabilities and cultures of the public and private sectors.

7.6 Channel 1, 2, 3, 4, 5, 6

It is recommended that C1 and C2 facilitate the interaction between the principal processes, management and control function. C3 enables the interplay between the basic operations and C4 considers the environmental intersects. C5 enables S2 to conduct its task and C6 aids S3* to fulfil its duty. In addition, two horizontal channels, which connect S1 and S4 with the environment, enable the interaction between the municipality and the surrounding environment.

The four channels guide networks and or channels transforming information between the management unit, the operation, and the environment, and each must have a higher capacity to transmit a given amount of information relevant to variety selection in a given time, than the originating sub-system must produce in that time. Moreover, wherever the information carried on a channel, efficient in distinguishing a given variety that crosses a boundary, it undergoes conversion and the variety of the transducer must be at least equivalent to the variety of the channel.

7.7 Recommendation to train the audit function team on VSM

The importance of the audit function in the VSM structure was established. Auditors perform a crucial function in monitoring and supervising the municipal risk profile, detecting and then recommending areas to improve risk management approaches, as well as advance municipal proficiency and effectiveness through positive criticism. It assists the municipality to realise its purpose by bringing a methodical, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes. The study recommends that internal and external auditors be trained in applying the VSM to the municipal context, which they must assess and evaluate regularly. VSM application will be very powerful as diagnostic points and valuable insights.

7.8 Limitations of VSM in this study

Having experienced the use of the VSM model in real-world case study of the UDM, the researcher is certain that the viable systems structure shown in this thesis, delivers a dynamic framework for the strategic analysis, planning and

management of the agility of the municipality. Interviews held with municipal officials participating in the study all came to a unanimous conclusion that managing the UDM, using a viable business structure, would result in improved agility, responsiveness and business results. However, this research in this area is not advanced enough to provide objective data on the actual agility, responsiveness and performance of organisations using the viable business structure.

Lastly, in order to corroborate the applicability and determine the limitations of the viable business configuration discussed in this thesis, the researcher proposes the following research agenda: An investigation into the success of VSM strategies developed for the municipality, business units and business processes, using a viable business structure, or the use of the model practices, to better understand the limitations and benefits of the VSM in the local government sphere.

7.9 Conclusion

The study investigated how a VSM model can foster the resolution of system problems and conflicts, to address gaps in light of the commonly aspired purpose of providing WaS at the UDM. Although the researcher considered various concepts and dynamics underlying WaS provision, the focus was to understand its governance. The study justified that governance of WaS is essential to preserve municipal aims, their mission, system arrangements and fore-thought. Some of the central issues highlighted in good governance are based on the quality of leadership about decision-making, ethics, accountability and transparency, which can be minimised by strengthening S3*. The researcher extends the belief that governance affairs serve as a foundation for an operative and successful way in dispensing superior amenities to the public.

During the time of the study, it was observed that the UDM management and political leadership was not presiding over a viable municipality, and the implication is that, since VSM has five functions and if any are removed, disconnected from a subsidiary, for example, then its abilities to function

successfully may as well be destroyed. It was confirmed that S4 does not exist. Secondly, S5 is unable to find a way to represent the essential qualities of the entire system to the larger meta-system, and then the system's survival is in question. The limited functioning and or the need for sub-systems S1, S2, S3 and S5 have also been shown. Since subsystem S2 is dysfunctional, activity in subsystem S1 can turn deadly and self-defeating, as units fight for resources and against entropy; when sub-system S4 is missing. Sub-systems S3 and S5 have collapsed into each other, leaving the critical sub-system S5 a mere functionary.

There is apparent collapse of S5 into S3 because there is a real absence of sub-system S4. The recommendation is to create a strong S4, because S4 deals with planning and envisioning the way preceding external environmental fluctuations and internal institutional capabilities, so that the municipality can create its own future, as opposed to being restricted by the environment. To guarantee that the UDM plans are well vested in a specific appreciation of the current institutional context, the intelligence function (S4) also needs to have at its disposal an up-to-date model of the organisation.

All the same, the VSM has been applied at the municipality as an abstract instrument for the diagnosis and the design of the institution. VSM has demonstrated itself to be a robust instrument, not only enabling a better understanding of the UDM, it additionally simplifies the sense of working operations. Nothing proves that VSM or its claims are faultless. However, the evidence outlined in the study speaks for itself. A proposal for future research is to observe, on a broader empirical basis, whether the claims made by the VSM theory hold true. The underlying fact is, however, that the model has not been counterfeited but, on the contrary, corroborated by the growing empirical evidence from VSM applications.

It is important that organisational systems are appropriately arranged to ensure money is effectively spent on service delivery and accounted for, as well as that government resources are used economically. Government establishments that are supposed to enforce governance at the UDM, such as the AG's Office, DWS,

CoGTA and National Treasury should be competent and capable enough to ensure that accountability and obligations, including the ethos of democracy, are upheld. The above is viewed from the functioning and organisational or institutional analysis perspective.

REFERENCES

- Aboojee, Y. 2013. 7 Steps to financial competence - a municipal debt collections focus: *Official Journal of the Institute of Municipal Finance Officers*, 13(4): 12–13, Winter 2013.
- Abu-Mahfouz, A. M., Hamam, Y., Page, P. R., Djouani, K. and Kurien, A. 2016. Real-time dynamic hydraulic model for potable water loss reduction. *Procedia Engineering*, 154: 99-106.
- Adewumi, J., Ilemobade, A. and Van Zyl, J. 2010. Treated wastewater reuse in South Africa: Overview, potential and challenges. *Resources, Conservation and Recycling*, 55(2): 221-231.
- Adewumi, J., Ilemobade, A. and van Zyl, J. 2014. Factors predicting the intention to accept treated wastewater reuse for non-potable uses amongst domestic and non-domestic respondents. *Journal of the South African Institution of Civil Engineering*, 56(1): 11-19.
- Adie, J. W., Duda, J. L., Ntoumanis, N. J. M. 2008. Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: *A test of basic needs theory*, 32(3): 189-199.
- Ai, X., Sandoval-Solis, S., Dahlke, H. and Lane, B. 2015. Reconciling hydropower and environmental water uses in the Leishui River Basin. *River Research and Applications*, 31(2): 181-192.
- Ajam, T. 2014. Intergovernmental fiscal relations in South Africa. *The Oxford Companion to the Economics of South Africa*: Oxford Press University.
- Akcil, A. and Koldas, S. 2006. Acid Mine Drainage (AMD): causes, treatment and case studies. *Journal of Cleaner Production*, 14(12-13): 1139-1145.

Akinboade, O. A., Mokwena, M. P. and Kinck, E. C. 2014. Protesting for improved public service delivery in South Africa's Sedibeng District. *Social indicators research*, 119(1): 1-23.

Alba, R. and Bolding, A. 2016. IWRM avant la lettre? Four key episodes in the policy articulation of IWRM in downstream Mozambique. *Water Alternatives*, 9(3): 549.

Alcamo, J., Henrichs, T. and Rösch, T. 2017. *World water in 2025: Global modeling and scenario analysis for the world commission on water for the 21st century*. Available: https://wedocs.unep.org/bitstream/handle/20.500.11822/19071/World_water_in_2025_global_modeling_scenarios.pdf?sequence=1&isAllowed=y (Accessed 14 December 2017).

Allan, J. A. 2005. Water in the environment/socio-economic development discourse: Sustainability, changing management paradigms and policy responses in a global system. *Government and Opposition*, 40(2): 181-199.

Al-Saidi, M. 2017. Towards understanding the integrative approach of the water, energy and food nexus. *Science of the Total Environment*, 574: 1131-1139.

Amtaika, A. 2013. *Local government in South Africa since 1994: Leadership, democracy, development and service delivery in a post-apartheid era*. Available: <https://cap-press.com/pdf/30909.pdf> (Accessed 11 December 2017).

Amy, G., Ghaffour, N., Li, Z., Francis, L., Linares, R. V., Missimer, T. and Lattemann, S. 2017. Membrane-based seawater desalination: Present and future prospects. *Desalination*, 401: 16-21.

ANA. 2018. Low education levels of councillors under scrutiny. *IOL* Available: <https://www.iol.co.za/news/politics/low-education-levels-of-councillors-under-scrutiny-14765511> (Accessed 7 June 2018).

Angelakis, A. and Gikas, P. 2014. Water reuse: overview of current practices and trends in the world with emphasis on EU states. *Water Util J*, 6: 67-78.

Araujo, L., Ramos, H. and Coelho, S. 2006. Pressure control for leakage minimisation in water distribution systems management. *Water Resources Management*, 20(1): 133-149.

Arcanjo, M. 2018. Delaying Day Zero: Fighting back against water insecurity. *Climate Institute*. Available: <http://climate.org/delaying-day-zero-fighting-back-against-water-insecurity/> (Accessed 11 June 2018).

Arnold, R. D. and Wade, J. P. 2015. A definition of systems thinking: a systems approach. *Procedia Computer Science*, 44: 669-678.

Arora, M., Malano, H., Davidson, B., Nelson, R. and George, B. 2015. Interactions between centralized and decentralized water systems in urban context: A review. *Wiley Interdisciplinary Reviews: Water*, 2(6): 623-634.

Asha, A. 2014. Capacity challenges for local government efficacy for development planning and implementation. *Journal of Public Administration*, 49(3): 803-812.

Ashby, W. R. 1991. Requisite variety and its implications for the control of complex systems. In: *Facets of systems science*, pp. 405-417. Springer.

Ashton, P. J., Hardwick, D. and Breen, C. 2008. *Changes in water availability and demand within South Africa's shared river basins as determinants of regional social-ecological resilience*. Available: http://www.anthonyturton.com/assets/my_documents/my_files/C2B_AshtonHardwick&Breen_-_Final_-_25May2008.pdf (Accessed 09/05/2018).

Atkinson, D. 2007. Taking to the streets: Has developmental local government failed in South Africa. *State of the nation: South Africa*, 2007: 53-77.

Auditor-General South Africa (AGSA). 2011. *Consolidated general report on the local government audit outcomes: Initiatives and impact of key role players on audit outcomes*. Available: https://www.agsa.co.za/Portals/0/MFMA2011-12Extracts/MFMA_2011-12_consolidated_extracts/14_MFMA_2013_Initiatives_and_impact_of_key_role_players.pdf (Accessed: 20/01/2019).

Auditor-General South Africa (AGSA). 2018. *Report of the Auditor-General to the Joint Committee of Inquiry into the functioning of the Department of Water and Sanitation: Challenges facing the water and sanitation portfolio*. Pretoria: AGSA.

Auditor-General South Africa (AGSA). 2021. *Auditor-General calls on government leaders to ensure 'sustainable' audit outcomes*. 31 March 2021. Available: <https://www.agsa.co.za/Portals/0/Reports/PFMA/201920/2021%20PFMA%20Media%20Release%20FINALISED%202.pdf> (Accessed: 18 May 2021).

Awuzie, B. and McDermott, P. 2013. Understanding complexity within energy infrastructure delivery systems in developing countries: adopting a viable systems approach. *Journal of Construction Project Management and Innovation*, 3(1): 543-559.

Babbie, E. R. 2013. *The basics of social research*. Cengage learning. Chapman University.

Backeberg, G. R. 2005. Water institutional reforms in South Africa. *Water Policy*, 7(1): 107-123.

Bain, R., Cronk, R., Hossain, R., Bonjour, S., Onda, K., Wright, J., Yang, H., Slaymaker, T., Hunter, P. and Prüss-Ustün, A. 2014. Global assessment of exposure to faecal contamination through drinking water based on a systematic review. *Tropical Medicine & International Health*, 19(8): 917-927.

Baker, N. 2010. Equipped for governance: South Africa's King III report anoints internal auditors as central to their company's governance activities and an essential part of business strategy. *Internal auditor*, 67(1): 28-33.

Bakker, K., Kooy, M., Shofiani, N. E. and Martijn, E.-J. 2008. Governance failure: rethinking the institutional dimensions of urban water supply to poor households. *World Development*, 36(10): 1891-1915.

Baltacı, A. and Balcı, A. 2017. Complexity Leadership: A Theoretical Perspective. *International Journal of Educational Leadership and Management*, 5(1).

Bates, B., Kundzewicz, Z. and Wu, S. 2008. *Climate change and water*. Intergovernmental Panel on Climate Change Secretariat.

Bazilian, M., Rogner, H., Howells, M., Hermann, S., Arent, D., Gielen, D., Steduto, P., Mueller, A., Komor, P. and Tol, R. S. 2011. Considering the energy, water and food nexus: Towards an integrated modelling approach. *Energy Policy*, 39(12): 7896-7906.

Beck, T., Rodina, L., Luker, E. and Harris, L. 2016. Institutional and policy mapping of the water sector in South Africa.

Begum, S. AbdElIslam, N.M. Adnan, M. Tariq, A. Yasmin, A. and Hameed, R. 2014. Ethnomedicines of highly utilised plants in the temperate Himalayan region, 11(3): 132-142.

Bellaubi, F. and Pahl-Wostl, C. 2017. *Corruption risks, management practices, and performance in water service delivery in Kenya and Ghana: an agent-based model*. Available: <https://doi.org/10.5751/ES-09205-220206> (Accessed 15 November 2019).

Benson, D. Gain, A. K. and Rouillard, J. J. 2015. Water governance in a comparative perspective: From IWRM to a 'nexus' approach? *Water Alternatives*, 8(1): 756-773

Berardi, L., Laucelli, D., Ugarelli, R. and Giustolisi, O. 2015. Leakage management: Planning remote real time controlled pressure reduction in Opegård municipality. *Procedia Engineering*, 119: 72-81.

Besseling, D. 2008. uThukela Water-proud of its contribution. *Water&Sanitation Africa*, 3(3): 4-7.

Bhagwan, J., Wegelin, W., Mckenzie, R. and Wensley, A. 2014. Counting the lost drops: South Africa's study into non-revenue water. *Water Practice and Technology*, 9(4): 502-508.

- Bierkens, M. F., Bell, V. A., Burek, P., Chaney, N., Condon, L. E., David, C. H., de Roo, A., Döll, P., Drost, N. and Famiglietti, J. S. 2015. Hyper-resolution global hydrological modelling: What is next? Everywhere and locally relevant. *Hydrol Process*, 29(2): 310-320.
- Biggs, H., Clifford-Holmes, J., Freitag, S., Venter, F. and Venter, J. 2017. Cross-scale governance and ecosystem service delivery: A case narrative from the Olifants River in north-eastern South Africa. *Ecosystem Services*, 28: 173-184.
- Binet, M.-E., Carlevaro, F. and Paul, M. 2014. Estimation of residential water demand with imperfect price perception. *Environmental and Resource Economics*, 59(4): 561-581.
- Biswas, A. K. 2018. Africa's Manmade Water Crisis. *Project Syndicate*. Available: <https://www.project-syndicate.org/commentary/cape-town-water-crisis-lesson-for-africa-by-asit-k-biswas-and-cecilia-tortajada-2018-02?barrier=accesspaylog> (Accessed 29 April 2018).
- Blanke, A., Rozelle, S., Lohmar, B., Wang, J. and Huang, J. 2007. Water saving technology and saving water in China. *Agricultural Water Management*, 87(2): 139-150.
- Blumberg, B., Cooper, D. R. and Schindler, P. S. 2008. *Business research methods*. McGraw-Hill Higher Education London.
- Boelens, R. and Seemann, M. 2014. Forced engagements: Water security and local rights formalization in Yanque, Colca Valley, Peru. *Human Organization*, 73(1): 1-12.
- Bogardi, J. J., Dudgeon, D., Lawford, R., Flinkerbusch, E., Meyn, A., Pahl-Wostl, C., Vielhauer, K. and Vörösmarty, C. 2012. Water security for a planet under pressure: interconnected challenges of a changing world call for sustainable solutions. *Current Opinion in Environmental Sustainability*, 4(1): 35-43.

- Boix, C. and Svolik, M. W. 2013. The foundations of limited authoritarian government: Institutions, commitment, and power-sharing in dictatorships. *The Journal of Politics*, 75(2): 300-316.
- Brandenberger, L., Schläpfer, I., Leifeld, P. and Fischer, M. 2015. *Interrelated Issues and Overlapping Policy Sectors: Swiss Water Politics*. Available: <https://pdfs.semanticscholar.org/6469/dff93792f531bb6dae2e8ab125d00377bf8f.pdf> (Accessed 24 January 2017).
- Brouwer, R., Tesfaye, A. and Pauw, P. 2011. Meta-analysis of institutional-economic factors explaining the environmental performance of payments for watershed services. *Environmental Conservation*, 38(4): 380-392.
- Brigham, E. F. and Houston, J. F. 2012. *Fundamentals of Financial Management, Concise Edition: Business and Economics*. Anderson Univeristy. United States of America.
- Bryman, A. 2015. *Social research methods*. United Kingdom: Oxford University Press.
- Burgess, S., Propper, C., Ratto, M. and Tominey, E. 2017. Incentives in the public sector: Evidence from a government agency. *The Economic Journal*, 127(605): F117-F141.
- Burke, G. J., Carrillo, J. E. and Vakharia, A. J. 2007. Single versus multiple supplier sourcing strategies. *European Journal of Operational Research*, 182(1): 95-112.
- Butler, C. and Adamowski, J. 2015. Empowering marginalized communities in water resources management: Addressing inequitable practices in Participatory Model Building. *Journal of Environmental Management*, 153: 153-162.
- Calderón, C. and Servén, L. 2014. *Infrastructure, growth, and inequality: An overview*. World Bank Research Policy Working Paper.

- Cameron, R. 2009. New public management reforms in the South African public service: 1999-2009. *Journal of public administration*, 44(Special issue 1): 910-942.
- Cameron, R. 2014. Vertical Decentralisation and Urban Service Delivery in South Africa: Does Politics Matter? *Development Policy Review*, 32(s1)
- Camkin, J. and Neto, S. 2016. Roles, rights, and responsibilities in water governance: reframing the water governance debate. *World Affairs*, 179(3): 82-112.
- Carnie, T. 2015. Salty tap water for South Coast towns. *IOL news*, 16 September 2015. Available: <https://www.iol.co.za/news/south-africa/kwazulu-natal/salty-tap-water-for-south-coast-towns-1939609> (Accessible 25 June 2021).
- Cash, C. 2016. Good governance and strong political will: Are they enough for transformation? *Land Use Policy*, 58: 545-556.
- Cave, K. and Plummer, R. 2013. Exploring water governance and management in Oneida Nation of the Thames (Ontario, Canada): An application of the institutional analysis and development framework. *Indigenous Policy Journal*, 23(4): 1-27.
- Cezarino, L. O. and Beltrán, A. C. 2009. Diagnosis of organizational soft problems in a Peruvian financial institution by systemic thinking. *Syst Pract Action Res*, 22(2): 101-110.
- Chaane, T. 2014. Support to and interventions in local government: Financial and Fiscal Commission, Department Cooperative Governance, National Treasury, SA *Local Government Association briefings*. Available: <https://pmg.org.za/committee-meeting/16814/> (Accessed: 15/10/2019).
- Chakraborti, D., Rahman, M. M., Ahamed, S., Dutta, R. N., Pati, S. and Mukherjee, S. C. 2016. Arsenic groundwater contamination and its health effects in Patna district (capital of Bihar) in the middle Ganga plain, India. *Chemosphere*, 152: 520-529.

Chatzimichailidou, M. M. and Katsavounis, S. 2012. S. Beer's Viable System Model application in furniture industry-a case study. In: *Proceedings of International Conference for Entrepreneurship, Innovation and Regional Development*.

Checkland, P. and Scholes, J. 2000. Soft systems methodology in action: Including a 30 year retrospective. *Journal-Operational Research Society*, 51(5): 648-648.

Checkland, P. 2000. Soft systems methodology: a thirty year retrospective. *System Research and Behavioral Science*, 17(S1): S11-S58.

Cheruiyot, K., Wray, C. and Katumba, S. 2015. Spatial statistical analysis of dissatisfaction with the performance of local government in the Gauteng City-Region, South Africa. *South African Journal of Geomatics*, 4(3): 224-239.

Chikoto, T. 2009. Informal Settlements in South Africa. BSc (Hons), University of Pretoria
[https://repository.up.ac.za/bitstream/handle/2263/14436/Chikoto_Informal\(2009\).pdf?sequence](https://repository.up.ac.za/bitstream/handle/2263/14436/Chikoto_Informal(2009).pdf?sequence) (Accessed June 2021).

Chirieleison, C. and Montrone, A. 2013. Evaluating local government costs and revenues: The case of an Italian privately owned for-profit event. *Tourism Management Perspectives*, 8: 90-97.

Christmas, A. and de Visser, J. 2009. Bridging the gap between theory and practice: Reviewing the functions and powers of local government in South Africa. *Commonwealth Journal of Local Governance*, (2): 107.

Cilliers, P., Biggs, H., Blignaut, S., Choles, A., Hofmeyr, J.-H., Jewitt, G. and Roux, D. 2013. Complexity, modeling, and natural resource management. *Ecology and Society*, 18(3).

Ciuhureanu, A. T., Balteş, N. and Brezai, L. 2009. The financial management's role in modern organizations: Interferences and differences between the

management of the accounting activity and the financial management. *Annals Economic Studies Timișoara*, XV: 597-600.

Clark, D. 2015. *Development and assessment of an integrated water resources accounting methodology for Water Research Commission South Africa*. University of KwaZulu-Natal: Water Research Commission.

Clark, R. M. and Hakim, S. 2014. Securing water and wastewater systems: global perspectives. In: *Securing Water and Wastewater Systems*. Springer, Cham 2: 1-27.

Clarvis, M. H., Allan, A. and Hannah, D. M. 2014. Water, resilience and the law: from general concepts and governance design principles to actionable mechanisms. *Environmental Science & Policy*, 43: 98-110.

Clifford-Holmes, J. K., Slinger, J. H., de Wet, C. and Palmer, C. G. J. S. S. E. 2018. Modelling in the 'Muddled Middle': A Case Study of Water Service Delivery in Post-Apartheid South Africa. 215. *36th International Conference of the System Dynamics Society*.

Cohen, A. and Davidson, S. 2011. The watershed approach: Challenges, antecedents, and the transition from technical tool to governance unit. *Water Alternatives*, 4(1): 1.

Conway, D., Van Garderen, E. A., Deryng, D., Dorling, S., Krueger, T., Landman, W., Lankford, B., Lebek, K., Osborn, T. and Ringler, C. 2015. Climate and southern Africa's water–energy–food nexus. *Nature Climate Change*, 5(9): 837.

Cooley, H., Ajami, N., Ha, M.-L., Srinivasan, V., Morrison, J., Donnelly, K. and Christian-Smith, J. 2014. Global water governance in the twenty-first century. In: *The world's water*. Island Press, Washington, DC Springer, 56(4):1-18.

Cosgrove, W. J. and Rijsberman, F. R. 2014. *World water vision: making water everybody's business*. London: Routledge.

Council, W. W. 2013. *Budapest Water Summit Hungary*. Budapest summit. Available: <http://www.worldwatercouncil.org/en/2013-budapest-water-summit> (Accessed 21 February 2017).

Couzens, E. 2015. Avoiding Mazibuko: Water security and constitutional rights in Southern African case law. *PER: Potchefstroomse Elektroniese Regsblad*, 18(4): 1162-1186.

Cremer, J., Estache, A. and Seabright, P. 1994. *The decentralization of public services: lessons from the theory of the firm*. World Bank Publications. Available: <http://documents.worldbank.org/curated/en/221301468765598964/The-decentralization-of-public-services-lessons-from-the-theory-of-the-firm> (Accessed 08 July 2018).

Creswell, W. J. 2012. *Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. London: Sage Publications.

Creswell, J. W. 2014. *A concise introduction to mixed methods research*. London: Sage Publications.

Creswell, J. W. and Creswell, J. D. 2017. *Research design: Qualitative, quantitative, and mixed methods approaches*. London: Sage publications.

Crossman, J., Whitehead, P., Futter, M., Jin, L., Shahgedanova, M., Castellazzi, M. and Wade, A. 2013. The interactive responses of water quality and hydrology to changes in multiple stressors, and implications for the long-term effective management of phosphorus. *Science of the Total Environment*, 454: 230-244.

Daigger, G. 2009. Evolving urban water and residuals management paradigms: *Water reclamation and reuse, decentralization, and resource recovery*, 81(8): 809-823.

Davies, J. 2002. Models of governance-a viable systems perspective. *Australasian Journal of Information Systems*, 9(2):57-66.

Davis, J. 2004. Corruption in public service delivery: experience from South Asia's water and sanitation sector. *World Development*, 32(1): 53-71.

De Beer, F. and Du Toit, D. H. 2015. Human resources managers as custodians of the King III code. *South African Journal of Economic and Management Sciences*, 18(2): 206-217.

de Loë, R. C. and Patterson, J. J. 2017. Rethinking water governance: moving beyond water-centric perspectives in a connected and changing world. *Nat. Resources J.*, 57: 75.

de Visser, J. 2007. Service delivery and budget implementation plan: common sense rather than mere compliance. *Local Government Bulletin*, 9(2): 10-11.

de Visser, J. 2009. Developmental local government in South Africa: Institutional fault lines. *Commonwealth en Us. Journal for Local Governance*, 2: 7-25.

de Visser, J. 2010. The Political-administrative interface in South African municipalities: Assessing the quality of local democracies. *Commonwealth Journal of Local Governance*, (5): 86-101.

Denby, K., Movik, S., Mehta, L. and van Koppen, B. 2016. The 'trickle down' of IWRM: A case study of local-level realities in the Inkomati Water Management Area, South Africa. *Water Alternatives*, 9(3): 473.

Dennis, I. and Dennis, R. 2012. Climate change vulnerability index for South African aquifers. *Water SA*, 38(3): 417-426.

Department of Cooperative Governance and Traditional Affairs (CoGTA). 2020. *KZN Cogta tables forensic reports into irregular expenditure at msunduzi and Ugu*. Available:<https://www.kzncogta.gov.za/kzn-cogta-tables-forensic-reports-into-irregular-expenditure-at-msunduzi-and-ugu/> (Accessed 14 May 2020)

Department of Water Affairs (DWA). 2002. *National water Research Strategy*. Pretoria: Government.

Department of Water Affairs (DWA). 2013. *National Water Resource Strategy*. Pretoria: Available: <http://www.dwa.gov.za/documents/Other/Strategic%20Plan/NWRS2-Final-email-version.pdf> (Accessed 30 March 2018).

Department of Water Affairs (DWA). 2015a. *The National Water Resources Infrastructure Branch* Pretoria: Available: <http://www.dwa.gov.za/NWRI/Default.aspx> (Accessed 7 August 2017).

Department of Water Affairs (DWA). 2015b. *Revision of the pricing strategy for water use charges in terms of Section 56(1) of the National Water Act, 1998*. Pretoria: Government. Available: www.gpwonline.co.za (Accessed 27 January 2017).

Department of Water Affairs (DWA). 2015/16. *South Africa Yearbook 2015/16*. Pretoria: Water Affairs. 17 November 2017.

Department of Water Affairs (DWA). 2016. Non-Financial Investigation Into the Eradication of Backlogs with respect to access to Tap Water in Households within the 27 Priority Dms by 2019. *Pretoria: water & sanitation*. Available: <http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwi6g5nWkqbjAhU1tHEKHXNXBvAQFjABegQIBBAC&url=http%3A%2F%2Fwww.dwa.gov.za%2Fwsks%2FUserControls%2FDownloadImportFiles.aspx%3FFileID%3D855&usq=AOvVaw3h9ccnXf92tOvUo2njA58c> (Accessed 17 November 2017).

Department of Water Affairs (DWA). 2017a. *Blue Drop Green Drop Report: Department of Water and Sanitation briefing*. Available: <https://pmg.org.za/committee-meeting/23873/> (Accessed 18 January 2018).

Department of Water Affairs (DWA). 2017b. *Report on the state of the department of water and sanitation*. Cape Town: DWA. Available: <https://www.fse.org.za/Downloads/SAWCStateofDWSReport.pdf> (Accessed 11 December 2017).

Department of Water and Sanitation (DWaS). 2018. *Annual report 2017/2018*. Available: https://www.gov.za/sites/default/files/gcis_document/201810/water-and-sanitation-annual-report.pdf (Accessed 20 April 2018).

Dewulf, A., Gray, B., Putnam, L., Lewicki, R., Aarts, N., Bouwen, R. and Van Woerkum, C. 2009. Disentangling approaches to framing in conflict and negotiation research: A meta-paradigmatic perspective. *Human Relations*, 62(2): 155-193.

Dewulf, A., Mancero, M., Cárdenas, G. and Sucozhanay, D. 2011. Fragmentation and connection of frames in collaborative water governance: a case study of river catchment management in Southern Ecuador. *International Review of Administrative Sciences*, 77(1): 50-75.

Dinar, A. 2014. Water and economy-wide policy interventions. *Foundations and Trends® in Microeconomics*, 10(2): 85-165.

Dipholo, K., Mafema, E. and Tshishonga, N. 2011. Challenges and opportunities of democratic decentralisation in sustaining local government in Botswana and South Africa. *Journal of Public Administration*, 46(4): 1431-1444.

Dlamini, K. P. 2013. Impact of performance management system on the implementation of the Integrated Development Plan at Ugu District Municipality. MBA, Management College of South Africa.

Dlamini, P., Orchard, C., Jewitt, G., Lorentz, S., Titshall, L. and Chaplot, V. 2011. Controlling factors of sheet erosion under degraded grasslands in the sloping lands of KwaZulu-Natal, South Africa. *Agricultural Water Management*, 98(11): 1711-1718.

Dlamini, N. 2021a. Margate Beach and Lagoon closed over sewage leak. *The Witness*, 26 February 2021. Available: <https://www.news24.com/witness/news/margate-beach-and-lagoon-closed-over-sewage-leak-20210226> (Accessed 01 [June 2021](#)). [21](#).

Dlamini, N. 2021b. Ugu District Municipality dismisses nine Samwu shop stewards for misconduct .*The Witness*, 27 May 2021. Available: <https://www.news24.com/witness/news/kzn/ugu-district-municipality-dismisses-nine-samwu-shop-stewards-for-misconduct-20210526>; <https://www.iol.co.za/mercury/news/union-vows-to-fight-dismissal-of-south-coast-whistle-blowers-2860398a-7088-4bb8-84a9-7300a0d509ae> (Accessed 19 June 2021).

Dominici, G., Basile, G. and Palumbo, F. 2013. Viable systems approach and consumer culture theory: A conceptual framework. *Journal of Organisational Transformation & Social Change*, 10(3): 262-285.

DPSA. 2013. Service Charter. *Public Service Coordinating Bargaining Council (PSCBC)*, Available: <http://www.dpsa.gov.za/dpsa2g/documents/institutional/2013-2015%20DSPA%20Strategic%20Plan.pdf> (Accessed 27 April 2018).

du Plessis, J., Burger, A., Swartz, C. and Musee, N. 2006. *A desalination guide for South African municipal engineers*. Pretoria: Water Research Commission.

Du Plooy-Cilliers, F., Davis, C. and Bezuidenhout, R. (2014). *Research Matters*. Paarl Media Paarl, South Africa.

Dube, R., Maphosa, B. and Scott-Goldman, J. 2014. *The Role of Local Community Institutions in the Adaptation of Rural and Urban Communities to the Impacts of Climate Change on Water Access and Use*. Available: <http://www.wrc.org.za/wp-content/uploads/mdocs/1963-1-141.pdf> (Accessed 22 April 2018).

Duma, N. 2020. Report reveals damning findings against senior Ugu municipality officials. *Eye witness news*, 13 October 2020. Available: <https://ewn.co.za/2020/10/13/report-reveals-damning-findings-against-senior-ugu-municipality-officials> (Accessed: 21 June 2021).

Duit, A., Galaz, V., Eckerberg, K. and Ebbesson, J. 2010. Governance, complexity, and resilience: *Global Environmental Change*, 20(3): 363-368.

- Duursema, H. H. 2013. *Strategic Leadership: Moving beyond the leader-follower dyad*. Ph.D. Erasmus University of Rotterdam.
- Effah Ameyaw, E. and Chan, A. P. 2013. Identifying public-private partnership (PPP) risks in managing water supply projects in Ghana. *Journal of Facilities Management*, 11(2): 152-182.
- Ejimabo, N.O. 2015. The Influence of Decision Making in Organizational Leadership and Management Activities. *Journal of Entrepreneurship & Organization Management*, 4(2): 1-13.
- Ekane, N., Nykvist, B., Kjellén, M., Noel, S. and Weitz, N. 2014. Multi-level sanitation governance: understanding and overcoming challenges in the sanitation sector in sub-Saharan Africa. *Waterlines*, 33(3): 242-256.
- Elina Herrala, M. and Jouni Olavi Haapasalo, H. 2012. Effect of governance models on enhancing water service delivery. *International Journal of Public Sector Management*, 25(5): 373-390.
- Eshuis, J. and Van Buuren, A. 2014. Innovations in water governance: the importance of time. *International Review of Administrative Sciences*, 80(2): 401-420.
- Espejo, R. 2002. Seeing systems: overcoming organisational fragmentation. In: *Synergy Matters*, pp. 1-6. Springer.
- Espejo, R. and Gill, A. 1997. The viable system model as a framework for understanding organizations. *Phrontis Limited & SYNCHO Limited*,
- Espejo, R. and Reyes, A. 2011. *Organizational systems: Managing complexity with the viable system model*. Springer Science & Business Media.
- Espinosa, A. 2015. Governance for sustainability: learning from VSM practice. *Kybernetes*, 44(6/7): 955-969.

- Espinosa, A., Harnden, R. and Walker, J. 2008. A complexity approach to sustainability—Stafford Beer revisited. *European Journal of Operational Research*, 187(2): 636-651.
- Evans, W. D., Pattanayak, S., Young, S., Buszin, J., Rai, S. and Bihm, J. W. 2014. Social marketing of water and sanitation products: a systematic review of peer-reviewed literature. *Social Science & Medicine*, 110: 18-25.
- Eze, N. M. and Harrison, O. O. 2013. Financial management in local government: The Nigeria experience. *International journal of financial research*, 4(4): 146.
- Faguet, J. P. 2014. Decentralization and governance. *World Development*, 53: 2-13.
- Fahami, Z., Pordanjani, H. A. M. and Mahmoudi, M. T. 2016. The accepted audit opinion and its impact on the relationship between earnings management and stock returns. *Asian Journal of Research in Banking and Finance*, 6(2): 56-64.
- Fauchereau, N., Trzaska, S., Rouault, M. and Richard, Y. 2003. Rainfall variability and changes in southern Africa during the 20th century in the global warming context. *Natural Hazards*, 29(2): 139-154.
- Fennessy, G. and Burstein, F. 2000. Using soft systems as a methodology for researching knowledge management problems. In: Proceedings of *ICSTM*. Monash University, Australia, 180-185.
- Förster, J. J., Downsborough, L. and Chomba, M. J. 2017. When policy hits practice: Structure, agency, and power in South African water governance. *Society & Natural Resources*, 30(4): 521-536.
- Fosu, A. K. 2015. Growth, inequality and poverty in Sub-Saharan Africa: recent progress in a global context. *Oxford Development Studies*, 43(1): 44-59.
- Fourie, W. 2018. Aligning South Africa's National Development Plan with the 2030 Agenda's Sustainable Development Goals: Guidelines from the Policy

Coherence for Development movement. *Sustainable Development*, 26(6): 765-771.

Frank, J. and Martinez-Vazquez, J. 2014. *Decentralization and infrastructure: from gaps to solutions*. Georgia state university: University Library.

Friedrich, E., Pillay, S. and Buckley, C. 2009. Carbon footprint analysis for increasing water supply and sanitation in South Africa: a case study. *Journal of Cleaner Production*, 17(1): 1-12.

Friesen, J., Sinobas, L. R., Foglia, L. and Ludwig, R. 2017. Environmental and socio-economic methodologies and solutions towards integrated water resources management: *Science of the Total Environment*. 581–582: 906-908

Fuo, O. N. 2013. A critical investigation of the relevance and potential of IDPs as a local governance instrument for pursuing social justice in South Africa. *PER: Potchefstroomse Elektroniese Regsblad*, 16(5): 01-69.

Furlong, C., De Silva, S., Guthrie, L. and Considine, R. 2016. Developing a water infrastructure planning framework for the complex modern planning environment. *Utilities Policy*, 38: 1-10.

Gay, L. F. and Sinha, S. K. 2014. *Water infrastructure asset management primer*. London: IWA Publishing.

Ghosh, R., Kansal, A. and Aghi, S. 2016. Implications of end-user behaviour in response to deficiencies in water supply for electricity consumption—A case study of Delhi. *Journal of Hydrology*, 536: 400-408.

Gianpaolo, B., Gandolfo, D., Federica. P. 2013. Viable Systems Approach and Consumer Culture Theory: A Conceptual Framework. *Journal of Organizational Transformation & Social Change*, 10(3): 262–285.

Gilbert, N. 2012. Water under pressure: a UN analysis sets out global water-management concerns ahead of Earth Summit. *Nature*, 483(7389): 256-258.

- Giné Garriga, R. and Pérez Foguet, A. 2013. Water, sanitation, hygiene and rural poverty: issues of sector monitoring and the role of aggregated indicators. *Water Policy*, 15(6): 1018-1045.
- Giroux, G. and McLelland, A. J. 2003. Governance structures and accounting at large municipalities. *Journal of Accounting and Public Policy*, 22(3): 203-230.
- Gleick, P. H. 2003. Water use. *Annual Review of Environment and Resources*, 28(1): 275-314.
- Gleick, P. H. 2012. China dams. In: *The world's water*. Springer, 127-142.
- Gleick, P. H. 2014. The world's water: *the biennial report on freshwater resources* 8(1):420.
- Godard, J. 2004. A critical assessment of the high-performance paradigm. *British Journal of Industrial Relations*, 42(2): 349-378.
- Golinelli, G. M., Pastore, A., Gatti, M., Massaroni, E. and Vagnani, G. 2011. The firm as a viable system: managing inter-organisational relationships. *Sinergie Italian Journal of Management*, (58): 65-98.
- Gong, H. Jiang, H. and Leung, J. 2019. *The changing relationship between the Chinese Government and Non-governmental Organisations in social service delivery: approaching partnership?* Available: <https://www.tandfonline.com/doi/abs/10.1080/02185385.2018.1525762>. (Accessed 23 March 2019).
- Gordhan, P. 2014. *Back to basics: Serving our communities better*. Department of Cooperative Governance and Traditional Affairs. Available: http://www.cogta.gov.za/cgta_2016/wp-content/uploads/2016/06/Minister-Pravin-Gordan-Back-to-Basics-Presentation.pdf. (Accessed 06 November 2018).

- Gowlland-Gualtieri, A. 2007. South Africa's Water Law and Policy Framework. *International Environmental Law Research Centre* Geneva, Switzerland Available: <http://www.ielrc.org/content/w0703.pdf> (Accessed 30 May 2008).
- Graebner, M. E., Martin, J. A. and Roundy, P. T. 2012. Qualitative data: Cooking without a recipe. *Strategic Organization*, 10(3): 276-284.
- Grafton, Q. R., Wyrwoll, P., White, C. and Allendes, D. 2014. *Global Water Issues and Insights*. Australia: ANU Press.
- Graven, M. H. 2014. Poverty, inequality and mathematics performance: the case of South Africa's post-apartheid context. *ZDM*, 46(7): 1039-1049.
- Gray, N. 2017. *Water technology*. Dublin: CRC Press.
- Gray, N. F. 2008. *Drinking water quality: problems and solutions*. Dublin: Cambridge University Press.
- Green, P. A., Vörösmarty, C. J., Harrison, I., Farrell, T., Sáenz, L. and Fekete, B. M. 2015. Freshwater ecosystem services supporting humans: Pivoting from water crisis to water solutions. *Global Environmental Change*, 34: 108-118.
- Grey, D. and Sadoff, C. W. J. W. P. 2007. Sink or swim? *Water Security for Growth and Development*, 9(6): 545-571.
- Griffin, P.A. & Wright, A.M. 2015. Commentaries on Big Data's importance for accounting and auditing. *Accounting Horizons*, 29(2): 377-379.
- Groenfeldt, D. and McKenna-McGruff, B. 2013. Towards a new water ethic. *The Bonn declaration on global water security. Global Water System Project, Bonn*: 14-15.
- Groenfeldt, D. and Schmidt, J. J. 2013. Ethics and water governance. *Ecology and Society*, 18(1).

Guiteras, R., Levinsohn, J. and Mobarak, A. M. 2015. Encouraging sanitation investment in the developing world: a cluster-randomized trial. *Science*, 348(6237): 903-906.

Gupta, J. and Pahl-Wostl, C. 2013. Global water governance in the context of global and multilevel governance: its need, form, and challenges. *Ecology and Society*, 18(4).

Haddon, A., Loughlin, C. and McNally, C. 2015. Leadership in a time of financial crisis: what do we want from our leaders? *Leadership & Organization Development Journal*, 36(5): 612-627.

Hambira, W. L. and Gandidzanwa, C. P. 2006. Water pricing: A key to sustainable water supply and demand management in Southern Africa: A comparative study of Botswana and Zimbabwe. In: Proceedings of *Proceedings of the IASTED International Conference on Environmentally Sound Technology in Water Resources Management—Science and Technology for Development in the 21st Century*, pp. 24-29.

Hanasaki, N., Fujimori, S., Yamamoto, T., Yoshikawa, S., Masaki, Y., Hijioka, Y., Kainuma, M., Kanamori, Y., Masui, T. and Takahashi, K. 2013. A global water scarcity assessment under shared socio-economic pathways. *Hydrology and Earth System Sciences*, 17(7): 2393.

Harvey, P. 2008. Poverty Reduction Strategies: opportunities and threats for sustainable rural water services in sub-Saharan Africa. *Progress in Development Studies*, 8(1): 115-128.

Haveri, A. 2006. Complexity in local government change: Limits to rational reforming. *Public Management Review*, 8(1): 31-46.

Heckroodt, S. 2012. A study for an expanded conceptual scanning framework and the impact on current business environment scanning: a systems thinking approach. Stellenbosch: Stellenbosch University.

- Hedden, S. and Cilliers, J. 2014. Parched prospects-the emerging water crisis in South Africa. *Institute for Security Studies Papers*, (11): 16.
- Heikkila, T. 2017. Evidence for tackling the complexities of water governance. *Public Administration Review*, 77(1): 17-20.
- Heleba, S. 2011. The right of access to sufficient water in South Africa: How far have we come? *Law, Democracy & Development*, 15(1)
- Hellberg, S. 2017. Water for survival, water for pleasure-A biopolitical perspective on the social sustainability of the basic water agenda. *Water Alternatives*, 10(1): 65.
- Helness, H., Damman, S., de Clercq, W. and Elema, N. 2017. A Framework for Integrated Sustainability Assessment of Water Cycle Services. *European Journal of Sustainable Development*, 6(4): 1-12.
- Hering, D., Carvalho, L., Argillier, C., Beklioglu, M., Borja, A., Cardoso, A. C., Duel, H., Ferreira, T., Globevnik, L. and Hanganu, J. 2015. Managing aquatic ecosystems and water resources under multiple stress. An introduction to the MARS project. *Science of the total environment*, 503: 10-21.
- Herrfahrdt-Pähle, E. 2014. Applying the concept of fit to water governance reforms in South Africa. *Ecology and Society*, 19(1).
- Hill, M. 2013. Addressing the Challenge of Institutional Infrastructure in a Technically Focussed World. In: *Climate Change and Water Governance*. Springer, 327-345.
- Hinton, K. E. 2012. *A practical guide to strategic planning in higher education*. Society for College and University Planning Ann Arbor, MI.
- Hirsch, G.B., Levine, R. and Miller, R.L., 2007. Using system dynamics modeling to understand the impact of social change initiatives. *American Journal of community psychology*, 39(3-4), pp.239-253.

Hollingworth, B., Koch, P., Chimuti, S. and Malzbender, D. 2011. *An investigation into the water infrastructure development financial allocation pathways in municipalities*. Water Research Commission.

Holman, J. 2010. Desalination could comprise up to 10% of South Africa's urban water supply mix by 2030. *Engineering News, July*:111-120.

Hoverstadt, P. and Bowling, D. 2002. Modelling organisations using the viable system model. In: Proceedings of *Systems Engineering Workshop, Royal Academy of Engineering, London*.

Hordijk, M., Sara, L. M. and Sutherland, C. 2014. Resilience, transition or transformation? A comparative analysis of changing water governance systems in four southern cities. *Environment & Urbanization* 26(1): 130–146, International Institute for Environment and Development (IIED).

Hutton, G. and Bartram, J. 2008. Global costs of attaining the Millennium Development Goal for water supply and sanitation. *Bulletin of the World Health Organization*, 86: 13-19.

Hutton, G. and Varughese, M. 2016. The costs of meeting the 2030 sustainable development goal targets on drinking water, sanitation, and hygiene.

IFAC, I. 2013. Recommended practice guideline reporting on the long-term sustainability of an entity's finances. *Final Pronouncement July*, 2013.

Iglesias, A., Garrote, L., Diz, A., Schlickerrieder, J., Martin-Carrasco, F. and Policy. 2011. Re-thinking water policy priorities in the Mediterranean region in view of climate change. *Water Resource Management*, 14(7): 744-757.

Ilemobade, A., Adewumi, J. and Van Zyl, J. 2009. Framework for assessing the viability of implementing dual water reticulation systems in South Africa. *Water SA*, 35(2).

Imuezerua, E. and Chinomona, E. 2015. Analysing the Concept of Municipal Budgeting and Service Delivery Pattern in a South Africa's District Municipality. *Mediterranean Journal of Social Sciences*, 6(1): 359.

Ivens, S. 2008. Does increased water access empower women? *Development*, 51(1): 63-67.

Jackson, M. C. 2001. Critical systems thinking and practice. *European Journal of Operation Research*, 128(2): 233-244.

Jackson, M. C. 2003. *Systems thinking: Creative holism for managers*. United Kingdom: Wiley Chichester.

Jacobs, B. 2004. Using soft systems methodology for performance improvement and organisational change in the English National Health Service. *Journal of Contingencies and Crisis Management*, 12(4): 138-149.

Jacobs, H. and Llemobade, A. 2013. Water footprint: preface. *Water SA*, 39(06): 341-344.

Jacobs, K. L. and Snow, L. J. D. 2015. Adaptation in the Water Sector: Science & Institutions. *144(3)*: 59-71.

Jemmali, H. and Sullivan, C. A. 2014. Multidimensional analysis of water poverty in MENA region: An empirical comparison with physical indicators. *Social Indicators Research*, 115(1): 253-277.

Jitsing, A., Brey, Z., Wall, K., Craig, S., Thosago, M. and Munro, S. 2019. State of municipal finance management: an overview of capacity and challenges. *Civil Engineering=Siviele Ingenieurswese*, 27(v27i1): 39-45.

Jones, I. 2014. *Research methods for sports studies*. London: Routledge.

Joubert, A., Stewart, T. J. and Eberhard, R. 2003. Evaluation of water supply augmentation and water demand management options for the City of Cape Town. *Journal of Multi-Criteria Decision Analysis*, 12(1): 17-25.

Kanakoudis, V. and Gonelas, K. 2014. Developing a methodology towards full water cost recovery in urban water pipe networks, based on the "user-pays" principle. *Procedia Engineering* 70:907–916.

Kanakoudis, V., Gonelas, K. and Patelis, M. 2014. Developing water pressure management scenarios to cut down the real losses in the water distribution system of Kozani, Greece. Proceedings of *Proceedings of the 12th Int. Conf. on Protection & Restoration of the Environment. PRE12*. 248-255.

Kaniaru, W. 2015. From scarcity to security: Water as a potential factor for conflict and cooperation in Southern Africa. *South African Journal of International Affairs*, 22(3): 381-396.

Kanyane, M. 2011. Financial viability of rural municipalities in South Africa. *Journal of Public Administration*, 46(2): 935-946.

Karper, P. 2020. Political battle drains coastal taps. *Mail & Guardian*, 6 March 2020. Available: <https://mg.co.za/article/2020-03-06-political-battle-drains-coastal-taps/> (Accessed 26 June 2021).

Kemerink, J., Ahlers, R. and Van der Zaag, P. 2011. Contested water rights in post-apartheid South Africa: the struggle for water at catchment level. *Water SA*, 37(4): 585-594.

Khosrowjerdi, M. 2011. Designing a viable scientific communication model: VSM approach. *Library Hi Tech*, 29(2): 359-372.

Kidd, M. 2017. Climate change, groundwater and the law: exploring the connections in South Africa. *Water International*, 42(6): 678-690.

Kiparsky, M., Sedlak, D. L., Thompson Jr, B. H. and Truffer, B. 2013. The innovation deficit in urban water: the need for an integrated perspective on institutions, organizations, and technology. *Environmental Engineering Science*, 30(8): 395-408.

Koelble, T. A. and Siddle, A. J. D. 2014. Institutional complexity and unanticipated consequences: the failure of decentralization in South Africa. *Democratization*, 21(6): 1117-1133.

Koma, S. B. 2010. The state of local government in South Africa: Issues, trends and options. *Journal of Public Administration*, 45(Special issue 1): 111-120.

Koppen, B. C., Giordano, M. and Butterworth, J. 2008. *Community-based water law and water resource management reform in developing countries*. CABI.

Kotzé, M. and Venter, I. 2010. Perceptions of leadership effectiveness in the public sector: an empirical study. *Journal of Public Administration*, 45(3): 413-435.

Kumar, R. and Sharma, V. 2015. *Auditing: Principles and practice*. PHI Learning Pvt. Ltd.

Kubheka, A. 2021. Umgeni Water and Ugu municipality to iron out assistance details. *IOL*, 8 March 2021. Available: <https://www.iol.co.za/dailynews/news/umgeni-water-and-ugu-municipality-to-iron-out-assistance-details-89a3acd7-27ce-4be0-9281-687504a2acb8> (Accessed 3 July 2021).

KwaZulu-Natal, Cooperative Governance and Traditional Affairs (CoGTA). 2020. *Investigation of Fraud and Corruption at Ugu District Municipality*. Reporting period September 2019-September 2020. CoGTA KZN.

Lange, G. M., Mungatana, E. and Hassan, R. 2007. Water accounting for the Orange River Basin: An economic perspective on managing a transboundary resource. *Ecological Economics*, 61(4): 660-670.

Larsen, T. A., Hoffmann, S., Lüthi, C., Truffer, B. and Maurer, M. J. S. 2016. Emerging solutions to the water challenges of an urbanizing world. *Science*, 352(6288): 928-933.

- LaVanchy, G. T. 2017. When wells run dry: Water and tourism in Nicaragua. *Annals of Tourism Research*, 64: 37-50.
- Lawhon, M. and Makina, A. 2017. Assessing local discourses on water in a South African newspaper. *Local Environment*, 22(2): 240-255.
- Lawton, A. and Páez, I. 2015. Developing a framework for ethical leadership. *Journal of Business Ethics*, 130(3): 639-649.
- Leedy, P. D. and Ormrod, J. E. 2005. *Practical research*. Upper Saddle River, N.J: Pearson Custom.
- Leonard, A. 2007. Symbiosis and the viable system model. *Kybernetes*, 36(5/6): 571-582.
- Leonard, E. C. and Trusty, K. A. 2015. *Supervision: Concepts and practices of management*. Boston: Nelson Education.
- Levitt, H. M., Motulsky, S. L., Wertz, F. J., Morrow, S. L. and Ponterotto, J. G. 2017. Recommendations for designing and reviewing qualitative research in psychology: Promoting methodological integrity. *Qualitative Psychology*, 4(1): 2-22.
- Lewicki, R., Gray, B. and Elliott, M. eds., 2003. Making sense of intractable environmental conflicts: Concepts and cases. Island press.
- Lewis, S. 2015. Qualitative inquiry and research design: Choosing among five approaches. *Health Promotion Practice*, 16(4): 473-475.
- Lilford, R. J., Oyebode, O., Satterthwaite, D., Melendez-Torres, G., Chen, Y.-F., Mberu, B., Watson, S. I., Sartori, J., Ndugwa, R. and Caiaffa, W. J. e. 2016. The health of people who live in slums. Improving the health and welfare of people who live in slums. *Health Finance and Governance Project*, 7(8).
- Local Government: Municipal Structures Act, 1998 (Act 117 of 1998)

- Lopes, M. E. 2001. Soft Systems Methodology: An Application to a Community Based Association. In: Proceedings of *Proceedings Field Graduate Institute Action Research Symposium*. Alexandria, Virginia, USA. Citeseer.
- Lumsden, T., Schulze, R. and Hewitson, B. 2009. Evaluation of potential changes in hydrologically relevant statistics of rainfall in Southern Africa under conditions of climate change. *Water SA*, 35(5): 649-656.
- MacDonald, A. M., Bonsor, H. C., Dochartaigh, B. É. Ó. and Taylor, R. G. 2012. Quantitative maps of groundwater resources in Africa. *Environmental Research Letters*, 7(2): 024009.
- MacDonald, A. M., Calow, R. C., Macdonald, D. M., Darling, W. G. and Dochartaigh, B. E. 2009. What impact will climate change have on rural groundwater supplies in Africa? *Hydrological Sciences Journal*, 54(4): 690-703.
- Mackay, H. 2003. *Water policies and practices. Towards a just South Africa: the political economy of natural resource wealth* (ed. D. Reed & M. de Wit): 49-83.
- Madigele, P., Snowball, J. and Fraser, G. 2015. Water, water everywhere: Is integrated water resource management the right institutional prescription for South Africa's water management challenges. In: Proceedings of *Presentation to the Economic Society of South Africa (ESSA) Conference 2nd-4th September*.
- Magubane, B. 2014. *South African Government*. Available: <https://www.gov.za/about-government/government-programmes/back-basics> (Accessed 18 November 2018).
- Magubane, T. 2021. Ugu municipality parts ways with municipal manager. *IOL Mercury News*, 23 May 2021. Available: <https://www.iol.co.za/mercury/news/ugu-municipality-parts-ways-with-municipal-manager-b3d0b722-f047-449e-b6ca-060aca63273b> (Accessed 21 June 2021).
- McGuirk, P. M. & O'Neill, P. 2016. Using questionnaires in qualitative human geography. In I. Hay (Eds.), *Qualitative Research Methods in Human Geography* (pp. 246-273). Don Mills, Canada: Oxford University Press.

Mailovich, C. 2018. Only 18 municipalities got clean audits in 2017/2018 *Business Live*. Available: <https://www.businesslive.co.za/bd/national/2019-06-26-only-18-municipalities-got-clean-audits-in-20172018/> (Accessed 11 October 2018).

Managa, A. 2012. Unfulfilled promises and their consequences: A reflection on local government performance and the critical issue of poor service delivery in South Africa. *Africa Institute of South Africa, Aisa Policybrief* Number 76.

Manamela, K. F. 2010. An investigation of water delivery constraints at Mabokelele village, Limpopo Province, South Africa. University of Limpopo (Turfloop Campus).

Manickum, T. and John, W. 2014. Occurrence, fate and environmental risk assessment of endocrine disrupting compounds at the wastewater treatment works in Pietermaritzburg (South Africa). *Science of the Total Environment*, 468: 584-597.

Manyaka, R. and Madzivhandila, T. 2013. The implementation of Integrated Development Plan for service delivery purposes in South African municipalities: are we there yet. In: *Conference Proceedings published by the South African Association of Public Administration and Management (SAAPAM)*, pp. 174-185.

Maphunye, K. J., Tshishonga, N. and Mafema, E. D. 2014. Analyzing the Quality of South Africa's Public Services at the Local Government Level through the Batho Pele Principles. *Journal of African & Asian Local Government Studies*, 3(1).

Maramura, T. C. and Thakhathi, D. 2016. Analyzing the Electronic Governance Policies and Legislative Frameworks on Public Service Delivery in South Africa. *Journal of Communication*, 7(2): 241-245.

Maroun, R.A. 2015. *A holistic participatory approach to water and sanitation improvement in disadvantaged urban slums. PhD. American University of Beirut.*

Lebanon. Available: <https://scholarworks.aub.edu.lb/bitstream/handle/10938/10868/ed-68.pdf?sequence=1> (Accessed 20 March 2019).

Martin, S., Brannigan, J. and Hall, A. 2005. Sustainability, systems thinking and professional practice. *Journal of Geography in Higher Education*, 29(1): 79-89.

Maserumule, M. H. 2011. Good governance in the New Partnership for Africa's Development (NEPAD): A public administration perspective. PhD. Available: http://uir.unisa.ac.za/bitstream/handle/10500/4854/thesis_maserumule_mh.pdf?sequence=1&isAllowed=y (Accessed 02 February 2019).

Mashamaite, K. 2014. Public Service Delivery Protests in a Democratic South Africa: A Dilemma for Local Municipalities. *Mediterranean Journal of Social Sciences*, 5(25): 231.

Mashitisho, D. 2017. *Briefing the Portfolio Committee on Water and Sanitation on the 2017/18 Water Tariffs*. Pretoria: Available: https://www.google.co.za/search?ei=lpAjXcP9OcTYxgOn_qGACA&q=water+tariffs+structure&oq=water+tariffs+structure&gs_l=psy-ab.32650.24845.25791202.1134.13669.1j0j2j12j10j6j0j101gws-wiz00i71j0j0i67j0i131i67j0i131j0i10j0i22i10i30j0i22i30.bbfv340cmCM (Accessed 29 November 2017).

Masih, I., Maskey, S., Mussá, F. and Trambauer, P. 2014. A review of droughts on the African continent: a geospatial and long-term perspective. *Hydrology and Earth System Sciences*, 18(9): 3635.

Matshabamphala, M. D. J. 2014. "Finding our way": the need for accountable leadership and good governance in South Africa's public services. *Journal of Public Administration*, 49(4): 1008-1018.

Mayosi, B. M. and Benatar, S. R. 2014. Health and health care in South Africa—20 years after Mandela. *New England Journal of Medicine*, 371(14): 1344-1353.

Mazibuko, G. P. 2013. The Impact of the municipal billing system on revenue collection in selected South African cities. Masters, University of Pretoria.

- Mbecke, P. 2014a. Corporate municipal governance for effective and efficient public service delivery in South Africa. *Journal of Governance and Regulation*, 3(4): 98-106.
- Mbecke, Z.-M. P. 2014b. Resolving the service delivery dilemma in South Africa through a cohesive service delivery theory. *Problems and Perspectives in Management*, 12(4): 265-275.
- Mbili, S. M. 2015. Evaluating the implementation of performance management system in Ugu District Municipality. Masters of Public Administration, University of Kwazulu-Natal.
- McDonald, D. A. 2004. *Environmental Justice in South Africa*. Cape Town: Juta and Company Ltd.
- Mckenzie, R. S. and Wegelin, W. 2009. Challenges with the implementation of Water Demand Management in Guateng Province. *WISA paper 0508*: p 1-15.
- McKenzie, R. S., Siqalaba, Z. and Wegelin, W. 2012. *The State of non-revenue water in South Africa (2012)*. Water Research Commission Pretoria.
- McKinney, M. and Thorson, J. E. 2015. Resolving water conflicts in the American West. *Water Policy*, 17(4): 679-706.
- McLennan, G. 2007. Towards Postsecular Sociology? *Sociology*. 41(5): 857-870
- Mdanisi, C. T. 2010. Policy, planning and provision: a case study of water in the Limpopo Province. Masters, University of KwaZulu–Natal.
- Megdal, S. B., Eden, S. and Shamir, E. 2017. *Water Governance, Stakeholder Engagement, and Sustainable Water Resources Management: Multidisciplinary* Digital Publishing Institute. *Water Journal*, 9(3),190.
- Mehta, L. 2014. Water and human development. *World Development*, 59: 59-69.
- Mehta, V. K., Sekhar, M., Kemp-Benedict, E., Sekhar, M., Mehta, V. K., Kemp-Benedict, E., Malghan, D., Gebbert, S., Mehta, V. K. and Wang, D. 2012.

Groundwater Impacts of water consumption patterns in Bengaluru, India. In: Proceedings of *Proceedings of the 5th Annual International groundwater Conference, Aurangabad, India*.

Meissner, R. 2016. Paradigms and theories in water governance: The case of South Africa's National Water Resource Strategy. *Water SA*, 42(1): 1-10.

Merrey, D. J., Drechsel, P., de Vries, F. P. and Sally, H. 2005. Integrating "livelihoods" into integrated water resources management: taking the integration paradigm to its logical next step for developing countries. *Regional Environmental Change*, 5(4): 197-204.

Mhlanga, F. 2012. An assessment of the relationship between traditional leaders and ward councillors and its impact on service delivery: The case study of Mnquma Local Municipality. Doctoral dissertation, University of Fort Hare.

Mills-Novoa, M. and Hermoza, R. T. 2017. Coexistence and conflict: IWRM and large-scale water infrastructure development in Piura, Peru. *Water Alternatives*, 10(2): 370.

Mingers, J. and White, L. 2010. A review of the recent contribution of systems thinking to operational research and management science. *European Journal of Operational Research*, 207(3): 1147-1161.

Minteer, B. A. and Manning, R. E. 2003. Pragmatism in environmental ethics: democracy, pluralism, and the management of nature. *Environmental ethics: an anthology*: 319-330. Blackwell, Malden, MA.

Mkhungo, M. D. 2015. Factors that Account for Survivability of Black Small-scale Sugarcane Growers in Ugu District Municipality. University of KwaZulu-Natal, Westville.

Mkhoza, T. 2017. DA lays water pollution complaint Ugu district municipality. *IOL News*, 11 January 2017. Available: <https://www.iol.co.za/news/da-lays-water-pollution-complaint-ugu-district-municipality> (Accessed 10 June 2021).

Mngomezulu, S., 2020. Political Interference in the Administration of Service Delivery in UMLALAZI Local Municipality of KwaZulu-Natal, South Africa. *Journal of Economics and Behavioral Studies*, 12(1 (J)), pp.38-45.

Mofolo, M. and Smith, W. 2009. Making use of 'Batho pele' principles to improve service delivery in municipalities. *Journal of Contemporary Management*, 6(1): 430-440.

Mogale, T. M. 2003. Developmental local government and decentralised service delivery in the democratic. South Africa. In Mhone, G. and Edigheji, O. (eds.). *Governance in new South Africa: The Challenges of Globalisation*. Lansdowne. University of Cape Town Press.

Moletsane, A. M., de Klerk, N. and Bevan-Dye, A. L. 2014. Community expectations and perceptions of municipal service delivery: a case study in a South African Municipality. *Mediterranean Journal of Social Sciences*, 5(21): 281.

Molefe, L. and Overton-de Klerk, N. 2019. Community perceptions of ward councillors' communication in service delivery protest areas: the desirability of a strategic communication approach. *Communitas*, 24.

Molobela, T. 2016. The effect of revenue planning on municipal financial performance: a case study of the Polokwane Local Municipality in the Limpopo Province. SAAPAM Limpopo Chapter 5th Annual Conference Proceedings 2016, Available: <http://ulspace.ul.ac.za/bitstream/handle/10386/1651/33%20Molobela.pdf?sequence=1&isAllowed=y> (Accessed 14 September 2018).

Morgan, J. 2014. *The Future of Work: Attract new talent, build better leaders, and create a competitive organization*. ISBN 9781118877241. Wiley.

Morgan, J. 2015. *The 5 types of organizational structures: Part 2, 'Flatter' Organizations*. Available: <http://www.forbes.com/sites/jabobmorgan/2015/07/08/.../?sh=188664116dac>. (Accessed 21 July 2021)

- Moriarty, P., Butterworth, J., van Koppen, B. and Soussan, J. 2004. Water, poverty and productive uses of water at the household level. *Beyond Domestic*, 19: 1-243.
- Motubatse, K. N., Ngwakwe, C. C. and Sebola, M. 2017. The effect of governance on clean audits in South African municipalities. *African Journal of Public Affairs*, 9(5): 90-102.
- Moutinho, L. 2004. Soft Systems Methodology-Conceptual Model Building and Its Contribution-Wilson, B. (2001), John Wiley and Sons, Chichester. *European Management Journal*, 1(22): 123-124.
- Movik, S., Mehta, L. and Manzungu, E. 2016. The flow of IWRM in SADC: The role of regional dynamics, advocacy networks and external actors. *Water Alternatives*, 9(3): 434.
- Mpehle, Z. 2012. Are service delivery protests justifiable in the democratic South Africa? *Journal of Public Administration*, 47(Special issue 1): 213-227.
- Mukheibir, P. and Ziervogel, G. 2007. Developing a Municipal Adaptation Plan (MAP) for climate change: the city of Cape Town. *Environment and Urbanization*, 19(1): 143-158.
- Mukhtarov, F. and Gerlak, A. K. 2014. Epistemic forms of integrated water resources management: towards knowledge versatility. *Policy Sciences*, 47(2): 101-120.
- Mulder, L. 2006. *Econometric Model to predict the effect that various Water Resource Management Scenarios would have on South Africa's Economic Development*. Pretoria, South Africa.
- Muller, H. 2014. The South African experience on legal, institutional and operational aspects of the rights to water and sanitation. *Aquatic Procedia*, 2: 35-41.

Muller, M. 2008. Free basic water - a sustainable instrument for a sustainable future in South Africa. *Environment and Urbanization*, 20(1): 67-87.

Muller, M., Chikozho, C. and Hollingworth, B. 2015. *Water and regional integration, Final report, Project No. K5/2252*: Pretoria: Water Research Commission.

Municipality, G. T. 2013. Service delivery and budget implementation plan. *Strategies*, 208: 470.

Mustafa, R. 2011. The POEMs of Educational Research: *A Beginners' Concise Guide*, 4(3): 23-30.

Mwabi, J., Adeyemo, F., Mahlangu, T., Mamba, B., Brouckaert, B., Swartz, C., Offringa, G., Mpenyana-Monyatsi, L. and Momba, M. 2011. Household water treatment systems: a solution to the production of safe drinking water by the low-income communities of Southern Africa. *Physics and Chemistry of the Earth, Parts A/B/C*, 36(14-15): 1120-1128.

Mwelase, L. T. 2016. Non-revenue water: most suitable business model for water services authorities in South Africa: Ugu District Municipality. M.Tech.,. Durban University of Technology.

National Council of Provinces Committee. 2021. (Parliamentary Monitoring Group) Nquthu local municipality & Mkhanyakude district municipality section 139 intervention: *KZN Cogta input*. Available: <https://pmg.org.za/committee-meeting/33231/> (Accessed 23 May 2021).

Neri, L. and Russo, A. 2014. A framework for audit quality: Critical Analysis. *Business and Management Review*, 3(9): 25-30.

Newsroom. 2019. ANC Launces its election manifesto. *Eye Witness News* Available: <https://ewn.co.za/2019/01/12/must-read-the-anc-s-2019-elections-manifesto> (Accessed 30 January 2019).

Ngidi, T. and Dorasamy, N. 2014. Imperatives for Good Governance: A Case Study of the Implementation Batho Pele Principles at Durban Home Affairs Regional Level. *Journal of Social Sciences*, 38(1): 9-21.

Ngidi, T. L. 2013. Impact of Batho Pele principles on service delivery: a case study of the Durban regional office of the Department of Home Affairs. D.Tech., Durban University of Technology.

Nikolaou, K. 2014. Critique of political economy of water and the collaborative alternative. *European Water Movement*, Available: <http://europeanwater.org>, (Accessed 21 February 2019).

Njiraini, G. W. 2016a. Water Policy in South Africa. PhD., Universitäts-und Landesbibliothek Bonn.

Njiraini, G. W. 2016b. Water policy in south africa-effects, impacts, and the associated transaction costs in the Olifants Basin. PhD., Rheinischen Friedrich-Wilhelms-Universität Bonn.

Nkhata, B. and Breen, C. 2016. Assessing and measuring adaptive capacity: the experiences of African countries in developing meaningful metrics for water management. *Current Opinion in Environmental Sustainability*, 21: 9-14.

Nkomo, S. 2017. Public Service Delivery in South Africa: Councillors and Citizens Critical Links in Overcoming Persistent Inequities. *Afrobarometer Policy Paper* No. 42: 1-17.

Nair, N. 2020. Parliament summons Ugu officials to explain water crisis on KZN south coast. *Sunday Times*, 13 March 2020. Available: <https://www.timeslive.co.za/news/south-africa/2020-03-13-parliament-summons-ugu-officials-to-explain-water-crisis-on-kzn-south-coast/> (Accessed 21 June 2021).

news24.com. 2021. *Ugu Municipal workers strike over alleged corruption*. 24 March 2021. Available: <https://ewn.co.za/video/11051/ugu-municipal-workers-strike-over-alleged-corruption> (Accessed March 2021).

Nojiyeza, I. S. 2014. Integrated water resources management and the manufactured scarcity of water in Africa. PhD, University of KwaZulu-Natal.

Nxumalo, S. 2021. Ugu residents take to the streets after three weeks without access to water. *IOL News*, 25 March 2021. Available: <https://www.iol.co.za/mercury/news/ugu-residents-take-to-the-streets-after-three-weeks-without-access-to-water-fbb666da-58bb-4187-8339-4e4f2da1a1c6> (Accessed 14 June 2021).

Nxumalo, M. 2021. Ugu water problems continue. *IOL*, 22 April 2021. Available: <https://www.iol.co.za/dailynews/news/ugu-water-problems-continue-b651648a-93f7-4e9e-bfc2-19a9cbbb47d9> (Accessed 7 June 2021).

Nyagwambo, N., Chonguiça, E., Cox, D. and Monggae, F. 2008. Local Governments and IWRM in the SADC Region. *Institute of Water and Sanitation Development (IWSD): Harare, Zimbabwe*: 58.

Nyambod, E. M. and Nazmul, H. 2010. Integrated water resources management and poverty eradication—policy analysis of Bangladesh and Cameroon. *Journal of water resource and protection*, 2(3): 191-198.

Nyarko, I. K., Dorkenoo, C. B., Semordey, E. Y. and Agbanu, P. 2016. Organizational Structure as a Logical Tool for Determining the Flow of Responsibility and Authority. *International Journal of Management and Administrative Sciences (IJMAS)*, 3(3): 1-19.

Nyathikazi, S. 2021. MECs meet Ugu protesters. *IOL News*, 25 March 2021. Available: <https://www.iol.co.za/dailynews/news/mecs-meet-ugu-protesters-43b4f574-eeab-451a-9312-3f63dc365019> (Accessed 17 June 2021).

Nzimakwe, T. and Mpehle, Z. 2012. Key factors in the successful implementation of Batho Pele principles. *Journal of Public Administration*, 47(Special issue 1): 279-290.

- Ogunbodede, N. and Tolu, L. 2018. Transparency, accountability and service delivery in nigeria: a focus on public service. *Afro Asian Journal of Social Sciences*, IX(II): 2229–5313, Quarter II, 2018.
- Osborn, Hunt and Jauch 2002 Toward a Contextual Theory of Leadership. *The Leadership Quarterly*, 13(6): 797-837.
- Osborne, S., Radnor, Z., Kinder, T. and Vidal, I., 2014. A Sustainable public service organisations: A Public Service-Dominant approach. *Society and Economy*. 2014 Sep 1:36(3), pp.313-338.
- Osolale, O. and Okoh, A. 2017. Human enteric bacteria and viruses in five wastewater treatment plants in the Eastern Cape, South Africa. *Journal of Infection and Public Health*, 10(5): 541-547.
- Otteng, O. and Jagero, J. 2014. The function of service charter as a communication tool for consumers of immigration services in Kenya. *International Journal of Communication Research*, 4(1): 9-21.
- Otto, B. 2018. *Mapping, Measuring and Mitigating Global water Challenges Africa*: World Resource Institute. Available: <https://www.wri.org/our-work/topics/water> (Accessed 28 April 2018).
- Ov, N. 2018. Water crisis in Cape Town: a failure in governance. *The Lancet*, Vol. 2. Available: <http://www.thelancet.com/planetary-health>: (Accessed: 19 June 2019).
- Palmer, C. G., Biggs, R. and Cumming, G. S. 2015. Applied research for enhancing human well-being and environmental stewardship: using complexity thinking in Southern Africa. *Ecology and Society*, 20(1): 1-4.
- Pahl-Wostl, C., P. Jeffrey, N. Isendahl, and M. Brugnach. 2011. Maturing the new water management paradigm: progressing from aspiration to practice. *Water Resources Management*, 25(3):837-856.

- Pearce, D. 2002. An intellectual history of environmental economics. *Annual Review of Energy and the Environment*, 27(1): 57-81.
- Pejan, R. 2013. The application of assignment and delegation within the context of the National Water Act: the implications for catchment management agencies. *South African Law Journal*, 130(1): 125-153.
- Pérez Ríos, J. 2010. Models of organizational cybernetics for diagnosis and design. *Kybernetes*, 39(9/10): 1529-1550.
- Pereira, L. S., Cordery, I., and Lacovides, I. 2009. *Coping with water scarcity: addressing the challenges*. New rev. and extended ed. Dordrecht; London: Springer.
- Peters, K. and Oldfield, S. 2005. The paradox of 'Free Basic Water' and cost recovery in Grabouw: Increasing household debt and municipal financial loss. In: *Proceedings of Urban Forum*. Springer, 313-335.
- Petty, N. J., Thomson, O. P. and Stew, G. 2012. Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. *Manual Therapy*, 17(5): 378-384.
- Pietilä, P. 2006. *Role of municipalities in water services*. D.Tech., Tampere University of Technology.
- Pollard, S. and du Toit, D. 2005. Achieving integrated water resource management: the mismatch in boundaries between water resources management and water supply. In: *Proceedings of International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa'*, pp. 26-28.
- Pollitt, C. and Bouckaert, G. 2011. Public Management Reform: A Comparative Analysis - New Public Management, Governance, and the Neo-Weberian State. *International Review of Administrative Sciences*, 78(1): 180-182.

- Pollitt, C. and Hupe, P. 2011. Talking about government: The role of magic concepts. *Public Management Review*, 13(5): 641-658.
- Ponterotto, J. G., Mathew, J. T. and Raughley, B. 2013. The value of mixed methods designs to social justice research in counseling and psychology. *Journal for Social Action in Counseling & Psychology*, 5(2): 42-68.
- Pradhan, A. and Mbohwa, C. J. R. 2014. Development of biofuels in South Africa: Challenges and opportunities. *Renewable and Sustainable Energy Reviews*, 39: 1089-1100.
- Preston, I. R. 2015. Water supply development decision-making in South Africa. Masters, Rhodes University.
- Pretorius, D. and Schurink, W. 2007. Enhancing service delivery in local government: the case of a district municipality. *South African Journal of Human Resource Management*, 5(3): 19-29.
- Rainey, H. G. 2009. *Understanding and managing public organizations*. San Francisco: John Wiley & Sons.
- Ramalho, A. 2017. *Report for Corporate governance for South Africa 2016*. South Africa: Institute of Directors in South Africa. Available: [https://c.ymcdn.com/sites/iodsa.site-ym.com/resource/collection/684B68A7-B768-465C-8214-E3A007F15A5A/loDSA King IV Report - WebVersion.pdf](https://c.ymcdn.com/sites/iodsa.site-ym.com/resource/collection/684B68A7-B768-465C-8214-E3A007F15A5A/loDSA%20King%20IV%20Report%20-%20WebVersion.pdf) (Accessed 23 April 2017).
- Ramutsheli, M. and van Rensburg, J. J. 2015. The root causes for local government's failure to achieve objectives. *Southern African Journal of Accountability and Auditing Research*, 17(2): 107-118.
- Rant, M. and Rozman, R. 2008. Modelling the interplay of environment, organisational and network structure changes. *Economic and Business Review for Central and South-Eastern Europe*, 10(2): 89.

- Rasul, I. and Rogger, D. 2016. Management of bureaucrats and public service delivery: Evidence from the Nigerian civil service. *The Economic Journal*, 128(608): 413-446.
- Razumova, M., Rey-Maqueira, J. and Lozano, J. 2016. The role of water tariffs as a determinant of water saving innovations in the hotel sector. *International Journal of Hospitality Management*, 52: 78-86.
- Reichborn-Kjennerud, K. 2013. Political accountability and performance audit: the case of the auditor general in Norway. *Public Administration*, 91(3): 680-695.
- Resnick, D. 2014. Urban governance and service delivery in African cities: the role of politics and policies. *Development Policy Review*, 32(s1).
- Reynolds, M. and Holwell, S. 2010. *Systems approaches to managing change: a practical guide*. London: Springer.
- Rhodes, B. and McKenzie, M. T. 2018. To what extent does socio-economic status still affect household access to water and sanitation services in South Africa? *Journal of Economic and Financial*, 11(1): 1-9.
- Richter, N., Perumal S., Becker, K. 2003. Evaluation of nutritional quality of Moringa (*Moringa oleifera* Lam.) leaves as an alternative protein source for Nile tilapia (*Oreochromis niloticus* L.). *Aquaculture*, 217(1/4): 599-611.
- Richter, B. D. 2010. Re-thinking environmental flows: from allocations and reserves to sustainability boundaries. *River Research and Application*, 26(8): 1052-1063.
- Rishigen, V. 2015. Residents forced to drink salt water: mayor must account - DA KZN. *The politics Web*, 10 November 2015. Available: <https://www.politicsweb.co.za/politics/residents-forced-to-drink-salt-water-mayor-must-ac> (Accessed 27 May 2021).
- Rodina, L. 2016. Human right to water in Khayelitsha, South Africa—Lessons from a 'lived experiences' perspective. *Geoforum*, 72: 58-66.

- Rogers, P. and Hall, A. W. 2003. *Effective water governance*. Global water partnership Stockholm.
- Rohr, H., Cilliers, J. and Fourie, W. 2017. Spatial planning and land-use management tools in aid of securing water sustainability: The case study of Mogalakwena Local Municipality in South Africa. *Town and Regional Planning*, 71: 11-23.
- Romano, M. and Kapelan, Z. 2014. Adaptive water demand forecasting for near real-time management of smart water distribution systems. *Environmental Modelling & Software*, 60: 265-276.
- Ruiters, C. 2013. Funding models for financing water infrastructure in South Africa: Framework and critical analysis of alternatives. *Water SA*, 39(2): 313-326.
- Ruiters, C. and Matji, M. P. 2015. Water institutions and governance models for the funding, financing and management of water infrastructure in South Africa. *Water SA*, 41(5): 660-676.
- Ruiters, C. and Matji, M. P. 2016. Public private partnership conceptual framework and models for the funding and financing of water services infrastructure in municipalities from selected provinces in South Africa. *Water SA*, 42(2): 291-305.
- Rusca, M., Boakye-Ansah, A. S., Loftus, A., Ferrero, G. and van der Zaag, P. 2017. An interdisciplinary political ecology of drinking water quality. Exploring socio-ecological inequalities in Lilongwe's water supply network. *Geoforum*, 84: 138-146.
- Rusca, M. and Schwartz, K. 2017. The paradox of cost recovery in heterogeneous municipal water supply systems: Ensuring inclusiveness or exacerbating inequalities? *Habitat International*, 73, 101-108.
- Ryan, A. B. 2006. Methodology: Analysing qualitative data and writing up your findings. *Researching and Writing your thesis: a guide for postgraduate students*: pp. 92-108.

Sahle, E. N., Galvin, M., Pierce, B. and Todd, K. 2019. The UN's Human Right to Water in the Context of New Water Governance Regimes in South Africa and Tanzania. In: *Human Rights in Africa*, pp. 285-330. Springer.

Saleth, R. M., Kadushkin, A. and Ali, T. 2005. Water Institutional Changes for Realizing MDGs: Conceptual Basis and Analytical Framework. In: *Proceedings of Sixth Annual Global Development Conference: Developing and Developed Worlds: Mutual Impact*. Dakar, Senegal.

Sandoval-Solis, S. and McKinney, D. C. 2012. Integrated water management for environmental flows in the Rio Grande. *Journal of Water Resources Planning and Management*, 140(3): 355-364.

Sarens, G., Abdolmohammadi, M. J. and Lenz, R. 2012. Factors associated with the internal audit function's role in corporate governance. *Journal of Applied Accounting Research*, 13(2): 191-204.

Satterthwaite, D. 2016. Missing the Millennium Development Goal targets for water and sanitation in urban areas. *Environment and Urbanization*, 28(1): 99-118. IIED. DOI:10.1177/0956247816628435. Available: www.sagepublications.com.

Savenije, H. H. and Van Der Zaag, P. 2002. Water as an economic good and demand management paradigms with pitfalls. 27(1): 98-104.

Schreiner, B. 2013. Viewpoint- Why has the South African National Water Act been so difficult to implement. *Water Alternatives*, 6(2): 239-245.

Schreiner, B. and Van Koppen, B. 2002. Catchment management agencies for poverty eradication in South Africa. *Physics and Chemistry of the Earth, Parts A/B/C*, 27(11-22): 969-976.

Schulz, C., Martin-Ortega, J., Glenk, K. and Ioris, A. A. 2017. The value base of water governance: A multi-disciplinary perspective. *Ecological Economics*, 131: 241-249.

- Schwaninger, M. 2006. Design for viable organizations: The diagnostic power of the viable system model. *Kybernetes*, 35(7/8): 955-966.
- Scott, C. A., Kurian, M. and Wescoat, J. L. 2015. The water-energy-food nexus: Enhancing adaptive capacity to complex global challenges. In: *Governing the nexus*. Springer, 15-38.
- Seip, B. K. 2011. Organizational structure and impact on service delivery: a case study of the Middle Ramu District Administration in Papua New Guinea. *Contemporary PNG Studies*, 15: 67.
- Senge, P. M. 2014. *The fifth discipline fieldbook: Strategies and tools for building a learning organization*. London: Crown Business.
- Seo, J. 2011. *Resource dependence patterns and organizational performance in nonprofit organizations*. PhD, Arizona State University.
- Shafritz, J. M., Borick, C., Russell, E. W. and Hyde, A. C. 2016. *Introducing public administration*. London: Routledge.
- Shah, T. 1999. Water against poverty: Livelihood-oriented water resource management. *Water Nepal*, 6(1): 117-143.
- Shalley, C. E. 2012. Writing good theory: Issues to consider. *Organizational Psychology Review*, 2(3): 258-264.
- Shannon, M. A., Bohn, P. W., Elimelech, M., Georgiadis, J. G., Marinas, B. J. and Mayes, A. M. 2008. Science and technology for water purification in the coming decades. *Nature*, 452(7185): 301.
- Shen, Y. and Chen, Y. 2010. Global perspective on hydrology, water balance, and water resources management in arid basins. *Hydrological Processes*, 24(2): 129-135.
- Siebrits, R., Winter, K., Barnes, J., Dent, M., Ginster, M., Harrison, J., Jackson, B., Jacobs, I., Jordaan, A. and Kasan, H. 2014. Priority water research questions

for South Africa developed through participatory processes. *Water SA*, 40(2): 199-210.

Simon, M. K. and Goes, J. 2013. *Assumption, limitations, delimitations, and scope of the study. Dissertation and scholarly research: Recipes for success*. Available: <http://www.dissertationrecipes.com> (Accessed 12 April 2018).

Slabbet, S. 2016. *Perceptions of Municipal Water and Sanitation Services*. SALGA. Available: <http://www.wrc.org.za> (Accessed 08 January 2019).

Smith, T. and de Visser, J. 2009. *The Role of Ward Committees in Enhancing Participatory Local Governance and Development in South Africa: Evidence from Six Ward Committee Case Studies*. Community Law Centre. Cape Town: Government Printer.

Sohail, M. and Cavill, S. 2008. Water for the poor: Corruption in water supply and sanitation. *Global Corruption Report 2008: Corruption in the Water Sector*: 44-52.

Sorlini, S., Pedrazzani, R., Palazzini, D. and Collivignarelli, M. 2013. Drinking water quality change from catchment to consumer in the rural community of Patar (Senegal). *Water Quality, Exposure and Health*, 5(2): 75-83.

Sousa, J., Ribeiro, L., Muranho, J. and Marques, A. S. 2015. Locating leaks in water distribution networks with simulated annealing and graph theory. *Procedia Engineering*, 119: 63-71.

South Africa. 1997. *White Paper on Transforming Public Service Delivery*: Government Printer Pretoria.

South Africa, 1983. *Conservation of Agricultural Resources Act, 1983*. Government Printer.

South Africa. *Constitution of the Republic of South Africa*. Cape Town: Government Printer.

South Africa, Department of Water Affairs 2013. Proposed National Water Resource Strategy 2 (NWRS). Managing Water for an Equitable and Sustainable future.

South Africa, Department Of Water Affairs and Forestry (DWAf). 1997. Guidelines For Compulsory National Standards Regulations: Section 9 Of The Water Services Act (Act 108 of 1997). Available: <https://cer.org.za/wp-content/uploads/1997/12/Guidelines-for-the-Compulsory-National-Standards-and-Norms-and-Standards-for-Water-Services-Tariffs.pdf> (Accessed 11 May 2021).

South Africa, Department of Water Affairs (DWA). 2014. *National Water Act 36 of 1998*. Pretoria: Government Printers. Available: https://cer.org.za/wp-content/uploads/2010/05/36-OF-1998-NATIONAL-WATER-ACT_2-Sep-2014-to-date.pdf (Accessed 10 April 2018).

South African Local Government Association (SALGA). 2021. SALGA expresses its deep concern about the state of municipal finances detailed in the audit outcomes for local government for the period 2019/20. Available: https://www.salga.org.za/Documents/Media%20Room/Media%20Statements/2019-2020%20SALGA%20Audit%20Outcomes%20Media%20Statement_30%20June_2021.pdf (Accessed 28 June 2021).

South African Weather Service. 2015. *Rainfall Pattern for South Africa (1961-1990)*. 30 April 2015.

Spellman, F. R. 2018. *The science of water: Concepts and applications*. London: CRC press.

Sporns, O. 2007. Brain connectivity. *Scholarpedia*, 2(10): 4695.

Sraboni, A. 2021. Human Resource Management discipline, *International Journal of Financial, Accounting, and Management (IJFAM)* ISSN: 2656-3355, 2(4): 343-355. Khulna University Available:<https://doi.org/10.35912/ijfam.v2i4.412> (Accessed 3 June 2021).

STATSSA. 2017. *Community survey 2016*. Pretoria: Statistics SA. Available: <http://www.statssa.gov.za/> (Accessed 04 July 2019).

Sterman, J. D. 2000. *Business dynamics: systems thinking and modeling for a complex world*. Irwin McGraw-Hill, Boston.

Streeten, P., Burki, S. J., Haq, U., Hicks, N. and Stewart, F. 1981. *First things first: meeting basic human needs in the developing countries*. New York: Oxford.

Stuart-Hill, S. I. 2015. *Mainstreaming Adaptation to Climate Change Into Decision Making in the Water Sector: Concepts and Case Studies from South Africa*. University of KwaZulu-Natal, Pietermaritzburg.

Sujarwoto, S. 2017. Why decentralization works and does not works? A systematic literature review. *Journal of Public Administration Studies*, 1(3): 1-10.

Sultana, F. and Loftus, A. 2015. The human right to water: Critiques and condition of possibility. *Wiley Interdisciplinary Reviews: Water*, 2(2): 97-105.

Sung, D., You, Y. and Song, J. H. J. O. S. 2008. The Conceptual Mechanism for Viable Organizational Learning Based on Complex System Theory and the Viable System Model.

Sureshchandar, G., Rajendran, C. and Anantharaman, R. 2002. The relationship between service quality and customer satisfaction—a factor specific approach. *Journal of services marketing*, 16(4): 363-379.

Sutherland, C., Scott, D. and Hordijk, M. 2015. Urban water governance for more inclusive development: A reflection on the 'waterscapes' of Durban, South Africa. *The European Journal of Development Research*, 27(4): 488-504.

Swindell, D. and Hilvert, C. 2014. Contemplating Collaboration. *Public Management*, 96(7).

Tapela, B. N. 2012. *Social water scarcity and water use: Report to the Water Research Commission*. Water Research Commission. Available:

<http://www.wrc.org.za/wp-content/uploads/mdocs/1940-1-121.pdf> (Accessed 10 November 2018).

Tartakovsky, D. M. 2013. Assessment and management of risk in subsurface hydrology: A review and perspective. *Advances in water resources*, 51: 247-260.

Taylor, R. G., Scanlon, B., Döll, P., Rodell, M., Van Beek, R., Wada, Y., Longuevergne, L., Leblanc, M., Famiglietti, J. S. and Edmunds, M. 2013. Ground water and climate change. *Nature Climate Change*, 3(4): 322-329.

Tewari, D. 2009. A detailed analysis of evolution of water rights in South Africa: An account of three and a half centuries from 1652 AD to present. *Water SA*, 35(5): 693-710.

Tewari, D. and Oumar, S. B. 2013. Is the water permit system a panacea or a bed of inefficiency? The case of South Africa. *Water Policy*, 15: 570–584.

Thabethe, P. D. 2011. An evaluation of water and sanitation provision by Uthukela Water in selected districts of KwaZulu-Natal, PhD., University of KwaZulu-Natal.

Thomas, J. C. 2017. *Citizen, Customer, Partner: Engaging the Public in Public Management*. London: Routledge.

Thomassen, J.-P., Ahaus, K., Van de Walle, S. and Nabitiz, U. 2014. An implementation framework for public service charters: results of a concept mapping study. *Public Management Review*, 16(4): 570-589.

Thompson, H. 2006. *Water Law: a practical approach to resource management and the provision of services*. Cape Town: Juta and Company Ltd.

Thopil, G. A. and Pouris, A. 2016. A 20 year forecast of water usage in electricity generation for South Africa amidst water scarce conditions. *Renewable and Sustainable Energy Reviews*, 62: 1106-1121.

Thornton, G. 2018. *Engagement beyond the boardroom: What do your stakeholders expect?* South Africa: Available: http://www.gtturkey.com/UD_OBJE/PDF/IFRS/corporate_governance_report_2018_international_final_screen.pdf (Accessed 22 November 2018).

Tissington, K., Dettmann, M., Langford, M., Dugard, J. and Conteh, S. 2008. Water services fault lines: An assessment of South Africa's water and sanitation provision across 15 municipalities. Published by the *Centre for Applied Legal Studies (CALS) in Johannesburg, the Centre on Housing Rights and Evictions (COHRE) in Geneva, & the Norwegian Centre for Human Rights (NCHR) at the University of Oslo*. Available: https://www.researchgate.net/publication/304803375_An_assessment_of_South_Africa's_water_and_sanitation_provision_across_15_municipalities (Accessed 15 April 2009).

Teisman, G. R. and Edelenbos, J. 2011. Towards a perspective of system synchronization in water governance: a synthesis of empirical lessons and complexity theories. *International Review of Administrative Sciences*, 77(1) 101-118.

Tomkinson, R. 2017. *Shared services in local government: improving service delivery*. London: Routledge.

Tortajada, C. 2010a. Water governance: a research agenda. *International Journal of Water Resources Development*, 26(2): 309-316.

Tortajada, C. 2010b. Water governance: Some critical issues. *International Journal of Water Resources Development*, 26(2): 297-307.

Tremblay, H. 2011. A clash of paradigms in the water sector? Tensions and synergies between integrated water resources management and the human rights-based approach to development, *Natural Resources Journal*, 51(2): 307-356.

Tsheola, J. 2014. Twenty years of faltering. *Journal of Public Administration*, 49(1): 392-405.

Tshishonga, N. 2019. Prospects and challenges of transforming local government into a learning organisation. *African Journal of Public Affairs*, 11(1): 157-175.

Tuli, F. 2010. The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences*, 6(1).

Turner, K., Naidoo, K., Theron, J. and Broodryk, J. 2015. *Investigation into the cost and operation of southern african desalination and water reuse plants: Volume 1*.

Twala, C. 2014. The African National Congress (ANC) and the Cadre Deployment Policy in the Postapartheid South Africa: A Product of Democratic Centralisation or a Recipe for a Constitutional Crisis? *Journal of Social Sciences*, 41(2): 159-165.

Ugu District Municipality (UDM). 2017. *Integrated Development Plan*. Port Shepstone: Development planning. Available: http://ugu.gov.za/Documents/IDP/2017%202018%20IDP/2017_2018%20to%202021_2022%20Final%20IDP1.pdf (Accessed 17 March 2018).

UN-Habitat. 2016. *Water and Sanitation in the world's Cities* Earthscan Publications Ltd. London: EarthScan. Available: <https://unhabitat.org/wp-content/uploads/2016/01/Water%20and%20Sanitation%20in%20the%20World%E2%80%99s%20Cities%20Local%20Action%20for%20Global%20Goals%20.pdf> (Accessed 17 February 2019).

UNICEF. 2015. *Progress on sanitation and drinking water: 2015 update and MDG assessment*. World Health Organization (WHO). Available: <https://www.unicef.org> (Accessed 05 September 2018).

United Nations (UN). 2018. *The Sustainable Development Goals Report*. Available: <https://unstats.un.org/sdgs/files/report/2018/>

TheSustainableDevelopmentGoalsReport2018-EN.pdf New York: United Nations. (Accessed 8 April 2018).

Van den Berg, C. 2015. Drivers of non-revenue water: A cross-national analysis. *Elsevier*, 36: 71-78.

Van der Waldt, G. 2014. Implementation challenges facing performance management systems in South African municipalities: selected cases. *Administratio Publica*, 22(2): 132-152.

van Koppen, B. and Schreiner, B. 2014a. Moving beyond integrated water resource management: developmental water management in South Africa. *International Journal of Water Resources Development*, 30(3): 543-558.

van Koppen, B. and Schreiner, B. 2014b. Priority General Authorisations in rights-based water use authorisation in South Africa. *Water Policy*, 16(S2): 59-77.

Van Wart, M. and Kapucu, N. 2011. Crisis management competencies: The case of emergency managers in the USA. *Public Management Review*, 13(4): 489-511.

Van Wyk, J. and Oranje, M. 2014. The post-1994 South African spatial planning system and Bill of Rights: A meaningful and mutually beneficial fit? *Planning Theory*, 13(4): 349-369.

Vatala, S. 2005. Synergies between an integrated development plan, a service delivery and budget implementation plan (SDBIP) and other related plans for 2005-2006 fiscal year. *Journal of Public Administration*, 10(1): 225-233.

Virtanen, P. and Vakkuri, J. 2015. Searching for organizational intelligence in the evolution of public-sector performance management. *NISPAcee Journal of Public Administration and Policy*, 8(2): 89-99.

Wadesango, N., Mhaka, C., Chikomo, T., Wadesango, V.O. 2018. Causes of Poor Service Delivery and the Feasibility of Outsourcing to Improve Services in

Local Authorities. *Journal of Economics and Behavioral Studies*, 10(2): 188-198.
ISSN: 2220-6140.

Waldman, D. A., Ramirez, G. G., House, R. J. and Puranam, P. 2001. Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Academy of Management Journal*, 44(1): 134-143.

Walker, J. and Espinosa, A. 1991. *Viable Systems Model. A guide for co-operatives and federations*. Available: http://www.greybox.uklinux.net/vsmg_2,2

Walumbwa, F. O., Mayer, D. M., Wang, P., Wang, H., Workman, K. and Christensen, A. L. 2011. Linking ethical leadership to employee performance: The roles of leader–member exchange, self-efficacy, and organizational identification. *Organizational Behavior and Human Decision Processes*, 115(2): 204-213.

Wang, X.-J., Zhang, J.-Y., Shahid, S., ElMahdi, A., He, R.-M., Zhen-xin, B., et al. (2012). Water resources management strategy for adaptation to droughts in China. *Mitigation and Adaptation Strategies for Global Change*, 17(8), 923–937

Wang, S. and Feeney, M. K. 2016. Determinants of information and communication technology adoption in municipalities. *American Review of Public Administration*, 46(3): 292-313.

Watch, C. 2013. *Thuli Madonsela: SA Iron Lady*. Available: <https://www.corruptionwatch.org.za/thuli-madonsela-sas-iron-lady/> (Accessed 11 December 2017).

Weaver, M., O’Keeffe, J., Hamer, N. and Palmer, C. 2017. Water service delivery challenges in a small South African municipality: Identifying and exploring key elements and relationships in a complex social-ecological system. *Water SA*, 43(3): 398-408.

Wegelin, W. 2018. Guidelines for the No Drop Assessment Program. South Africa. Available: <http://www.waterloss2018.com/wp-content/uploads/2018/06/07/D1C1.pdf> (Accessed 08 December 2018).

Wegelin, W. and Jacobs, H. 2013. The development of a municipal water conservation and demand management strategy and business plan as required by the Water Services Act, South Africa. *Water SA*, 39(3): 415-422.

Wester, P., Merrey, D. J. and De Lange, M. 2003. Boundaries of consent: Stakeholder representation in river basin management in Mexico and South Africa. *World Development*, 31(5): 797-812.

Williams, B. and van't Hof, S. 2016. *Wicked solutions: A systems approach to complex problems*. Lulu. com. WHO.

Wilson, M. 2012. A new integrated and holistic approach to service delivery planning. *Service Delivery Review*, 9(2):26-29.

Winters, M. S., Karim, A. G. and Martawardaya, B. 2014. Public service provision under conditions of insufficient citizen demand: Insights from the urban sanitation sector in Indonesia. *World development*, 60: 31-42.

Wintgens, T., Salehi, F., Hochstrat, R. and Melin, T. 2008. Emerging contaminants and treatment options in water recycling for indirect potable use. *Water Science and Technology*, 57(1): 99-107.

Wolf, A. T., Kramer, A., Carius, A. and Dabelko, G. D. 2005. Managing water conflict and cooperation. *State of the World 2005: redefining global security*: 80-95.

Wolf, J., Prüss-Ustün, A., Cumming, O., Bartram, J., Bonjour, S., Cairncross, S., Clasen, T., Colford, J. M., Curtis, V. and France, J. 2014. Systematic review: assessing the impact of drinking water and sanitation on diarrhoeal disease in low-and middle-income settings: systematic review and meta-regression. *Tropical Medicine & International Health*, 19(8): 928-942.

Woodhouse, P. 2008. Water rights in South Africa: Insights from legislative reform. Woodhouse, Philip, Water Rights in South Africa: Insights from Legislative Reform (April 2008). *Brooks World Poverty Institute Working Paper* No. 36. Available at SSRN: <https://ssrn.com/abstract=1265588> or <http://dx.doi.org/10.2139/ssrn.1265588>

Woodhouse, P. and Muller, M. 2017. Water Governance—An Historical Perspective on Current Debates. *World Development*, 92: 225-241.

World Health Organization (WHO). 2015. *Progress on sanitation and drinking water: 2015 update and MDG assessment*. Report from WHO, UN Children's Fund.

World Health Organization (WHO) and UNICEF. 2014. *Progress on drinking water and sanitation: 2014 Update*. World Health Organization (WHO). Available: https://apps.who.int/iris/bitstream/handle/10665/112727/9789241507240_eng.pdf;jsessionid=E2736CD1EA3E0DCD82AF44400F40921D?sequence= (Accessed 22 November 2018).

World Health Organization (WHO) and UNICEF. 2015. *Water, sanitation and hygiene in health care facilities: status in low and middle income countries and way forward*. Available: https://apps.who.int/iris/bitstream/handle/10665/154588/9789241508476_eng.pdf (Accessed 17 June 2018).

Wildavsky, A. 1983. Information as an organizational problem. *Journal of Management Studies*, 20(1): 29-40.

Water Service Authority (WSA). 2007. *Water Services Act: Regulations: Compulsory national standards and measures to conserve water*. Pretoria: Available: <http://www.gov.za> (Accessed 7 November 2018).

Xu, J., Yu, Z., Zhong, W. and Xing, Z. 2016. Urban Water Metabolism Carrying Capacity Simulation Prediction And Governance Strategies Based On. *Journal of Residuals Science & Technology*, 13(7): 13-19

- Yin, R. K. 2018. *Case study research and applications: Design and methods*. 6th ed. Los Angeles: Sage Publications.
- Yousaf, M., Ihsan, F. and Ellahi, A. 2016. Exploring the impact of good governance on citizens' trust in Pakistan. *Government Information Quarterly*, 33(1): 200-209.
- Yu, H. 2016. Can water users' associations improve water governance in China? A tale of two villages in the Shiyang River basin. *Water International*, 41(7): 966-981.
- Zama, F. 2019. *Ugu working on restoring water supply*. Available: <http://ugu.gov.za/Newsroom/Pages/Ugu-working-on-restoring-water-supply.aspx>. Issued by:Ugu District Municipality (Accessed 23 May 2021)
- Zeff, H. B., Herman, J. D., Reed, P. M. and Characklis, G. W. 2016. Cooperative drought adaptation: Integrating infrastructure development, conservation, and water transfers into adaptive policy pathways. *Water Resources Research*, 52(9): 7327-7346.
- Zetland, D. and Gasson, C. 2013. A global survey of urban water tariffs: are they sustainable, efficient and fair? *International Journal of Water Resources Development*, 29(3): 327-342.
- Zhang, Y. 2014. The city manager's role in policy-making: A perspective beyond substitution and collaboration models. *The American Review of Public Administration*, 44(3): 358-372.
- Zokaei, K., Elias, S., O'Donovan, B., Samuel, D., Evans, B. and Goodfellow, J. 2010. *Lean and systems thinking in the public sector in Wales*. Cardiff University: Lean Enterprise Research Centre report for the Wales Audit Office.
- Zubane, P. 2011. Alternative service delivery models for the South African public service for the year 2020. MPhil, Stellenbosch University.

APPENDIX 1 – RESEARCH ETHICS CLEARANCE LETTER



MANAGEMENT SCIENCES: FACULTY RESEARCH ETHICS COMMITTEE (FREC)

19 May 2017

Student No: 19851548

FREC No: 18/17FREC

Dear Mrs K Dlamini

PHD IN MANAGEMENT SCIENCES (LEADERSHIP & COMPLEXITY)

TITLE: AN INVESTIGATION INTO A VIABLE SERVICE DELIVERY SYSTEM IN RELATION TO WATER AND SANITATION IN UGU DISTRICT MUNICIPALITY

Please be advised that the Faculty Research Ethics Committee has reviewed your proposal and the following decision was made: Ethics Level 2

Approval has been granted for a period of two years, after which you are required to apply for safety monitoring and annual recertification. Please use the form located at the Faculty. This form must be submitted to the FREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the FREC according to the FREC SOP's. Please note that ANY amendments in the approved proposal require the approval of the FREC as outlined in the FREC SOP's.

Yours Sincerely

Prof JP Govender
Chairperson: FREC

APPENDIX 2 – REQUEST FOR PERMISSION LETTER

Mr DD Naidoo

The Municipal Manager

UGU District Municipality

PORT SHEPSTONE, 4240

Fax: (039) 688 3365

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN UGU DISTRICT MUNICIPALITY

Dear Mr. Naidoo

My name is Khethiwe Dlamini, and I am a Management Science student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis is **An Investigation into a viable Service Delivery systems in relation to Water and Sanitation in Ugu District Municipality**. This project will be conducted under the supervision of Dr. Stan Hardman.

I am hereby seeking your consent to collect primary data from municipal staff at the level of middle management up to the councilors and key external stakeholders. Face interview with key staff as well as discussion groups with the identified groups or forums will be conducted

Your responses will be used for scholarly purposes only, confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management Science, DUT.

Upon completion of the study, I undertake to provide UGU District Municipality with a bound copy of the full research report. If you require any further information, please do not hesitate to contact me on 0761457334, or email at Khethiwe.Dlamini@ugu.gov.za.

Thank you for your time and consideration in this matter.

Research ethics administrator

Dr. Stan Hardman

Cell: 082 5532176

APPENDIX 3 – LETTER OF INFORMATION AND CONSENT



Dear Respondent,

School of Management Science
PhD Research Project
Research Office: 031 373 2900
Researcher: Dlamini KP (0761457334)
Supervisor: Dr Stan Hardman

I, Khethiwe Dlamini (Reg. No.19851548), am a PhD student in the School of Management Science, at the Durban University of Technology. You are invited to participate in a research project entitled: An Investigation into a viable Service Delivery System in relation to Water and Sanitation in Ugu District Municipality.

The overarching aim of this study is to identify performance interventions that can be used to optimise Service delivery in Ugu District 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 identifying you as a participant will be maintained by the School of Management Science, DUT.

If you have any questions or concerns about participating in this study, please contact me or my supervisor at the numbers listed above. It should take you about 20-25 minutes to complete the questionnaire. I hope you will take the time to complete the questionnaire.

Sincerely

Investigator's signature _____

Date _____

This page is to be retained by participant

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.

Signature of Participant Date

This page is to be retained by researcher

APPENDIX 4 – QUESTIONNAIRE FOR UGU EMPLOYEES

Coding.....

SECTION A: DEMOGRAPHIC PROFILE

Kindly tick in the relevant box.

1. Gender

Male	Female

2. Age group

Below 21	22-35	36-60	61 and above

3. How long have you been working in the municipality?

2 years or less	3-5 years	6-9 years	10 years or more	

4. Occupation

Field worker	Office worker	Middle Manager	Senior manager	General Manager

5. Level of education

Grade 12 or below	Technical Vocational Training & Education Certificate	National Diploma certificate	Degree	Masters	Doctorate

SECTION B: PURPOSE OF THE ORGANISATION

B.1. In your own understating/knowledge, what is the purpose of Ugu District Municipality?

.....
.....]

B.2 In your own words what is the vision of the municipality?

.....
.....

B.3 In your own words what is the mission of the municipality?

.....
.....

B.4 Culture is a set of the most predominantly shared values in an organisation. Of the following please mark in an order of importance the following values, where 1 is the most important and 5 is least important.

	1	2	3	4	5	Please support your answer
Respect						
Openness						
Teamwork						
Leadership						
Excellence						

B.5 Thinking about the municipality, in your opinion, who makes the following types of decision, please tick in the relevant box

		Political leadership	Municipal Manager	General Manager	Managers	Other, please specify
1.	Strategic					
2.	Operational					
3.	Staffing					
4.	Service delivery					
		Please support your answer				

B.6 is the decision-making mechanism of the municipality credible?

.....

B.7 Are the decisions made implemented?

.....

B.8 Is the municipality delivering service to the best of its ability? If yes please expand on your answer. If no- what are the short comings?

.....

SECTIONS C – PERCEPTION OF UGU MUNICIPALITY

This section requires you to tick a box that best describes your answer and also support your answer in the space provided.

C.1 Thinking about Ugu Municipality, please can you tell me, on a scale of 1-5 where 1 = poor, 2=not too good, 3+= fair, 4 = good and 5 = excellent service; how would you rate the service quality of water and sanitation provision? Please support your answer.

	1	2	3	4	5	Please support your answer
The ability to perform the promised service dependably and accurately						
The willingness to help customers and to provide prompt service						
The knowledge and courtesy of employees and their ability to convey trust and confidence						
The provision of caring, individualized attention to customers.						
The appearance of physical facilities, equipment, personnel and communication materials.						

C. 2. How would you rate the quality of the water produced by the Ugu municipality to customers?

		1	2	3	4	5	Please support your statement
1.	poor						
2.	bad						
3.	good						
4.	Very good						
5.	excellent						

C.3 Do the municipality staff members seem to get the maximum possible work from the resources (**money, equipment and staff**) they have available?

		Money	equipment's	staff
1.	They do not work efficiently at all			
2.	Not too efficient			
3.	Fairly efficient			
4.	They are very efficient			
5	They are extremely efficient			

C.4. Thinking about peak seasons and Ugu District being a tourist destination, how well do you think the municipality plan for peak seasons?

			Please support your statement
1.	They do an excellent Job in anticipating problems		
2.	They do a very good Job		
3.	A fair Job		
4.	Not too good a Job		
5.	They do a poor Job of anticipating problems.		

C.5. Thinking about sewer spillages/pipe bursts, how well do the staff members in the municipality anticipate problems or problem situations, thus preventing their occurrence or minimizing their effects?

	Please support your answer

1.	They do an excellent Job in anticipating problems		
2.	They do a very good Job		
3.	A fair Job		
4.	Not too good a Job		
5.	They do a poor Job of anticipating problems		

C.6. From time-to-time newer ways are discovered to organize work, and newer equipment and techniques are found with which to do the work. How well do the staff members in the municipality keep up with the changes that could affect the way in which they do their work?

		Please support your answer	
1.	They do a poor Job of keeping up to date		
2.	Not too good a Job		
3.	A fair job		
4.	They do a good job		
5.	They do an excellent Job of keeping up to date		

C.7. When changes are made, such as in the routines, reporting, or equipment, how quickly do the employees in your Municipality accept and adjust to these changes?

		Please support your answer	
1.	They accept and adjust to them immediately		
2.	They adjust very rapidly, but not immediately		

3.	Fairly rapidly		
4.	Rather slowly		
5.	They accept and adjust to them very slowly		

How well does the municipality manage change in ensuring that change is received well by the employees?

.....

After the changes have been introduced, does the municipality monitor to see if it has a positive impact on service delivery?

.....

C.8. Please tick the relevant box and explain your answer. What proportion of the employees in your municipality readily accept and adjust to these changes?

		Please support your answer	
1.	Considerably less than half of the staff accept and adjust to these changes readily		
2	Slightly less than half do		
3	The majority do		
4	Considerably more than half do adjust to changes		

C.9 Sometimes unusual circumstances disrupt the flow of work in the municipality. How well do the staff members in your municipality cope with these emergency situations?

	Please support your answer
--	----------------------------

1.	They do a poor Job of handling emergency situations		
2.	They do not do very well		
3.	They do a fair Job		
4.	They do a good Job		
5.	They do an excellent Job of handling these situations		

C.10. In your view, is the municipality servicing urban and rural areas the same?

		Please support your answer
1.	Urban areas are serviced better	
2.	Rural areas are serviced better	
3.	Services are the same both in urban and rural areas	
4.	There are limited services in rural areas	
5.	There are no services provided in rural areas	

C.11 The awareness of the municipality describes its ability to discern the context of its environment and also sense and anticipate changes that are of significant impact to its overall viability. Thinking about the above statement, Is the municipality aware of the changes happening outside of the organisation?

Yes (support your answer)	No (support your answer)	Other (specify and support your answer)
---------------------------	--------------------------	---

--	--	--

C.12 How does the municipality track changes in the surrounding environment?

.....

C13. How does the municipality make use of the information regarding the surrounding environment?

.....

C.14 How does that information regarding the surrounding environment get incorporated into planning?

.....

C.15.1 Learning and adaptation describe the need for the municipality to constantly develop, to match the needs of its business environment. Within the municipality are systems that identify permanent changes within its business context and initiate internal developments to its internal structure as a means of improving its capabilities, and thus its viability. How is the municipality adapting through learning?

.....

C.15.2 The information flow of the municipality is the network of systems by which information is transferred to the various decision-making centres of the municipality. In your opinion, as a municipal employee, are you well informed of what is going on in the municipality?

.....

C.15.3 How efficient is the information flow between the municipality and external stakeholders?

.....

C.15.4 How efficient is the information flow between municipality and internal stakeholders.

.....

 C.15.5 Do Municipality departments have adequate Information concerning their main Interactions with each other? Please support your answer

.....

 C.15.6 The processes in a municipality are the dynamics of the interaction between the causes and effects amongst the various states (different stakeholders) through which the purpose of the municipality is implemented. Thinking about the relationship between the municipality and its stakeholders, how would you describe the relationship between municipality and its stakeholders?

.....

 C.15.7 How does a municipality caters/services for different stakeholders e.g.

No	Stakeholders	Please explain clearly
1.	Businesses	
2.	Traditional areas	
3.	Urban areas	
4.	Schools in rural areas	
5.	Hospitals	

C.15.8 Thinking about the departments that provide support to other sections such as IT, Human Resource, Auxiliary Services and Supply Chain Management (SCM). Can you please tell me from scale of 1 to 5, where 1 means poor support and 5 excellent (poor, satisfactory, good, very good and excellent support), how would you rate each department?

		Human Resource	Information Technology	Supply Chain Management	Auxiliary Services	Geographic information Systems
1.	They do not work efficiently at all					

2.	Not too efficient					
3.	Fairly efficient					
4.	They are very efficient					
5.	They are extremely efficient					

Thank you for participating in the study

APPENDIX 5 – QUESTIONNAIRE FOR NON UGU EMPLOYEES

QUESTIONNAIRE

Coding.....

SECTION A: DEMOGRAPHIC PROFILE

Kindly tick in the relevant box.

1. Gender

Male	Female

2. Age group

Below 21	22-35	36-60	61 and above

3. Level of education

Grade 12 and below	Technical Vocational Training Education Certificate &	National Diploma certificate	Degree	Masters	Doctorate

SECTION B: PURPOSE OF THE ORGANISATION

B.1 In your own understanding/knowledge, what is the purpose of Ugu District Municipality?

.....

B.2 In your own words, what is the vision of the municipality?

.....

B.3 In your own words, what is the mission of the municipality?

.....

B.4 Culture is a set of the most predominantly shared values in an organisation. Of the following, please mark in order of importance the following values, where 1 is the most important and 5 is least important.

	1	2	3	4	5	Please support your answer
Respect						
Openness						
Teamwork						
Leadership						
Excellence						

B.5 Thinking about the municipality, in your opinion, who makes the following types of decision, please tick in the relevant box

		Political leadership	Municipal Manager	General Manager	Managers	Other, please specify
1.	Strategic					
2.	Operational					
3.	Staffing					
4.	Service delivery					
	Please support your answer					

B.6 is the decision-making mechanism of the municipality credible?

.....

B.7 Are the decisions made implemented?

.....

B.8 Is the municipality delivering service to the best of its ability? If yes please your answer. If no- what are the short comings?

.....

B.9 Are the Municipal officials performing at your expectation?

Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree

B.10 Are the Municipal officials capable of producing excellent services to the community?

Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree

SECTIONS C– REQUIRES YOU TO TICK A BOX THAT BEST DESCRIBES YOUR ANSWER AND ALSO SUPPORT YOUR ANSWER IN THE SPACE PROVIDED.

C.1 Thinking about Ugu Municipality, please can you tell me, on a scale of 1-5 where 1 = poor, 2 = fair, 3 = good and 4 = excellent service. How would you rate the service quality of water and sanitation provision? Please support your answer.

	1	2	3	4	5	Please support your answer
The ability to perform the promised service dependably and accurately						

The willingness to help customers and to provide prompt service						
The knowledge and courtesy of employees and their ability to convey trust and confidence						
The provision of caring, individualized attention to customers.						
The appearance of physical facilities, equipment, personnel and communication materials.						

C. 2. How good would you say is the quality of the water produced by the Ugu municipality to customers?

		1	2	3	4	5	Please support your statement
1.	poor						
2.	bad						
3.	good						
4.	Very good						
5.	excellent						

C.3 Do the municipality staff members seem to get the maximum possible from the resources they have available?

		money	equipment's	staff
1.	They do not work efficiently at all			
2.	Not too efficient			
3.	Fairly efficient			
4.	They are very efficient			

5.	They are extremely efficient			
----	------------------------------	--	--	--

C.4. As a consumer, do you think you are getting value for your money? If no please support your answer

.....

C.5. Thinking about peak seasons and Ugu District being a tourist destination, how well do you think the municipality plans for peak seasons? (Is the quality of service disrupted during peak seasons)?

			Please support your statement
1.	They do an excellent Job in anticipating problems		
2.	They do a very good Job		
3.	A fair Job		
4.	Not too good a Job		
5.	They do a poor Job of anticipating problems.		

C.5. Thinking about sewer spillages/pipe bursts, how soon is the municipality employees fix pipes, attend to those problem?

			Please support your answer
1.	They do an excellent Job in anticipating problems		
2.	They do a very good Job		
3.	A fair Job		
4.	Not too good a Job		
5.	They do a poor Job of anticipating problems		

C.10. In your view, is the municipality servicing urban and rural areas the same?

		Please support your answer
1.	Urban areas are serviced better	
2.	Rural areas are serviced better	
3.	Services are the same both in urban and rural areas	
4.	There are limited services in rural areas	
5.	There are no services provided in rural areas	

C.11 The awareness of the municipality describes its ability to discern the context of its environment and also sense and anticipate changes that are of significant impact to its overall viability. Thinking about the above statement, Is the municipality aware of the changes happening outside of the organisation?

Yes (support your answer)	No (support your answer)	Other (specify and support your answer)

C.12 How does the municipality track changes in the surrounding environment?

.....

C13. How does the municipality make use of the information regarding the surrounding environment?

.....

C.14 How does that information regarding the surrounding environment get incorporated into planning?

.....

C.15.1 Learning and adaptation describe the need for the municipality to constantly develop to match the needs of its business environment. Within the

municipality are systems that identify permanent changes within its business context and initiate internal developments to its internal structure as a means of improving its capabilities, and thus its viability.

How is the municipality adapting through learning?

.....

C.15.2 The information flow of the municipality is the network of systems by which information is transferred to the various decision-making centres of the municipality. Are you well-informed/updated of the water and sanitation issues by the municipality?

.....

C.15.3 How efficient is the information flow between the municipality and external stakeholders?

.....

C.16 The processes in a municipality are the dynamics of the interaction between the causes and effects amongst the various states (different stakeholders) through which the purpose of the municipality is implemented. Thinking about the relationship between the municipality and its stakeholders, how would you describe the relationship between municipality and its stakeholders?

.....

.....

C.17 How does a municipality cater to/service different stakeholders e.g.

No	Stakeholders	Please explain clearly
1.	Businesses	
2.	Traditional areas	
3.	Urban areas	
4.	Schools in rural areas	
5.	Hospitals	

C.18. Who are you in contact with at the municipality regarding issues concerning water and sanitation?

Thank you.....

APPENDIX 6 – TURNITIN REPORT

APPENDIX 7 – EDITOR’S REPORT