INFLUENCE OF URBANIZATION ON PERFORMANCE OF PUBLIC UTILITIES: A CASE OF NATIONAL WATER AND SEWERAGE CORPORATION IN LIRA MUNICIPALITY, UGANDA

BY

OKITE GEORGE
BEng CBE (KYU), PGD PPM (UMI)
16/U/13491/GMET/PE

A DISSERTATION SUBMITTED TO KYAMBOGO UNIVERSITY GRADUATE SCHOOL IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A DEGREE OF MASTER OF SCIENCE IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT OF KYAMBOGO UNIVERSITY

NOVEMBER, 2018

DECLARATION

I, **Okite George**, hereby declare that this dissertation is my own original work and that, to the best of my knowledge and belief, it contains no materials previously published or written by another person nor materials which has been accepted for the award of any other degree of this university or other institute of higher learning, except where due acknowledgement has been made in the text and reference list

Signature: ..... Date: .....

OKITE GEORGE

CERTIFICATION

We, the undersigned certify that we have read and hereby recommend for acceptance by Kyambogo University a dissertation/thesis entitled: **"Influence of Urbanization on Performance of Public Utilities: A Case of National Water and Sewerage Corporation in Lira Municipality Uganda",** in fulfillment of the requirements for the award of a degree of Masters of Science in Construction Technology and Management of Kyambogo University

Signature: ..... Date: 03/12/2018

Dr. Lawrence Muhwezi

(Supervisor)

Signature: ..... Date: 03/12/2018

Mr. Joseph Acai

(Supervisor)

ACKNOWLEDGEMENT

This dissertation would be incomplete without mentioning the support and contributions of the following individuals, organizations and institutions, to whom the author would like to express sincere gratitude:

- My academic supervisors, Mr. Joseph Acai and Dr. Lawrence Muhwezi who provided selfless guidance, constructive criticism and encouragement throughout the study. There is a huge difference between knowing what you want to study and doing it in a scholarly way. Thank you, Joseph and Lawrence, for guiding me through the scholarly path.
- Kyambogo University, particularly the department of Civil and Building Engineering for providing a conducive study environment that supported the realization of this goal.
- Friends and course mate that built the team work all through the dissertation period
- The Political and Technical Leaders of Oyam District Local Government for support both financially and morally throughout the entire course
- Last but not least; I would like to thank my family for financial and moral support during the course

My God bless you all

DEDICATION

This dissertation is dedicated to my brother; Professor Doctor Jasper Watson Ogwal Okeng the Vice Chancellor of Lira University, my wife Atimango Silvia, daughters Ayugi Geneveive & Atyang Getrude, two distinguished sons, Okello Jude and Okeng Emmanuel Won Gang.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

CVI	Content Validity Index
DV	Dependent Variable
FY	Financial Year
GoU	Government of Uganda
IV	Independent Variable
LMC	Lira Municipal Council
MDG	Millennium Development Goals
MoLHUD	Ministry of Land & Housing Development
NDP	National Development Plan
NGO	None Governmental Organization
NPHC	National Population and Housing Census
NR	Non-Relevance
NRC	National Research Council
NWSC	National Water and Sewerage Corporation
R	Relevance
SDI	Service Delivery Indicators
SPSS	Statistical Package for Social Scientists
SWM	Satterthwaite Mitlin
TSUPU	Transforming the Settlements of the Urban Poor in Uganda
UN	United Nations
UNICEF	United Nations International Children's Fund
USAID	United States Agency for International Development

WB	World Bank
WHO	World Health Organization

ABSTRACT

The study sought to investigate the influence of urbanization on the performance of NWSC in LMC with objectives to establish the relationship between urbanization and performance, to establish the challenges faced by NWSC as a result of urbanization, and to develop a framework for efficient delivery of services in LMC. Qualitative, quantitative approaches and interview, survey and document review methods were employed. A case study design and a model were applied to achieve the objectives. 384 participants were targeted and 381 responded. From the study findings, there was a significant positive correlation (rho = .487) between urban growth and development and Service delivery by NWSC. It is shown that the significance of the correlation (p = .000) is less than the recommended critical significance at 0.05, thus not rejected. It was also established that discriminatory urban planning with a mean of 3.50, lack of political will with a mean of 3.66, unplanned water supply with mean score of 3.46 were the most silent challenges faced by NWSC in the performance of her duties. Policy reform and water contamination fetched low mean score of 2.93 and 3.29 and constituted the least challenges that affect NWSC. The multiple regression model with all four predictors produced R^2 =0.463, F (6, 92) = 4.176, p < 0. 001.The research findings indicated that there was a strong positive relationship (R= 0.214) between the variables. The study also revealed that 46.3% of the NWSC performance factors can be explained by the independent variables. The municipality ought to expedite the planning process so as to ensure settlement and housing projects are setup with minimal interference on utility and other access lines which will enable service providers have a manageable operational cost.

***Key words**: Urbanization; Performance, Public Utilities*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Urbanization and growth are inseparable and no country has ever reached middle income status without a significant population shift into cities. Urbanization is necessary to sustain though not necessarily a driver of growth in developing countries, and it results into other benefits as well. Managing urbanization is an important part of nurturing growth; neglecting cities even in countries in which the level of urbanization is low can impose heavy costs (Olorunfemi, 2014).

Urbanization, in the context of this study may be define as the gradual increase in population, infrastructure development and unplanned settlement due to rural urban migration. Other school of thought defined urbanization as the agglomeration of people in relatively large number at a particular spot of the earth surface (Agbola, 2004; Olotuah and Adesiji, 2005); Conversely, urbanization is not about the population size but must satisfy certain conditions (National Population and Housing Census Report, 2014). Uganda illustrates a different phenomenon on urbanization without growth. The level of urbanization in Uganda in 1960 was extremely low, at just about 5%. Urbanization proceeded rapidly from this small base, but it still remains low at about 20%, (National Population and Housing Census Report, 2014). There is no international consensus on how to determine the boundaries of urban areas or identify when a settlement is 'urban', as evidenced by the diversity of national urban definition summaries in the publications of the United Nations Population Division (2014). McGranahan and Satterthwaite (2014)

observe that some researchers might prefer a simple, standardized definition, based on population size and density criteria, and some countries have adopted such definitions (in some cases with allowances to include commuters living beyond the bounds of the dense agglomeration). Alternatively, some countries have multiple criteria, perhaps including size, density and administrative level, but also extending to indicators of what could be considered urban employment (e.g. non-agricultural workers), facilities (e.g. higher-level schools), infrastructure like street lighting (Brown, 2013). As well as varying between countries, definitions also change over time. It is generally accepted that urbanization involves the shift in population from rural to urban settlements (Mc Granahan and Satterthwaite, 2014).

Globally urbanization is a recent phenomenon. In 1900 only about 15% of the world's population lived in the cities. The 20th century transformed this picture, as the pace of urban population growth accelerated very rapidly in about 1950. Sixty years later, it is estimated that half of the world's people will be living in the cities (National Development Plan, 2010). Urbanization has clearly not been pulled by productive industrialization in Uganda; other factors are at work (Weeks, 1994). Several countries in Africa have experienced this phenomenon, which is otherwise rare. Like modernization, physical and economic development, as well as the heterogeneity in occupation (Jack Harvey, 2000). The rate of urbanization in Uganda at 4.8 percent, is among the highest in the world (Brown, 2013) While Uganda's urbanization level is still low at 12 percent, by 2030 it is projected to reach 30 percent, with an urban population exceeding 20 million people (Cities-Alliance, 2010). In slum areas, the informality of housing overlaps with informal employment service provision and legal status (Brown, 2013). Understanding and

planning for accelerating urbanization in Uganda requires attention to rural urban linkages, population growth, legislation around land tenure, urban agriculture, employment opportunities, international migration patterns, and appropriate mechanisms to provide service and opportunities to the growing numbers of urban poor (Brown, 2013).

Although Uganda's urban population is considerably better off (measured by income) than the rural population and more than 90 percent of Uganda's poor live in rural areas, urban poverty is widespread, increasing and severe (Brown, 2013). Urban income distribution is highly unequal, and the majority of urban residents are impoverished, with an estimated 60 percent of Kampala's population living in slums (Brown, 2012). Brown (2013) observes that poverty in an urban setting is a markedly different experience from that in rural areas and advances the view that while there may be greater proximity to health, education and legal services, access is challenging due to the existence of a variety of formal and informal barriers.

This study investigated the influence of urbanization on performance of public utilities in Lira Municipality. Public utilities were considered as the dependent variable (DV) while Urbanization was treated as the independent variable (IV). A public utility is an organization that maintains the infrastructure for a public service, often also providing a service using that infrastructure. Public utilities are subject to forms of public control and regulation ranging from local community-based groups to statewide government monopolies. Accordingly, research has shown that increased urbanization either contributes positively to performance of public utilities or negatively affects them (Merriam, 2011). Increased population follows urbanization and this reflects on the

services offered by public utilities. It is this kind of relationship that the study sought to establish in Lira Municipality.

Lira Municipality is located in Lira District in Northern Uganda. It is geographically located at latitude 20' 17′ north of the equator and longitude 32' 56′ east of the principal meridian. It started as a Trading Centre in 1919 and became a township in 1933. In 1954 the township became a Town Board. At independence in 1962 Lira became a Town Council and it was not until 1985 that it was elevated to its current status of a Municipal Council.

Lira water supply area is located in Lira District and covers the entire Lira Municipality in its four divisions of Adyel, Ojwina, Central and Railways and beyond its boundaries to the surrounding areas of Anai, Akia, Ngetta, Angweta ngwet, Odokomit, Omito, Amuca, and also extending to Boroboro. The entire network is over 150km. However, due to NWSC infrastructure service delivery plan projects, the coverage area is fast expanding. The Area commands 7,753 water and 353 sewer connections. Out of these, 71% and 20% are domestic and commercial respectively. The number of households/ families served by the area is over 5,590 while the served population is currently estimated at 69,985 people (National Water and Sewerage Cooperation Annual Report, 2013/14). Most of the population are peasants who constitute about 55% , and there are also business men (produce and merchandise traders) who constitute about 38% and a high income earners (industries, institutions, hoteliers, civil servants and other office workers) who constitute about 19%.Water abstracted from Lake Kwania at intake station (45KM outside Lira town) is treated at Katchung treatment plant (Capacity of 261,000m^3/month) and is boosted at Agwata booster pumping station to Adwila tank and finally delivered to the

main reservoir at Ireda from where clean water is distributed to a 35km^2 distribution network. The area has got 15km of sewer network of mainly 6'' and 8'' pipes and two sewerage lagoons with treating capacity of about 900m3/d of which only 420m3/d is being used (NWSC, 2018).

1.2 Statement of the Problem

Despite an improvement in the performance of National Water and Sewerage Corporation in Lira Municipality; evidenced by an increase in the number of accounts opened from 7,784 (National Water and Sewerage Corperation Annual Report, 2013/2014) to 9,234 in 2016 (National Water and Sewerage Corporation Annual Report, 2016), urbanization and growth continue to generate challenges that impact on the delivery of services offered by National Water and Sewerage Corporation in the Municipality. Furthermore, there is an acknowledgement by NWSC that delivery of services to the urban poor remains one of the biggest challenges for most utilities in Africa (National Water and Sewerage Corporation, 2016). Inadequate service delivery, overcrowding and inability to access other utilities like clean water and proper sewerage systems continue to be obstacles in the way of effective service delivery for National Water and Sewerage Corporation. This problem is compounded by unreliable intermittent power supply, late release of government funds and sewerage discharges in the Municipality with implications on health and sanitation (National Water and Sewerage Corporation, 2016). Persistence of these problems would lead to lack of access to clean of water services to the population. The aim of this study was to examine the influence of urbanization on performance of National Water and Sewerage Corporation in Lira Municipality.

1.3 Main Objective

The main objective of the study was to investigate the influence of urbanization on the performance of National Water and Sewerage Corporation in Lira Municipality.

1.4 Specific Objectives of the Study

The specific objectives of the study were:

i. To establish the relationship between urbanization and performance of NWSC in Lira Municipality,

ii. To establish the challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality,

iii. To develop a model for efficient delivery of services in NWSC in Lira Municipality.

1.5 Hypothesis Test.

A null hypothesis ($\mathbf{H_0}$) is a type of hypothesis used in statistics that proposes that no statistical significance exists in a set of given observations while an alternative hypothesis ($\mathbf{H_1}$) is one that states there is a statistically significant relationship between two variables

1. There is a significant relationship between urbanization and performance of National Water and Sewerage Corporation
2. There is no relationship between urbanization and performance of National Water and Sewerage Corporation

1.6 Justification of the study

According to the National Population and Housing Census Report (2014), Lira Municipality had a total population of 99,392 persons with 17,362 persons with access to piped water. Despite the increase in population in Lira Municipality by 1.7% from 80,879

in 2002 to 99,392 in 2014, there seems to be insufficient resources to completely and efficiently carry out the responsibility that comes with urbanization (NPHC, 2014). This continues to pose more threats including limited water and sewerages services to urban population. The study therefore sought to examine how urbanization is related to performance of NWSC.

1.7 Significance of the Study

The study was intended to benefit various stakeholders in urbanization including government, local leaders, community members and the research community. Public utility providers and actors in the country also stand to benefit from the study. Findings were a positive pointer for different sets of action by the different stakeholders in urbanization and public utilities sphere.

1.8 Scope of the Study

1.8.1 Content Scope

This study focused on the relationship between urbanization and performance of NWSC. It essentially established the relationship between urbanization and performance of NWSC in Lira Municipality; the challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality, and developed a framework for efficient delivery of services in NWSC in Lira Municipality.

1.8.2 Geographical Scope

The study was conducted in Lira Municipality and it covered two selected divisions; Railways and Ojwina. Lira municipality was selected due to the fact that for the years, there have been wide spread issues on sewerage and water provisions services (Lira

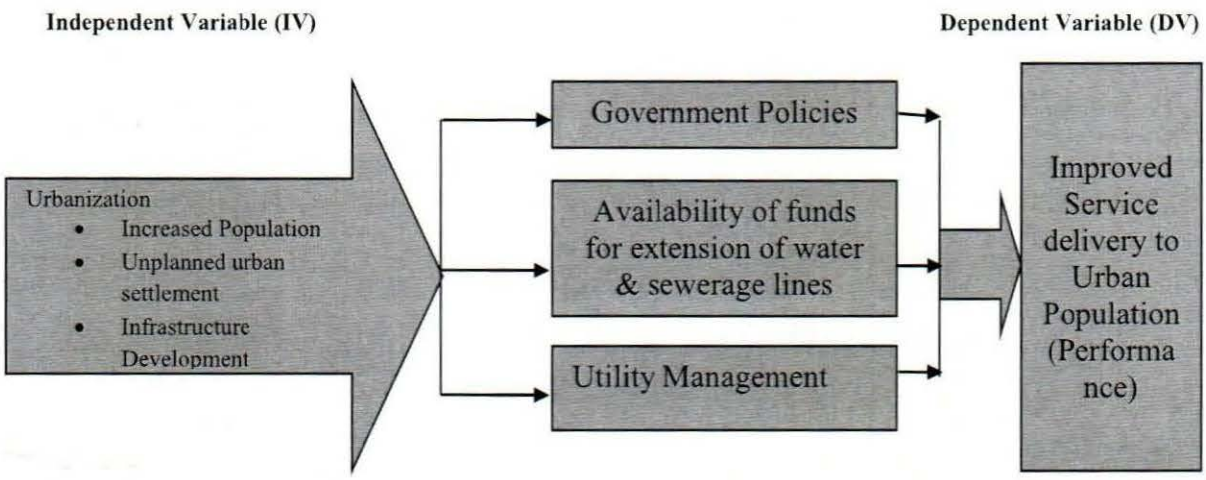
District Local Government Annual Report, 2016). Lira Municipality is located in Lira District in Northern Uganda. It is geographically located at latitude 20' 17′ north of the equator and longitude 32' 56′ east of the principal meridian. The two divisions were chosen based on population size and the level of service being provided by National water and Sewerage Corporation; Ojwina Division is highly populated, approximately 38,167 people (NHPS, 2014), most developed amongst other Divisions with well served NWSC network and other public facilities while Railways Division is sparsely populated, approximately 5,773 people (NHPS, 2014), least developed amongst other Divisions with poorly served NWSC network and other public facilities but with most industries established which takes big area of land. The selection criteria above led to proper analysis of performance of NWSC.

1.8.3 Time Scope

The study was conducted over a period of one year (2017-2018). This period was deemed appropriate for the study.

1.9 Conceptual Framework

The framework below in Figure 1.1 shows the relationship between urbanization and service delivery of public utilities. It shows the linkage between the variables. The purpose of the framework was to provide a linkage/relationship between the study variables. It provides how urbanization is interlinked to performance of NWSC as illustrated hereunder.



(Source: Merriam, 2011 and Adopted by the Researcher)

Figure 1.1: Conceptual Framework on the relationship between urbanization and performance of NWSC

From the conceptual framework in Figure 1.1, urbanization is measured by increased population, better utilities and infrastructure development. With utility management, sewerage systems, and water supply, these should lead to improved service delivery to Urban Population.

1.10 Chapter summary

This chapter provided background to the study, statement the problem investigated, research objectives and questions, hypotheses, provided scope of the study, justification and significance of the study. It also laid down a conceptual framework to be followed in the study. The next chapter considered literature to the variables under investigation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents the literature review basing on the study objectives as; To establish the relationship between urbanization and performance of NWSC in Lira Municipality, To establish the challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality, and To develop a framework for efficient delivery of services in NWSC in Lira Municipality.

2.2 Theoretical model for the Study. "Improved" Facilities versus "Adequate" Access

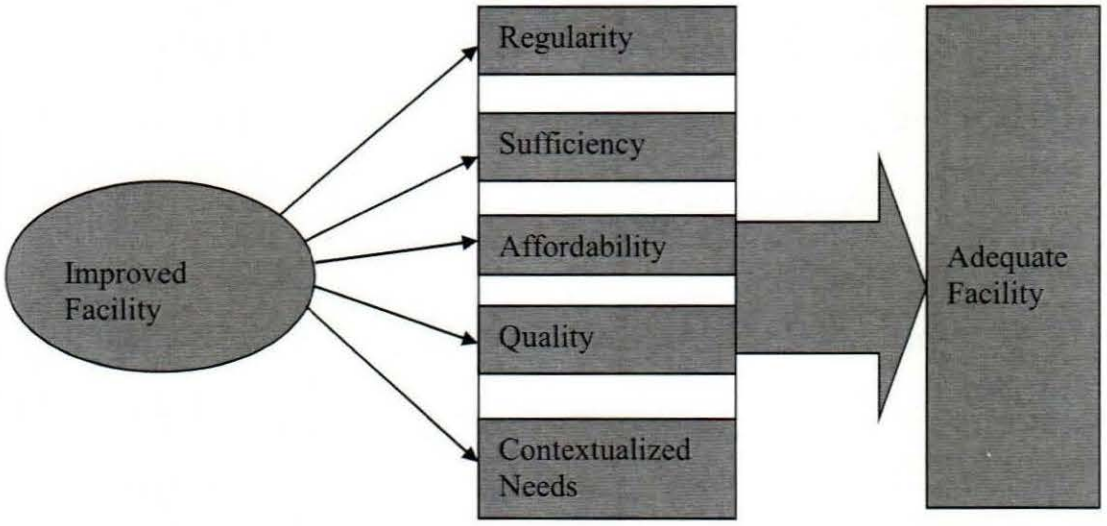


Figure 2.1: Theoretical Model for the Study. "Improved" Facilities versus "Adequate" Access

Source: Adapted from Hofmann (2011)

This model provides us a lens through which the delivery of public services can be elaborated in Lira Municipality. This research was situated in the debate of improved versus adequate facility with regard to the delivery of services by National Water and Sewerage Corporation in Lira Municipality. The researcher attempted to investigate the relationship of urban growth and development and its relationship with the delivery of services by National Water and Sewerage Corporation in Lira Municipality.

2.3 Urbanization and performance of Public Utilities

By 2030, urban populations worldwide are expected to grow by 1.4 billion people, with city and town dwellers accounting for 60% of the world's population (USAID, 2013). By 2050, this figure is expected to reach 2.6 billion (ibid.). While the pace and pattern of urban growth and urbanization varies, the vast majority of growth will take place in developing countries, with migration and urban growth leading a shift in the locus of global poverty that has been described as the 'urbanization of poverty' (Duflo et al., 2012). Mainstream measures of poverty tend to underestimate urban poverty due to the higher costs of living for urban residents (Satterthwaite and Mitlin, 2012) and it is estimated that 1 billion people live in informal settlements without access to many basic requirements such as shelter and services (Cities, U. and Government, L. 2013). In an increasingly urbanized world, it will be crucial to ensure that public services in urban areas deliver for poor people as well as the wider population. Funding and technical capacity for service provision are both typically more available in urban than in rural areas. However, it is also well known that governance and political economy factors play an important role in constraining and enabling effective service delivery (Boex and Edwards, 2014, Jones et al., 2014). The effects of these factors can be shaped by physical

and political economic characteristics of the urban environment, as well as broader political context and sector-specific qualities. In addition, any 'urban advantage' does not apply evenly across an urban population; access to services differs markedly between individuals according to their wealth, education, location, and other social and economic characteristics. In low-income countries only 40% of waste is collected, and a very large amount of this is either dumped or sent to poorly managed landfills (Cities, U. and Governments, L. 2013). A large body of research indicates that governance issues are highly significant in the effective delivery of solid waste management services.

2.4 Structural issues

The trajectory of water supply and sanitation infrastructural development may be considered instructive in the light of structural and typical urban water issues faced in developing countries. Conventional western- type wastewater disposal and treatment are increasingly considered inappropriate for cities in developing countries (Niemczynowicz 1992; Niemczynowicz 1994; Varisand Somlyody 1997; Wright 1997; Zurbrügg et al. 2004). Suggested directions for infrastructural development in cities in developing countries remain equivocal. Conventional infrastructural development is considered inappropriate and only reaches the high- and middle-income areas in cities. A more sustainable approach to wastewater disposal and treatment is based on a set of technological alternatives provided that the economic, financial and institutional aspects are well- addressed.

A structural problem in fast-growing cities is poor planning of water infrastructure and poor institutional capacities (Niemczynowicz 1999b; UN-Habitat 2003; Cohen 2004; Biswas 2006b). Implications of these problems appear at different levels. Unregulated construction of houses around cities without any water supply or sewerage infrastructure

makes water provision and waste water problematic in these areas (for example Accra in (Yankson et al, 2004). At the city level, installed water treatment and supply capacity are not able to meet growing urban demands. At the regional or national level, realistic strategic plans that foresee and meet future water demands are often lacking.

2.5 Solid waste management

A number of studies – covering North Africa, East Africa, West Africa and South Africa, South Asia and South-East Asia, and Latin America – examine political economy factors and the drivers of better or worse governance of solid waste management (Yhdego, 1995; Walling et al., 2004; Mariwah, 2012; Bjerkli, 2013). Many (though not all) of these do make explicit efforts to connect governance, institutional and political economy issues with measurable service delivery outcomes. Solid waste management is typically seen as a pressing priority for urban areas where there is a higher per capita and spatial concentration of waste production, and the potential for various social and economic problems is higher in the more concentrated settlements of urban areas. This is reflected in the fact that the vast majority of the literature on solid waste management focuses on urban areas for instance "urban expansion of Water and Sewerage services" and for this reason, it can be seen predominantly as an 'urban service'. In many cities, it is primarily a municipal government or other local government responsibility. There is also often a greater focus politically, and in the available literature, on waste collection than waste treatment and disposal, or the enforcement of environmental regulations such as anti-dumping rules. It is estimated that around 1% of the urban population worldwide relies on salvaging recyclables from waste for their livelihoods (Lizner and Lange, 2013).

These 'private good' characteristics and the resulting willingness to pay have led to many urban areas funding solid waste management through user fees (Hoornweg and Bhada-Tata, 2012). However, where these services have been contracted out, this approach has often had adverse effects on low-income residents (Nunan and Satterthwaite, 2010). Deprived areas are often poorly served by privatized services, due to an inability to pay and lower-value waste (Mariwah, 2012). Even where tariffs for collection are set at a level that is affordable for poorer residents through government subsidy or cross-subsidization (allowing contractors to charge higher rates to affluent areas), contractors often introduce higher informal charges or simply fail to collect from poorer areas (Nunan and Satterthwaite, 2010).

2.6 Urban expansion of Water and Sewerage services

National Water and Sewerage Corporation (NWSC) of Uganda, which has improved service coverage tremendously over the past decade through innovative management, the expansion of geographical coverage from 23 towns in 2013 to 165 towns as at June 2016, increase in the customer base from 317,000 accounts in 2013 to over 468,015 accounts as at 30th June 2016, Increase in daily water production from 239 million liters/day to over 286 million liters/day. Annual water network expansion of over 1000Km compared to the previous average of 80Km. The customer satisfaction index as at June 2016 was 88% against the Government of Uganda (GoU) performance contract target of 70%. All these achievements have only been possible through the collective effort of staff, management and committed guidance from the board.

2.7 Challenges faced by Corporations in Delivery of Services in Urban Areas

2.7.1 Lack of transparency and corruption

Transparency and corruption are additional factors that both undermine and indicate the effectiveness of the institutional environment. Corruption is a common phenomenon and undermines the provision of public services. The water sector is no exception. As analyzed thoroughly by (Plummer and Cross, 2006) for Africa, causes for corruption are founded in historical, political and societal realities. The main impact of corruption on the functioning of water and sanitation delivery is that it is wasting a large fraction of the available budget through leakage. Regional or country-specific estimates of leakage for Africa are lacking, but 20-35% (Davis 2003) based on South Asia provides a good indication of the scale in the water sector. To reduce corruption, a mix of entry points that works on parallel fronts and different levels is efficient and will probably be effective, according to (Shordt et al. 2006).

2.7.2 Historical and cultural factors

Historical and cultural factors are usually overlooked in the development sector, and the water sector is again no exception. The balancing of indigenous peoples" outlooks, philosophies and views with modern technologies and environmental concerns has often not been successful (Akiwumi 1998). A clear demonstration of this is the non-existent or poor functioning of high-tech western-style wastewater treatment plants in developing countries. In many cases, this copy-paste format has proven not to work well in environments where high-tech infrastructure has not yet become a tradition. Large scale piped water systems and central water treatment systems often have severe management problems (NWP 2006). The issue of inequitable allocation of water between users in a city

is less adequately addressed than other issues (Baylis *et al.* 2000). Social issues come in where access to water is discussed in relation to urban poverty (Bayliss et al, 2002). Access to water can be the underlying cause of social conflicts in an environment of water scarcity where water supply authorities fail to reach all their citizens (Turton et al, 1999).

2.7.3 Limited finances

In the absence of foreign aid or investment, managing the urban water infrastructure is a financial challenge in developing countries. High costs to maintain supply and infrastructure and poor revenue are common causes that create financial problems (Somlyody et al, 1997). Cost recovery for services is often a challenge, but different approaches exist (Briscoe 1995). Presently there is a lot of discussion on private- sector participation in the water sector. Poor performance of public water supply utilities is often used as a reason to privities partly or completely the governance of urban water supply. Some advocate privatization (Brook Cowen et *al,* 1999) while others argue against it or point at failures of such current practices (Bayliss 2002; Halland Lobina 2006; Nellis 2006; Prasad *et al.* 2006). (Johnstone et al. 1999) are neutral to this, but address the issue of how best to meet environmental and social objectives, given globally increased private-sector participation in urban water supply and sanitation.

2.7.4 Environmental challenges

Environmental issues can emerge within the urban area, where humans and the ecosystem are threatened or damaged by polluted water. The environment can also be affected at the larger scale, when cities change the hydrological cycle up to the water basin level. When compared to the, natural "situation, the paved and built-up area has reduced infiltration of precipitation and recharge to the groundwater. Water that does not infiltrate or evaporate

turns into run-off. The generated run-off is imposing fast peak-flows and challenging the urban drainage system not to be overloaded or locked to cause flooding. As (Niemczynowicz, 1999b) puts it, the city influences the run-off pattern and the state of the ecological systems not only within the city area but also in and around a whole river system downstream.

The Water for African Cities Programme initiated in 1999 by UN-Habitat had a focus on the environment; to protect the continent's threatened water resources and aquatic ecosystems from the increasing volume of land-based pollution from the cities (UN-Habitat 2005). This Programme was the first comprehensive initiative to support African countries to manage the growing urban water crisis. Improper wastewater disposal systems often create unhygienic situations and health risks. In the absence of a piped sewerage system, waste and wastewater are often disposed of through open drains that were constructed for storm water drainage. As a consequence, receiving water bodies have become heavily polluted, for example in Abidjan (Obrist *et al.* 2006), Accra (Karikari *et al.* 2006) and Addis Ababa (Melaku *et al.* 2007).

2.7.5 Over-population

In Zimbabwe, urbanization is also not a new phenomenon, soon after the country gained its independence from colonial rule in 1980; scores of people began to move into the capital city, Harare (Hove and Tirimboi, 2011). During the period from 1980 to 2000, the city of Harare had the capacity to absorb the large in-migration population, largely credited to the colonial infrastructure built through discriminatory urban planning. But the city of Harare has been since 2000 experience unprecedented rate of urbanization which is

apparently linked to the socio-economic misery in the peri-urban small towns and rural areas

However, the main concern involved the spread of water-borne diseases, as water and sanitation demand outweighed the planned supply. Consequently, lack of access to water supply and the dearth of sanitation translated into deterioration of the overall urban waste management systems which was transposed into the planned sections of the cities as the excess population forced access through informal means (Smith, 2012). The status quo of Harare City can in actual fact be alluded to the poor economic growth in the country, inadequate local governance and lack of political will which have overwhelmingly led to the collapse of the water and sanitation management systems (Manzungu et al. 2012). Notwithstanding the macro-variables that are at the core of the national challenges in Zimbabwe, it is the wanting local governance that explains the vogue of entitlement-mentality with which the excess population has sought to stake claims on and access to the urban infrastructure and services that appears to reasonably explain the spread of illegal and informal access to the formal sections of the city, thereby causing total collapse of the water and sanitation management systems. Perhaps, despite the popular rejection, the enforcement of the business regulation model of cost-recovery and payment for consumption could have served the purpose of local governance that is effective in-service delivery. The free for all has allowed for the rate payers to abandon their civic responsibilities, thereby compounding the problems for local authorities and governance of the city infrastructure as well as the water and sanitation management systems. Recent studies on the water and sanitation situation in Zimbabwe reveal that efforts to achieve the Millennium Development Goal (MDG) Seven (7) of reducing the number of people

without access to water and sanitation by 50% in 2015, seem to be ineffectual (Manzungu et al. 2012).

2.7.6 Politicization

Political market imperfections, Solid waste management is susceptible to patronage and politicization, and this can lead to a high incidence of political interference. As a local and labor-intensive service, it typically accounts for a substantial proportion of employment under the control of a municipality (Hoornweg and Bhada-Tata, 2012). As such, it is frequently used by local government to buy and reward loyalty with salaries. Bjerkli (2013) shows how solid waste management was used in Ethiopia to secure and reward loyalty to the ruling party through employment. The high visibility of collection also means that tariffs may be set artificially low, causing problems for fiscal sustainability. The market for private providers is, for many municipalities, a way to generate income (Bjerkli, 2013; Jones and Sharma Mainali, 2014). The voice of poor people is typically inadequately represented with respect to SWM (Observer, 2009; (Satterthwaite and Mitlin, 2012); Kazungu, 2010; Jayasinghe and Baillie, 2013). There is often a lack of willingness to recognize and cooperate with informal waste management workers, despite the fact that they are estimated to be responsible for 20% of municipal waste recovery worldwide (Gunsilius, 2012). The political imbalance may be partly due to the fact that residents of informal settlements are typically unable to vote as they have no formal address (Satterthwaite and Mitlin, 2012).

2.7.7 Policy and reform issues

Problems can also stem from successive reforms or policy initiatives that are neither aligned with each other nor designed to consolidate previous changes. In Ethiopia, for

example, successive privatization and decentralization reforms have resulted in disjointed and overlapping mandates (Bjerkli, 2013). Some forms of water provision common in urban areas, such as standpipes, are also difficult to control. However, while the urban poor are often assumed to be primarily responsible for water theft, Cheng (2013) notes that non-payment among the poor actually accounts for relatively small percentage of commercial water losses. The urban poor consume a relatively low volume of water compared with the commercial losses from industrial establishments and other large users. The relationship between development processes and the role of utility services is obviously an area requiring further research. But there are also three issues developing around the utilities' new roles as key agencies in the economic, social, and environmental management of cities.

2.8 How Urban Growth Management influences the Delivery of Public Utilities

Whereas available literature has generally dealt with ways of improving the condition of living of the urban population, little is known about how urban growth management influences the performance of public utilities. Urban water supply and sanitation services have commonly been provided by state-owned, monolithic water organizations. As part of a general move to market-led systems in the 1980s and 1990s, a new paradigm emerged to transform utilities into more modern service delivery organizations that emphasize operational and financial sustainability.

2.8.1 Private sector involvement in service delivery

For many of those years there was wide optimism that the private sector would resolve much of the performance problems of utilities and mobilize scarce financing to sustain growth and expand coverage. While private sector involvement has indeed increased in

the last decade, it has substantially fallen short of expectations that it would help turn around this sector. In essence, private financing has only accounted for less than 5% of the total investment in water supply and sanitation over the last 20 years (Delmon et al, 2014). At the same time, some public utilities have become more autonomous and accountable (Bjerkli, 2013). Some have improved their performance without involving the private sector and working totally within a public environment of key stakeholders and funding sources. Moreover, in many countries, there has also been a move to decentralize decision making down to the lowest practical level and place greater policy and oversight responsibilities on municipal governments (Aldo, Kingdom, Ginneken, 2016).

2.8.2 Waste management

There are clear opportunities for 'co-production' of solid waste management services (Majale, 2012). For example, community participation to clean up or provide composting services is described in India. In Dar es Salaam, Tanzania, scavengers are quite well organized, and through a series of middle men interact with the end users of the materials; in Ghana, better organization among informal waste workers has resulted in improvements in waste management services in poorer areas (Mariwah, 2012).

2.8.3 Urban housing and consumption styles

Housing production and consumption of housing services has multiplier effect on macro–economy. A thriving housing sector can contribute to economic growth though creation of employment opportunities in building materials' and construction sector. Sales of building materials and housing services generates revenue at same time improve circulation of currency in the economy. UNCHS and ILO (1995) argues that "rapid urbanization calls

for high capital spending on housing to meet the escalating housing demand and this further contributes to better performance of the National economy. This is due housing multiplier effect to macro – economy". It further indicates that "capital spending on housing contributes between 2 – 8% of GDP and 10 – 30% of Gross Fixed Capital Formation (GFCF). Housing services typically account for 5 – 10% of the GNP (Angel, 2000:24). In Middle East for example, housing construction typically account for 3% of GDP (Dhonte et al, 2000) and Tunisia housing investment has averaged 4% of GDP since 1990 (Erbas and Nothaft, 2002) while in Kenya, central government expenditure on housing decreased by 38% in fiscal year 1999 owing to the poor performance of the national economy and it has since remained low (Majale and Abu, 2001).

Land prices are critical factors in access to housing. High land prices resulting from market forces (demand and supply) and restrictive framework together with low incomes of many households turning land into a single biggest component of legal housing cost in many developing countries towns (UNEP, 2002). The problem is compounded by urbanization and globalization which has accelerated the commercialization of urban land market in developing countries (UN – HABITAT, 2003). In mid 1990s, land in Mumbai, India was among the most expensive in the world regardless of the fact that a large proportion of the local population live below the official poverty line (UN – HABITAT, 2006).

2.8.4 Urban poverty

Urbanization of poverty in developing countries is most conspicuous in the proliferation and expansion of slums and informal settlement (UN – HABITAT, 2003). Urban poverty is characterized by rapid growth of substandard housing and slums, deterioration of

residential neighborhood and absence of capital spending on existing housing stocks. It also manifests itself in acute unemployment and underemployment, failure to afford three meals a day, high crime rate and prostitution (World Bank, 1980). The informal housing delivery system in the slums are providing at least rudimentary shelter for the rapidly growing number of urban poor households where the vast majority resides. In this case given the prevailing level of income and other constrain, informal settlement can be seen as a solution not a problem because the informal rental housing is the only mode of providing cheap and affordable housing (UN- HABITAT, 2003). Slums and urban poverty are just manifestation of a population explosion and demographic changes due urbanization and globalization and slums must be seen as the result of failure of housing policies, laws and delivery systems as well as of national and urban policies.

The 'private good' dimensions of waste collection and its low monopoly tendency, visibility and territoriality tend to place greater emphasis on collection than the downstream aspects of the service. These also explain why informal settlements and poorer neighborhoods typically do not have well-functioning collection, as there is lower ability to pay and political significance. Once the waste has been collected from source, various service characteristics militate against effective provision.

2.8.5 Urban policies and programmes

Vancouver Action Plan (1976) emphasizes that effective implementation of strategies, policies, plans and programs in the field of human settlement require appropriate instruments in the form of political, administrative or technical institutions, enabling legislation and regulatory instruments as well as the formal procedures for harnessing resources in particular human capacities. It also calls for removal of any barrier that

prevented women from actively participating in planning, design and implementation of all aspects of human settlements.

Global Strategy for Shelter (GSS) to the year (2000) emphasizes that the goal of national policy should be to widen the range of housing choices available to all households so that they can adjust their shelter situation to their needs and preferences. This is much more important than having pre- determined targets in terms of housing production. It also underlines that government intervention may be required to offset market imperfection and in some specific cases, a policy may be justified to meet the social welfare requirement of the very poor and destitute.

In response to the dramatic and accelerating increase in Uganda's urban population, the Ministry of Local Government initiated a policy response with support from the NDP. A draft policy was created in 2010 (RoU, 2010b), and then the Ministry for Lands, Housing and Urban Development began the process of developing a revised and expanded policy document, which has become the NUP. DC, whose mandate is to meet the challenges of pro-poor policies and prosperous cities without slums. Cities Alliance has a particular interest in participatory upgrade programs, and while it has no permanent presence in Uganda, it works through a South African-based NGO federation, Slum/Shack Dwellers International (SDI), who in turn works closely with a Ugandan NGO, ACTogether, SDI and ACTogether are both part of the NUF and are the lead partners in TSUPU, focusing primarily on urban communities in five pilot cities (Arua, Jinja, Mbale, Mbarara and Kabale).

The focal points of the NUP as it emerges are twofold. First, it seeks to reform the overlapping bureaucracies at different levels of government currently involved in urban administration in order to make governance more efficient and effective, both in terms of cost and performance. In light of growing concerns with urban sprawl — in particular of slum settlements and the difficulties in managing land rights, service provision and security concerns — this was the initial impetus for developing the NUP. Second, in line with the priorities of the SDGs, the United Nations Development Programme and the World Bank, this policy is also pro-poor in its focus. While these two areas are not necessarily incompatible, it is important to note that the first administrative focus is best understood as of one of control and management, reflecting challenges from the perspective of local and national governments, while the second focus is part of the wider global attention to poverty and the needs of marginalized citizens.

2.9 Improved Facilities versus adequate access and performance measurement model

Improved Facilities versus adequate access and performance measurement (P) model by Hofmann (2011) informed by Schematic representation of the evolution of the product development process and modeling methods (Olofsson et al. 2007) informed the study.

The urbanization industry, which has a product development process similar to the construction process, has changed dramatically over the past decades. The introduction of new tools such as CAD software during the 1980s improved the design and documentation work to some extent. Instead, the major paradigm shift took place in the 1990s, when the simultaneous product development process was introduced (Womack et al. 1990). The development process went from being a sequential chain of activities to

having design activities that were carried out in parallel to each other, so-called concurrent engineering.

According to Womack et al. (1990), three essential elements are needed to create what they called "a lean development process": Leadership, Teamwork and Communication. The leadership must be able to gather cross-functional teams from the functionally oriented organization in order to bring multidimensional knowledge from marketing, engineering disciplines and production into the product development process. Effective communication between teams and team members is essential, since different design activities are conducted in parallel (Jongeling 2006). Compared with the traditional sequential development process, concurrent engineering offers a number of advantages, such as shorter lead times; the product is better adapted to market and production demands and this in turn results in a more attractive product with higher quality. The number of engineering hours is reduced, as design errors detected in a sequential process often lead to long chains of design iterations. The staff involved in the early design stages have often left the project to work on something else when errors are detected downstream in the activities involved in a sequential development process.

2.9.1 Model considerations

Improved Facilities versus adequate access and performance measurement model comes primarily from manufacturing industry, where product development with concurrent, parallel activities has been a huge success. With this model, it means that a large number of sequential activities are coordinated and performed at the same time by interdisciplinary teams which bring multidimensional knowledge to the project. One of the success factors for Improved Facilities versus adequate access and performance

measurement model in the service delivery industry was that the transformation took place at the same time as the modeling methods became increasingly sophisticated (Olofsson et al, 2007). The interaction between virtual prototyping with digital mock-ups and concurrent engineering demonstrates a symbiotic effect (Jongeling, 2006).

Improved Facilities versus adequate access and performance measurement model is largely a question of interaction between clients, design specialties and contractors using integrated project groups (Wang, 2002). Different disciplines contribute their knowledge collectively in order to implement the design process effectively and thereby obtain the best possible end result. The players work together to make informed and agreed decisions relating to the building process and cost and quality issues of the end product. Individual ideas are replaced by the group's combined interpretation, based on the integrated teams multidisciplinary experience. Individual objectives are replaced by common project goals.

Essentially, improved Facilities versus adequate access and performance measurement model brings together multidisciplinary teams, in which product developers from

different functions work together and in parallel from the start of a project with the objective to get things right as quickly as possible and as early as possible (Thabet et al, 2002). Compared with a traditional sequential service delivery process, it produces a raft of benefits, such as the reduction of construction time and construction costs, the improvement of product quality, faster reactions to customer requirements, fewer design errors and less rework.

2.10 Summary

Many cases from the developing world illustrate that keeping up the infrastructure coverage with the expansion of urban area is often an unrealistic target. Most towns in Uganda face a time lag of a few decades. One of the points from the previous discussion is that the gap between demand and supply of basic services like water can be explained by a range of common factors. It is important to be aware of social and financial issues in the urban water sector when studying any aspect of urban water management. However, they were not part of further analyses in this research. The next chapter provides the methodology that was applied in the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research design that was used, the population from which the sample was selected, the sampling techniques and procedures that were adopted, data collection methods and instruments, quality control, data analysis techniques that were used as well as ethical considerations.

3.2 Research Design

There are different research designs which include: correlational design (case-control study & observation), descriptive design (case study, Naturalistic observation & survey), semi-experimental design (field experiment & quasi experiment), Review (literature review & system review) and experimental design. This researcher employed a case study design in order to obtain relevant information (Silverman, 2005). This design was chosen because it is useful when not much is known about a phenomenon, in this case, Lira Municipality. The researcher used a case study which involved selection of divisions in Lira Municipality. This research design was further chosen because it allowed for the study to be conducted within the stipulated time meeting the requirements of the awarding institution.

3.3 Research Approach

Both qualitative and quantitative approaches were used. The researcher deployed both approaches and their methods to tap into the strengths of the approaches. This was enhanced by both methodological and data triangulation of responses from respondents in the study as suggested by (Creswell, 2009).

3.4 Study Population

The study population comprised of 11,670 persons and as per distribution, included 11,659 heads of households drawn from the divisions of Ojwina and Railway; 6 urban administrators from the two divisions; and 5 representatives from the utility service provider (NWSC).

3.5 Sampling Procedures

There are two major types of sampling in population and sample size i.e. (probability sampling, simple random sampling, stratified random sampling, multi-stage sampling) and non-probability sampling which includes; voluntary response sampling, judgement sampling, convenience sampling). This study used both probability sampling and purposive sampling techniques especially for key respondents. The researcher used simple random sampling in selecting respondents from the heads of household. In order to limit researcher bias, simple random sampling was applied to choose the respondents from the households. This provided a chance for all the respondents to be selected. Meanwhile, purposive sampling was used to select the key informants who were included in the sample without ignoring sensitivity in gender.

3.6 Sample Size and Selection

The study sample comprised of 384 respondents. The sample size was arrived at using the predetermined table for determining sample size by Krejicie and Morgan (1970) as cited in Amin (2005) as seen in Appendix III. The overall sample structure was as illustrated in Table 3.1.

Table 3.1: Summaries of sample size and selection

Category	Population size	Sample size	Sampling technique
Heads of Household	11,659	373	Simple random sampling
Urban managers	6	6	Purposive sampling
Utility providers	5	5	Purposive sampling
Total	**11,670**	**384**	

Source: Adopted from the National Population and Housing Census, 2014

3.7 Description of Study Area

Lira District is located in Lango sub-region in Northern Uganda and is bordered by the districts of Pader and Otuke in the North and North East, Alebtong in the East, Dokolo in the South and Apac in the West. Physically, the district lies between: Latitudes 1o 21'N, 2o 42" N Longitudes 320 51" E, 340 15" E. The district covers approximately a total area 1326 km2 of which 1286.22 km2 is land area. It is one of the districts that suffered the wrath of the Lord's Resistance Army (LRA) insurgency, which resulted into an influx of people from other districts.

Continental climate of the district is modified by the large swamp area surrounding the southern part of the district. The rainfall in the district is bimodal with one peak during April-May and the other in August-October. The average annual rainfall in the district varies between 1200-1600 mm decreasing northwards. The rainfall is mainly convectional and normally comes in the afternoons and evenings. The average minimum and maximum temperatures are 22.5^0C and 25.5^0C, respectively. Absolute maximum temperature hardly goes beyond 36^0C, and absolute minimum hardly falls below 20^0C. Land and sea breezes

are common in the district. Wind speed is low (1-4m/sec) during the rainy season and moderate (4-8m/sec) during the dry season. Lira District has one Higher Local Government, one Municipal Local Government (with 4 division LGs) and 9 Sub-county Local Governments. There are 63 parish administrative units, 20 wards administrative units, 678 village administrative units and 64 cell administrative units.

3.8 Data type

During the study, both primary and secondary data were collected on the three objectives. Primary data involved going to filed while secondary data involved reviewing different books, journals and reports.

3.9 Methods of Data Collection

The researcher employed both qualitative and quantitative data collections methods to collect primary and secondary data. Primary data were collected using questionnaires, in-depth interviews and observation. To guide this, the researcher used interview and observation guides in collection of primary data. Secondary data was collected from books, reports, journals, documents, photos, magazines, press releases and newspapers.

3.9.1 Survey

This was used to collect data from the heads of household respondents. Questionnaire survey was chosen because of the speed and ease of use in collecting data within a short period especially when respondents are able to read and write as opposed to interviewing. Questionnaires were likely to provide direct answers which were easy to analyze. This method was used to collect primary data from heads of households using closed ended questionnaires that had preconceived statement (See Appendix I).

3.9.2 In-depth interviews

This included face-to-face interaction between the researcher and the respondents. This method helped to get data concerning urbanization and its indicators, challenges faced and way forward. This was carried out across the different categories of respondents in the study. This method was also particularly useful for key respondents who were deemed knowledgeable on the subject under study. These were the urban managers and utility providers in Lira Municipality.

3.9.3 Observation

This method involved observation of different social settings and the nature of services offered. It also involved viewing the nature of environment that services are provided in. This helped to identify the challenges that faced in the delivery of services by NWSC. An observation checklist was used as the main study instrument.

3.10 Data Collection Instruments

3.10.1 Questionnaire

The researcher used questionnaires to collect data from community members. The questionnaires contained both closed and open-ended questions. The questionnaires were hand delivered by the researcher and the community members were required to fill them in the presence of the researcher so that the responses could be cross checked instantly in order to minimize errors. The questionnaire adopted a 5 - Point Likert scale (Strongly agree = 5, Agree = 4, Not sure = 3, Strongly disagree = 1, Disagree = 2). The questions were constructed in closed ended form. The questionnaire had two sections (A & B), one for background information of the respondents, and the second for the study objectives.

Section A considered five areas and Section B concerned the specific objectives to be investigated (See Appendix I).

3.10.2 Interview Guide

The researcher conducted interviews with key informants using an interview guide. The researcher made appointments with the urban administrators so that the interviews could be conducted at their convenience. Questions were drafted on each of the specific objectives, capturing the main elements (See appendix I).

3.11 Achievement of Research Objectives

3.11.1 Objective One:

To establish the relationship between urbanization and performance of NWSC in Lira Municipality

To achieve the first objective, questionnaire was first developed and after verification of the questionnaire and approval, questionnaires were hand delivered by the researcher and the community members were required to fill them in the presence of the researcher so that the responses could be cross checked instantly in order to minimize errors.

The questionnaire adopted a 5 - Point Likert scale (Strongly agree = 5, Agree = 4, Not sure = 3, Strongly disagree = 1, Disagree = 2). The questions were constructed in closed ended form with two sections, one for background information of the respondents, and the second for the study objectives (See Appendix I).

To achieve the relationship between urbanization and performance of NWSC, a hypothesis was used. It stated "*there is a significant relationship between urbanization and performance of NWSC*". A regression was run using spearman correlation coefficient (r) and this confirmed the relationship.

3.11.2 Objective Two:

To establish the challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality.

To achieve the second objective, questionnaire was first developed and this was validated and found reliable to be used in the study. After verification of the questionnaire and approval, questionnaires were hand delivered by the researcher and the community members were required to fill them in the presence of the researcher so that the responses could be cross checked instantly in order to minimize errors.

The questionnaire adopted a 5 - Point Likert scale (Strongly agree = 5, Agree = 4, Not sure = 3, Strongly disagree = 1, Disagree = 2). The questions were constructed in closed ended form with two sections, one for background information of the respondents, and the second for the study objectives (See Appendix I).

The nature of the questionnaire helped to capture the views of the respondents that were entered in SPSS 21.0 version and expressed in form of frequencies, percentages, mean and standard deviation. This helped to describe the changes faced challenges faced by National Water and Sewerage Corporation in delivery of services.

3.11.3 Objective Three:

Developing a model for efficient delivery of services in NWSC in Lira Municipality

The study was informed by the Hofmann (2011) theoretical model improved Facilities versus adequate access and performance measurement (P) where:

$P = X_1+X_2+X_3... X_n$ .....Equation (1)

Where Xi (X_1, X_2, X_n) represents a group of factors that constitute urbanization.

When translated the study seeks to propose the following model:

P = IP+ UPS + ID +WSE .....Equation (2)

Where;

IP	=	Increased Population
UPS	=	Unplanned Urban Settlement
ID	=	Infrastructure Development
WSE	=	Level of Water and Sewerage Extension
n	=	Constant

In this study, urbanization is represented by U and Performance of NWSC is represented by P were considered as the model parameters.

3.12 Documentation and Record Analysis

The researcher obtained additional information through reading books, journals, reports and newspapers related to urbanization and public utilities performance in addition to urban records in line with water supply and sewerage system. More literature was reviewed from journals, textbooks, government documents and reports to supplement primary data.

3.13 Data Quality Control

In order to ensure that the instruments used for data collection were devoid of inconsistencies and therefore would yield consistent results, the researcher subjected the instruments for pretesting for validity and reliability.

3.13.1 Validity of the instrument

Validity refers to the extent to which an instrument is able to measure what it is supposed to measure appropriately (Amin, 2005). The following measures were undertaken to ensure validity of the instruments. First, items in the instruments were largely adopted

from past studies with validated research instruments, and where necessary, some were modified to suit the current study. Secondly, the researcher sought guidance from the supervisor and experts in urbanization and service delivery concerning the appropriateness of the items in the instruments. Finally, the instruments were pilot tested before being administered to ensure that the items therein are clearly understood by the respondents and that they give the right responses.

3.13.2 Reliability of the instrument

Reliability means the ability of the instrument to deliver similar results when used in a study in future using the same methodology (Sarantakos, 2003). In respect to reliability, the data collection instruments were pretested on a small number of respondents from each category of the study population; eighteen (18) household heads, one (1) utility provider and one (1) urban manager to ensure accuracy and vanity of questions in line with each of the objectives of the study. The reliability of the instrument was then computed using Cronbach's Alpha Coefficient with the help of SPSS computer program (See appendix IV: all variables, Case processing summaries). When the reliability coefficient, alpha is greater than 0.7, it implies high level of reliability of instruments (Amin, 2005). It should be noted that the respondents who participated in the pre-test exercise of the instruments were not included in the final sample during data collection.

Table 3.2: Reliability indices for the respective sections of the questionnaire

Description	Urbanization	Challenges	Performance of NWSC
Average inter-item covariance	.43	0.38	0.39
Number of items in the scale	4	5	5
Scale reliability coefficient	0.768	0.987	0.768

Source: Primary Data (2018)

The reliability of the questionnaire variables was computed using SPSS 21.0 to obtain the Cronbach Alpha reliability Coefficient Test with values as indicated in the Table 3.3 (See Details in Appendix IV). The instrument was considered reliable since all the coefficients in Table 3.2 were above 0.7 which the least is recommended CVI in survey studies (Amin, 2004; Gay, 1996).

3.14 Data Collection Procedure

The researcher secured an introductory letter from the University and this was used to seek permission and make appointments with the administration of the different divisions. The researcher proceeded to make arrangements to conduct interviews with the different urban administrators. The questionnaires were administered to selected community members and the respondents were assured of confidentiality. The data collected was edited and analyzed for the development and writing of a final research report.

3.15 Data Analysis

Data analysis commenced as soon as the first completed instrument was done. The researcher scrutinized the filled in instruments for completeness, accuracy, consistency and comprehensiveness. Corrections were made as well as editing after consultations with the respective respondents where necessary. This was done for all completed instruments.

3.15.1 Qualitative analysis

Qualitative data was presented in descriptive form. Data was analyzed using content analysis. Data from interviews and observation was classified into themes and sub-themes and categories in line with study objectives to enable coding. Relationships between themes were sought thus leading to identification of sub-themes. Direct quotations were made, with emphasis placed on consistency and coherent flow of information (John et al., 2018). Relevant table extracts were included to give deeper meaning to the data presented.

3.15.2 Quantitative analysis

Quantitative data was organized into meaningful classifications so that it could be easily interpreted. This was done on a routine basis after the reception of any form of quantitative data. The aim was to ensure accuracy, uniformity and completeness of data collected. Some of the data was presented in statistical form using tables, pie charts and bar graphs using percentages. This enabled the analysis and interpretation of data in respect of various variables.

3.16 Ethical Consideration

The researcher first sought the informed consent of the respondents before the questionnaires were administered to them or interviews conducted and only those who accepted to freely participate in the study were considered. The information given by the participants was also kept confidential and has not in any way been used against any participant/ respondent and they were also not required to write their names on the questionnaires.

3.17 Measurement of variables

The study variables; urbanization, challenges, and performance of NWSC was measured using the ordinal scale based on the Likert rating scale. This comprised statements on each variable under study to which respondents were required to respond. The responses were on a scale of one to five. Where 1 represents strongly disagree, 2 for disagree, 3 not sure, 4 for agree and 5 for strongly agree. These helped the researcher measure the extent to which the variables are related.

3.18 Chapter summary

This chapter generally provided the methodical steps that were taken in data collection, analysis achievement of the objectives. It highlighted how this was done and followed. This helped in the subsequent chapters about presentation of findings and discussion.

CHAPTER FOUR

PRESENTATION, ANALYSIS, AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents findings of the study which was conducted to investigate the influence of urbanization on the performance of National Water and Sewerage Corporation in Lira Municipality. The findings are presented according to the objectives of the study. In the first section, the response rate is captured to keep the study in perspective; this is followed by the back ground of the respondents. In the third section, the empirical analyses of the study findings are provided. The testing of hypothesis that was set for this study is also provided to establish the influence of urbanization on the performance of National Water and Sewerage Corporation. The response rate in the whole study is explained in Table 4.1.

4.2 Response rate

The percentage of people who respond to a survey is called the response rate (Hamilton, 2003). Amin (2005) noted that 70% of the respondents are enough for the study to produce accurate and useful results. In this study, the sample was 384 respondents, but the study managed to get 381 respondents. The break down is shown in Table 4.1 below.

Table 4.1: Response rate

Method	Target Response	Actual response	Response rate
Interview	11	9	81.8%
Questionnaire	373	370	99.2%
Total	**384**	**379**	**98.7%**

Source: Primary Data, 2018

Table 4.1 above indicates that out of the 11 respondents that were set to be interviewed in the study, 9 responded representing a response rate of 81.8%. The Table 4.1 further indicates that out of 373 respondents targeted, 370 respondents responded with a response rate of 99.2%. The average response rate for study therefore was 98.7%. The study response rate of 98.7% was good enough since according to Amin (2005), 70% of the respondents are enough for the study. The response rate indicates that the data collected using both questionnaire and interview guide was representative for the study. This is justified by the response rate percentage of 95.7%. The remaining respondents could not be reached because some of them were out of the area during the time for research, others couldn't attend to the researcher in the specified time and some of them had travelled for official duties for a specified period of time.

4.3 Background information

This theme handles the background information of the respondents that were used in the study. Among these characteristics included, Age, Gender, Level of education, an Occupation as portrayed in tables below;

4.3.1 Age Group of Respondents

To establish the age of the respondents, respondents were asked to rank their ages and below are the results that are indicated in Table 4.2.

Table 4.2 Age Group of the Respondents

Age Group	Frequency	Valid Percentage
18 – 25	130	35.2
26 – 36	121	32.8
37 – 45	68	18.3
46 and Above	51	13.7
Total	**370**	**100.0**

Source: Primary data, 2018

From the 4.3, it was found out that most of the respondents had 18 – 25 years and these scored the highest toll of 35.2%. Those who were in the category of 26-36 years constituted 32.8%, 37-45years had 18.3% and those who were above 46yrs were represented by 13.7% each. The above statistics indicate that the study was conducted mostly in the people who were 18years and above. These categories of years are associated and susceptible to have enough experience of what is exactly happening in performance of National Water and Sewerage Corporation in Lira municipality.

4.3.2 Gender of the respondents

To understand the gender of the respondents, the researcher recorded their gender and below are the results that were recorded in Table 4.3

Table 4.3: Gender of the respondents

	Gender	Frequency	Valid Percent
Valid	Male	177	47.8
	Female	193	52.1
	Total	**370**	**100.0**

Source: Primary Data, 2018

From the Table 4.3, it is indicated that the study was conducted mainly from the female respondents who constituted 52.1%. Males on the other hand, were represented by 47.8% of the respondents. This implies that since the respondents were almost similar percentage from Lira municipality, this enabled the study to capture enough and balanced information required for the study. It was also important to capture male and female responses to provide gender outllook for the study

.

4.3.3 Level of Education of the Respondents

Respondents were also asked to state their level of education as shown in Table 4.4.

Table 4.4: Education level of respondents

	Education level	Frequency	Valid Percent
Valid	None	88	23.6
	Primary	102	27.6
	'O' Level	70	18.8
	'A' Level	53	14.5
	Others	57	15.3
	Total	**370**	**100.0**

Source: Primary Data, 2018

Table 4.4 indicates that most of the respondents had attained primary level of education and these constituted 27.6%. Those who had no formal education came second with 23.6% of the respondents. 18.8% of the respondents had ordinary level of education, and 14.5% had 'A' level. It is only 15.3% that had other qualifications from different institutions including certificates, diplomas, and degree. Basing on these findings, most findings of the study were based on the people who had enough comprehension capacity to identify what was required since they had some level of education. It shows that they

had knowledge on the influence of urbanization on the performance of National Water and Sewerage Corporation in Lira Municipality.

4.3.4 Occupation of Respondents

The study explored on the occupation of the respondents in lira municipality. The findings generated are presented in Table 4.5.

Table 4.5: Occupation of the respondents

	Occupation	Frequency	Valid Percentage
Valid	Casual laborer	93	25
	Public Servant	24	6.4
	NGO worker	35	9.4
	Trader	76	20.6
	Self employed	142	38.4
	Total	**370**	**100.0**

Source: Primary data, 2018

The study findings in Table 4.5 show that the majority of the respondents were self-employed and these took 38.4%. Those who were traders took 20.6% of the respondents. In the study conducted, 19.4% of the respondents were NGO workers, 6.4% were public servant and 25% were casual laborers. The nature of the occupation of the respondents was mixed enough to provided varying data for the study.

4.4. Empirical findings:

On the influence of urbanization on performance of NWSC in Lira Municipality.

In this section, the researcher presents the findings of the study as per the objectives adopted for the study in chapter one. These findings were thus obtained on 1) To establish the relationship between urbanization and performance of NWSC in Lira Municipality 2) To establish the challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality, 3) To develop a model for efficient delivery of services in NWSC in Lira Municipality. To understand these variables, respondents were introduced to different pre-conceived statements as per each variable to find out their views and in the subsequent section are the findings that were found on each dimension.

4.4.1 Relationship between urbanization and performance of NWSC

To determine the relationship between urbanization and performance of National Water and Sewerage Corporation, respondents were introduced to different items to have their opinions expressed. Their responses were computed by making an aggregate of responses given by respondents to the 5-items and 5point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree and 5=Strongly Agree), which sought to measure urbanization. This was categorized according to percentages and frequencies, mean and standard deviation.

Table 4.6: Relationship between urbanization and performance of National Water and Sewerage Corporation

Performance Indicators	SD		D		NS		A		SA		M	SD	F	%
	F	%	F	%	F	%	F	%	F	%				
Influence of Urbanization as a result of Population Increase	58	15.7	53	14.3	26	7.0	85	23.0	148	40.0	5.57	1.604	370	100.0
Unplanned urban settlement due to rural urban migration	58	15.7	72	19.5	22	5.9	98	26.5	120	32.4	3.41	1.282	370	100.0
Level of Infrastructure development as a result of Urbanization	32	8.6	67	18.1	31	8.4	105	28.4	135	36.5	3.66	1.195	370	100.0
Level of water and sewerage extension Services	59	16.0	89	24.1	30	8.1	86	23.2	106	28.6	3.25	1.506	370	100.0

Source: Primary Data, 2017

SD means strongly disagree, D means disagree, NS Means Not sure, A means agree, SA means Strongly Agree M means mean, and SD means Standard Deviation

The Table 4.6 above represents findings on objective one as it was measured. The study established that urbanisation as a result of population increase influences the delivery of services by National Water and Sewerage Corporation in Lira Municipality. This was established when the respondents were asked whether urbanization affects delivery of services by NWSC and the majority 40.0% (148) and 23.0% (85) agreed and strongly agreed , with corresponding mean of 4.03 and standard deviation of 1.604 respectively compared to the 7.0% (28) who were not sure, 14.3% (53) who disagreed and the 15.7%

(58) who strongly disagreed with the same corresponding mean of 5.57 and standard deviation of 1.604; implying that urbanization affects delivery of services by NWSC in Lira Municipality. This was found to be in line with the views of many respondents who participated in the interviews. For instance, in an interview with one key respondent, it was noted that a participant from management during interview said:

"Yes, urbanization affects service delivery by NWSC. Whereas planned urbanization promotes service delivery, well harmonized urban setups positively affect water and sewerage extension services within the area, unplanned urbanization slows down the delivery of services. Similarly, well developed systems of water and sewerage services tend to attract more people." [Interview with an urban manager in July 2018].

The findings indicate that most of urbanization has great influence on the services offered. The observed trends of an increasing acceptance that urbanization affects the delivery of services by NWSC is premised on the improved access to NWSC within urban settings as compared to the rural setup which access to services itself is helped by increasing capacity and acceptability to pay for NWSC services among urban dwellers compared to their rural counterparts.

The findings also relate with United Cities and Local Governments (2013) which notes that the effects of these factors can be shaped by physical and political economic characteristics of the urban environment, as well as broader political context and sector-specific qualities. In addition, any 'urban advantage' does not apply evenly across an urban population; access to services differs markedly between individuals according to their wealth, education, location, and other social and economic characteristics.

Regarding respondents' views on the unplanned urban settlement due to rural urban migration and how it affects the delivery of services by NWSC, 32.4% (120) agreed, 26.5% (98) strongly agreed, 5.9% (24) were not sure, 19.5% (72) disagreed while 15.7% (58) strongly disagreed. Since the majority agreed as confirmed by a response mean of 3.41 and a standard deviation of 1.282, it was concluded that unplanned urban settlement due to rural urban migration affects the delivery of services by NWSC. This finding was supported throughout the interviews, for instance one informant opinion:

"Urbanization negatively impacts the level of service delivery by NWSC in two primary ways; one through the increased activity in urban areas, construction works and other use of heavy machinery on ground works destroys assets such as water pipes increasing the cost of maintenance while also creation of new connections and networks requires compensation of settlers in the affected areas" [Interview with an urban manager in July 2018].

From the findings, it was shown that the role played by urbanization on the provision of public utilities by NWSC is hinged upon household incomes that entirely determine household practices to procure the services and patterns tend to dictate that wealthier neighborhoods and echelons of society will tend to have better access as they are better planned and have more disposable incomes in comparison to the poorer urban dwellings within slums that have lower household incomes and are poorly planned hence impeding extension of services by NWSC.

Asked whether provision of public utilities as a result of urbanization affects the level of delivery of services by NWSC in their, 36.5% (135) and 28.4% (105) agreed and strongly

agreed 8.4% (33) were not sure while 18.1% (67) and 8.6% (32) disagreed and strongly disagreed respectively. These findings with a response mean of 3.66 and standard deviation of 1.195 shows that the majority agreed that urbanization affects the level of delivery of services by NWSC, a finding that was supported by the interviews with key informants. For instance, during one interview, one key informant noted:

"Urbanization is a key factor affecting works as many setups are characterized by unplanned settlements some of which lie above water and others sewer lines and these do not allow for smooth extensions and maintenance." [Interview with a utility manager in July 2018]

The above findings are also supported by Biswas (2006) who notes that a structural problem in fast-growing cities is poor planning of water infrastructure and poor institutional capacities. Implications of these problems appear at different levels. Unregulated construction of houses around cities without any water supply or sewerage infrastructure makes water provision and waste water problematic in these areas.

On whether urbanization affects the level of water and sewerage extension in lira Municipality, 28.6% (106) agreed, 23.2% (86) strongly agreed, 8.1% (32) were not sure, 24.1% (89) disagreed while 16.0% (59) strongly disagreed. These responses attracted a mean of 3,25 and standard deviation of 1.506 which meant that the majority agreed implying that respondents were in agreement that urbanization affects the level of water and sewerage extension in lira municipality. This finding was supported by the key informants as one of them noted:

"Urbanization boosts the delivery of services by NWSC as it culminates in the increased extensions of pipe networks and sewerage delivery channels to meet the demand with in the municipal area. However, the process is also slowed down with an overwhelmed service delivery system due to increasing demand with urbanization and unplanned settlement within the municipality." [Interview with a utility manager in July 2018]

Urbanization creates the need for provision of improved access to public utility services; water and sewerage extensions while as it is characterized by growing populations who demand equitable access to these services. Although this is the case, more than a third of the respondents had disagreed that urbanization did not affect the level of water and sewerage extension and this could be attributed to the fact that some populations have less disposable household incomes while others have a preference to only one of the services such as water extensions while sewer systems would not be financially viable utility services to them hence do not reach a considerable part of the population.

The above findings are also shared by Yankson et al. (2004) who agree that at the city level, installed water treatment and supply capacity are not able to meet growing urban demands. At the regional or national level, realistic strategic plans that foresee and meet future water demands are often lacking.

4.4.2 Hypothesis Test:

There is a significant relationship between urbanization and performance of NWSC

To determine the relationship between urbanization (U) and performance of National Water and Sewerage Corporation (P), Spearman correlation coefficient (r) and regression were used to test the hypothesis. The regression considered urbanisation and performance of NWSC as major inputs. It considered R square, multiple R, adjusted R and ANOVA. (See Table 4.9). Results are presented in the Table 4.7.

Table 4.7: Correlation results for the relationship between urbanization and performance of National Water and Sewerage Corporation

		Urbanization	Performance of National Water and Sewerage Corporation
Urbanization	Spearman correlation	1	.487**
	Sig. (2-tailed)		.000
	N	372	372
Performance of National Water and Sewerage Corporation	Spearman correlation	.487**	1
	Sig. (2-tailed)	.000	
	N	372	372
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data, 2018

Findings show that there was a significant positive correlation (rho = .487) between urbanization as a result of population increase and Service delivery by National Water and Sewerage Corporation. These findings were subjected to a test of significance (p) and it is shown that the significance of the correlation (p = .000) is less than the recommended critical significance at 0.05. Thus, the effect was significant. Because of this, the

hypothesis *"There is a significant relationship between urbanization and performance of National Water and Sewerage Corporation"* was not rejected. Thus, positive significant relationship implies that a change in urban growth and development relates to a significant change in the delivery of services by National Water and Sewerage Corporation in Uganda. The positive nature of the correlation implied that private operators and NWSC should be aware of the services offered to effectively deliver to the clients.

A further analysis was conducted using a regression to determine the relationship between urbanization and performance of National Water and Sewerage Corporation. Findings are presented in the Table 4.8 accompanied by analysis and interpretation.

Table 4.8: Regression results showing the relationship between urbanization and performance of National Water and Sewerage Corporation

Regression Statistics					
Multiple R	.469				
R Square	.220				
Adjusted R Square	.217				
Standard Error	.77076				
ANOVA					
	df	*SS*	*MS*	*F*	*Sig F*
Regression	1	52.010	52.010	87.549	.000
Residual	371	184.755	.594		
Total	372				
	Coefficients	*Beta.*	*Standard Error*	*t Stat*	*P-value*
Predictor	.690		.287	2.404	.017
Urbanization	.675	.469	.072	9.357	.000

Source; Primary data

Findings in the Table 4.8 show a linear relationship (Multiple R = .469) between urbanization and performance of National Water and Sewerage Corporation in Lira

municipality. The adjusted R Square shows that urbanization accounts for 21.7% change in the performance of National Water and Sewerage Corporation. These findings were subjected to an ANOVA test, which showed that the significance (Sig F = .000) of the Fishers ratio (F = 87.549) was greater than the critical significance at .05. This means that an improvement in urbanization as a result of population increase will lead to corresponding improvement in the performance of NWSC.

The above findings are supported by UNCHS and ILO (1995) which noted that rapid urbanization calls for high capital spending on housing to meet the escalating housing demand and this further contributes to better performance of the National economy. This is due housing multiplier effect to macro – economy.

It also relates with Vancouver Action Plan (1976) which emphasizes that effective implementation of strategies, policies, plans and programs in the field of human settlement require appropriate instruments in the form of political, administrative or technical institutions, enabling legislation and regulatory instruments as well as the formal procedures for harnessing resources in particular human capacities.

4.4.3 Challenges faced by NWSC in delivery of services as a result of urbanization in LMC

The second objective aimed at establishing challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality. Respondents who partcipated in the survey were introduced to different pre conceived statements that were designed to measure challenges faced by National Water and Sewerage Corporation in delivery of services. Their findings are represented in form of frequencies, percentages, means and standard deviations as shown in Table 4.9.

Table 4.9: Descriptive statistics on challenges faced by National Water and Sewerage Corporation in delivery of services as a result of urbanization in Lira Municipality

Challenges	SD		D		NS		A		SA		M	SD	F	%	Ranking
	F	%	F	%	F	%	F	%	F	%					
Discriminatory urban planning	31	8.4	68	18.4	40	10.8	122	33.0	109	29.5	3.57	1.113	370	100.0	High
Contamination of water as a result of primitive	31	8.4	52	14.1	41	11.1	113	30.5	133	36.0	3.71	1.153	370	100.0	Low
Lack of political will	40	10.8	54	14.6	70	18.9	123	33.2	83	22.4	3.39	1.057	370	100.0	High
Policy reform	38	10.3	71	19.2	76	21.5	103	27.8	82	22.2	3.32	1.270	370	100.0	High
Unplanned water supply	28	7.6	24	6.5	22	5.9	88	23.8	208	56.2	4.15	1.071	370	100.0	Low

Source: Primary Data, 2018

SD means strongly disagree, D means disagree, NS Means Not sure, A means agree, SA means Strongly Agree M means mean, and SD means Standard Deviation

The study established that discriminatory urban planning is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization. This was revealed by the majority 33.0% (122) and 29.5% (109) agreed and strongly agreed respectively compared to the 10.5% (42) who were not sure, 18.4% (68) who disagreed and the 8.4% (31) who strongly disagreed. Thus, since the majority agreed as confirmed by the response mean of 3.57 and a standard deviation of 1.113, it implied that discriminatory urban planning is a challenge faced by NWSC in the performance of her duties. This was found to be in line with the views of many respondents who participated in the interviews. Regarding that, one key informant had this to say,

"As the growth rate increases, the number of customers affiliating to the corporation's water and sewer system also increases thus challenging NWSC to increase on its water production, sewer line constructions as well as manhole construction to the increasing

demands of the urban and municipality dwellers." [Interview with an urban manager in July 2018].

Discriminatory urban planning was faulted on poor implementation of development standards and policy ineffectiveness to spur proper planning which is more pronounced within the affluent neighborhoods while largely ignored in the poor neighborhoods; this discriminatory planning thus affects the delivery of services by NWSC as such unplanned settlements are characterized by destruction of the water and sewerage grid lines during construction, theft of equipment and subsequent difficulties in extension of services while these are non-existent within the neighborhoods that can afford to pay.

The findings are supported by UNEP (2002) which notes that discrimination in urban planning normally follows land crisis. It notes that land prices are critical factors in access to housing. High land prices resulting from market forces (demand and supply) and restrictive framework together with low incomes of many households turning land into a single biggest component of legal housing cost in many developing countries towns.

On contamination of water as a result of primitive behavior is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization, 30.5% (113) agreed, 36.0% (133) strongly agreed, 11.1% (43) were not sure, 14.1% (52) disagreed while 8.4% (31) strongly disagreed. These findings had a response mean of 3.71 and a standard deviation of 1.153 confirming that majority agreed. Thus, it can be concluded that contamination of water as a result of primitive behavior is a challenge faced by NWSC in the performance of her duties. This finding was supported in an interview when one respondent stressed;

"There is increasing behaviour o f the urban dwellers contaminating water that they use. This undermines the activities of NWSC. However, efforts are under way to continue sensitizing the population to appreciate the importance of clean environment and water"

The findings show that contamination of water sources takes various forms but mainly as a result on uncensored human behavior such as defecation, release of sewage during heavy down pour and it contributes to increase on the cost of water treatment to achieve decontamination this is an outstanding challenge as the financing in cleaning and assurance of safe water delivery is entirely on the corporation.

Regarding lack of political will as a challenge faced by NWSC in the performance of her duties in Lira Municipality as a result of urbanization, 33.2% (123) and 22.4% (83) agreed and strongly agreed respectively. 18.9% (72) were not sure while 14.6% (54) and 10.8% (40) disagreed and strongly disagreed respectively. These findings with a response mean of 3.39 and standard deviation of 1.057 show that the majority agreed implying that lack of political will is a challenge faced by NWSC in the performance of her duties, a finding that was supported by many respondents in the key informant interviews. For instance, during one interview, it was noted,

"Urban growth calls for amplified service extensions which can be technically draining due to the several factors like policy pitfalls, inadequate funds, unplanned construction works, political and societal hindrances." [Interview with an urban manager in July 2018].

It was observed that political commitment to the institutional goals of NWSC is through various avenues; funding, drafting favorable policies, fostering policy implementation in the related sectors and financing of related activities. These have been given minimal

attention and have in a long term impeded the performance of the corporation in delivering her services to the community.

The above findings concur with Hoornweg and Bhada-Tata (2012) who notes that political market imperfections, Solid waste management is susceptible to patronage and politicization, and this can lead to a high incidence of political interference. As a local and labor-intensive service, it typically accounts for a substantial proportion of employment under the control of a municipality.

The above views are also shared by Satterthwaite and Mitlin (2012) who noted that there is often a lack of willingness to recognize and cooperate with informal waste management workers, despite the fact that they are estimated to be responsible for of municipal waste recovery worldwide. The political imbalance may be partly due to the fact that residents of informal settlements are typically unable to vote as they have no formal address.

On policy reform as a challenge faced by NWSC in the performance of her duties as a result of urbanization, 27.8% (103) agreed, 22.2% (82) strongly agreed, 21.5% (78) were not sure, 19.2% (71) disagreed while 10.3% (38) strongly disagreed. A standard deviation of 1.270 and a response mean of 3.32 meant that the majority disagreed with policy reform as a challenge faced by NWSC in the performance of her duties as a result of urbanization. This finding raised a lot of contradictions during face to face interviews where some of the respondents strongly stressed that policy reform was a challenge faced by NWSC in the performance of her duties as a result of urbanization. On this very point, one key informant noted;

"Urban growth has quickly caused a lot more demand of service delivery by NWSC hence pushing them to give more and make more development. There is a bit of mismatch in terms of delivery to the population since growth at times overwhelms delivery causing a huge gap hence less quality service delivery or little service delivery in this case water supply." [Interview with an Urban Manager in July 2018].

Policy reform constitutes an important aspect within developing nations as this play a key role in determining uptake and implementation of new strategies and modalities of services. The reform in policy is specifically important in the context of promoting infrastructural development along grid lines while also ensuring feasible and sustainable funding opportunities for the services extended by NWSC to promote uptake within the radius of service.

The findings are also shared by Plummer and Cross (2006) transparency and corruption are additional factors that both undermine and indicate the effectiveness of the institutional environment. Corruption is a common phenomenon and undermines the provision of public services. The water sector is no exception. As analyzed thoroughly for Africa, causes for corruption are founded in historical, political and societal realities.

Regarding unplanned water supply as a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization, 23.8% (88) agreed, 56.2% (208) strongly agreed, 5.9% (24) were not sure, 6.5% (24) disagreed while 7.6% (28) strongly disagreed. The majority agreed as confirmed by a response mean of 4.46 and standard deviation of 1.089 implying that unplanned water supply is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization. This was supported

by many key informants in interviews where it was stressed that different lines of water connections are wrongly made suing illegal mans and this contributed to more unplanned water supply. One respondent stressed;

"We have a problem of illegal connections and this contributes to unplanned water supply, further frustrating the work of National Water and Sewerage Cooperation"

4.4.4 A Regression Analysis for developing a model for efficient delivery of services in NWSC in LMC

The third objective of this study was aimed at developing a model for efficient delivery of services in NWSC in Lira Municipality. To achieve this, the study used a multiple linear regression analysis model.

Table 4.10: Model summary table showing the effect of increased population, unplanned urban settlement, infrastructure development, and level of water and sewerage extension

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.463[a]	0.214	.163	.1.329

a. Predictors: Constant, Urbanization

Source: Primary Data, 2018

The multiple regression model with all four predictors produced R^2 =0.463, F (6, 92) = 4.176, p < 0. 001. The research findings indicated that there was a positive relationship (R= 0.214) between the variables. This shows that there is relationship positively between

urbanization and performance of NWSC. The study also revealed that 46.3% of the NWSC performance factors can be explained by the independent variables.

Table 4.11: Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Beta	Std. Error	Beta		
1	(Constant)	4.532	0.762		5.936	0.000
	Q5 (IP)	-0.331	0.102	-0.307	-3.241	0.002
	Q6 (UPS)	0.251	0.098	0.238	1.067	0.012
	Q7 (ID)	0.112	0.105	0.100	2.549	0.289
	Q8 (WSE)	-0.274	0.101	-0.258	-2.720	0.008
a. Dependent Variable: Performance of NWSC						

Source: Primary Data, 2018

In general, a multiple regression was run to predict how urbanization is related to performance of NWSC Lira municipality. These variables statistically and significantly predicted F (6, 92) = 4.176, $p < 0$ .0001, R2 = 0.214. All four variables added statistically and significantly to the prediction of performance of NWSC, $p < 0.05$.

This can be stated mathematically as:

P= 4.532 + (-0.331) IP + (0.251) UPS + (0.112) ID+ (-0.274) WSE + E

Where;

IP = Increased Population

UPS = Unplanned Urban Settlement

ID = Infrastructure Development

WSE = Level of Water and Sewerage Extension

E = Standard Error of Estimate

Table 4.11 indicates that increased population was significantly negatively related with performance of NWSC (β = -0.331, $p<0.05$). This means that when population increases,

demand on Water and Sewerages services also increases and individuals engage in activities like contamination of water that frustrates the activities of NWSC. The findings imply that an increase in population in an urban setting does not necessarily imply improved performance of water and sewerage services. It also reveals that increased population in lira municipality does not imply improved performance of NWSC. The constant 4.532 signifies a positive relationship implying that if urbanization conditions improve, performance of NWSC also increases. The study therefore argues that there should be deliberate arrangements to ensure performance of NWSC following population increase.

The above findings are supported by van Rooijen et al. (2005) who notes that increases in population intensifies demand for more services in urban centres that are usually unforeseen in planning processes. However, problems with financing of these projects are often causing delays in their execution. Increasing demands are forcing authorities to be creative in meeting those future demands, by increasing withdrawals from existing sources or by tapping from new sources.

From the Table 4.11, unplanned urban settlement was significantly positively related with performance of NWSC ($\beta = 0.251$, $p<0.05$). This means that regardless of the structures set up in lira municipality, NWSC continues to performance well. It also shows that the services of water and sewerage cooperation are not affected by the planned structures. It shows that NWSC performances continue to improve with unplanned urban settlement in lira municipality.

In a similar study, Aldo et al (2016) notes that in many countries, there has been a move to decentralize decision making down to the lowest practical level and place greater policy and oversight responsibilities on municipal governments in order to address unplanned settlement.

According to 4.11, Infrastructure Development was found to have a positive significant positive relationship (β = 0.112, $p<0.05$). This means that having in place proper infrastructure development like roads to transport NWSC workers to collection centers improves its performance.

In a related study, World Bank (1980) noted that urban poverty is characterized by rapid growth of substandard housing and slums, deterioration of residential neighborhood and absence of capital spending on existing housing stocks. It also manifests itself in acute unemployment and underemployment, failure to afford three meals a day, high crime rate and prostitution

From the Table 4.11, level of water and sewerage extension was significant negatively in relation with performance of NWSC (β = -0.274, $p<0.05$). This means that level of water and sewerage extension does not necessarily imply improved performance of NWSC. It also shows that the services of water and sewerage cooperation are not affected by the level of extensions.

4.5 Chapter summary

The chapter presents the findings basing on the study objectives. It highlights the key findings as they accrue from the entire study. Findings on the relationship between urbanization and performance of NWSC, challenges faced by NWSC in service delivery and a model for service delivery is provided in this chapter.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summaries of the findings, discussions of objectives set for the study, conclusions derived from the findings, and the recommendations that will help in improving the performance of NWSC in service delivery based on the findings of the study.

5.2 Summary

5.2.1 Relationship between urbanization and performance of NWSC in LMC

From the study findings, there was a significant positive correlation (rho = .487) between urban growth and development and Service delivery by National Water and Sewerage Corporation. It is shown that the significance of the correlation (p = .000) is less than the recommended critical significance at 0.05. Thus, the effect was significant. As a result of this, the hypothesis "There is a significant relationship between urbanization and performance of National Water and Sewerage Corporation" was accepted.

5.2.2 Challenges faced by NWSC in delivery of services as a result of urbanization in LMC

From the study, it was established discriminatory urban planning with a mean of 3.57, lack of political will with a mean of 3.39, unplanned water supply with mean score of 4.15 were the most challenges faced by NWSC in the performance of her duties. Policy reform and water contamination fetched low mean score of 3.32 and 3.71 and constituted the least challenges that affect NWSC.

5.2.3 Model for efficient delivery of services in NWSC in LMC

From the study, the multiple regression model with all four predictors produced R^2 =0.463, F (6, 92) = 4.176, $p < 0.001$. The research findings indicated that there was a strong positive relationship (R= 0.214) between the variables. The study also revealed that 46.3% of the NWSC performance factors can be explained by the independent variables. The research findings indicated that there was a strong positive relationship (R= 0.214) between the variables.

5.3 Conclusions

5.3.1 Relationship between urbanization and performance of NWSC in LMC

From the study findings, it was concluded that urbanisation is significantly positive related to performance of National Water and Sewerage Corporation (rho = .487). It was observed that with improved urbanisation, NWSC also intensifies in some of its services to cope up with urban growth and development.

5.3.2 Challenges faced by NWSC in delivery of services as a result of urbanization in LMC

The study concluded that discriminatory urban planning, lack of political will unplanned water supply that scored the highest mean constituted the most challenges to services offered by NWSC. This implies that most of the efforts of NWSC that are geared towards improving services in lira municipality ought to address such challenges.

5.3.3 Model for efficient delivery of services in NWSC in LMC

The study revealed that there was a strong positive relationship between the urbanization and performance of NWSC. The study also revealed that 46.3% of the NWSC performance factors can be explained by the independent variables.

5.4 Recommendations

Based on the findings of the study, the researcher has proposed several implementable remedies to the above trend and these are aimed at fostering and further improving the delivery of services by NWSC. The researcher thus recommends that:

The management of the municipality ought to expedite the planning process so as to ensure settlement and housing projects are setup with minimal interference on utility and other access lines which will enable service providers have a manageable operational cost.

The corporation should indulge the community in dialogue to ensure increased uptake and good water system maintenance so as to lower losses resulting from bad community practices such as contamination of sources, blockage of supply lines and theft of materials.

There is need to explore further options for inter – sectoral co-operation which would enable the corporation put in measures to cut loses by sharing important information to protect her grid lines from destruction by other agencies such as the Uganda National Roads Authority in the execution of their duties.

The corporation should increase investment to improve access to water for the general population in the municipality which would increase on the sales and thus make the operational costs more manageable in a long run.

Since there was limitation of primary date as most of the urban administrators and the utility providers reluctantly gave documentations and filling the questionnaires and yet the information required from them were key in the conclusion of the research work, the researcher recommend further research in other parts of Uganda with different administrative set up in order to compare the findings.

REFERENCES

Agbola, T. (2004). Readings in Urban and Regional Planning. *Printed by Foludex Press Limited, Ibadan Oyo Nigeria. Pg*, 1-595.

Amin, M. E. (2005). *Social Science Research: Conception, Methodology and Analysis*, Makerere University.

Baxter, P. & Jack, S. (2008). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report,* 13, 544-559.

Boex, J. & Edwards, B. (2014). Triggering Increased City-Level Public Finance for Pro-Poor Sanitation Improvements. *The Role Of Political Economy and Fiscal Instruments. Urban Institute*.

Browder, G. J., Xie, S., Kim, Y., Gu, L., Fan, M. & Ehrhardt, D. (2008). Improving the Performance Of China's Urban Water Utilities. The World Bank.

Brown, A. M. (2012). Uganda's New Urban Policy: Participation, Poverty, and Sustainability.

Brown, A. M. (2013). Uganda's National Urban Policy: The Emerging response to Poverty, Food Security, and Gender in Urban Uganda.

Cities-Alliance (2010). Urban On the Agenda in Uganda. April.

Creswell, J. W. (2009). Mapping the Field Of Mixed Methods Research. Sage Publications Sage Ca: Los Angeles, Ca.

Duflo, E., Galiani, S. & Mobarak, M. (2012). Improving Access to Urban Services for The Poor: Open Issues and a Framework for a Future Research Agenda. *J-Pal Urban Services Review Paper. Cambridge, Ma: Abdul Latif Jameel Poverty Action Lab. Http://Www. Povertyactionlab. Org/Publication/Improving-Access-Urban-Services-Poor*.

Hofmann, P. (2011). Falling through the Net: Access to Water And Sanitation by the Peri-Urban Water Poor. *International Journal of Urban Sustainable Development,* 3, 40-55.

John, W., Creswell, C. & David, J. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications

Jones, H., Clench, B. & Harris, D. (2014). The Governance Of Urban Service Delivery in Developing Countries. *Odi Report*.

Magrinyà Torner, F. (2005). The Challenge Of Slums. Global Report on Human Settlements (2003). *Cuadernos Internacionales De Tecnología Para El Desarrollo Humano, 2005, Núm. 3.*

Mcgranahan, G. & Satterthwaite, D. (2014). *Urbanisation: Concepts and Trends*, Iied.

Mugenda, O. M. & Mugenda, A. G. (2003). Research Methods Quantitative and Qualitative Approaches

Nardi, P. M. (2018). *Doing Survey Research: A Guide To Quantitative Methods*, Routledge.

Nickson, A. (1998). Organisational Structure and Performance in Urban Water Supply: The Case Of SAGUAPAC Co-opertaive in Santa Cruz, Bolivia.

Okidi, J. & Mugambe, G. (2002). An Overview Of Chronic Poverty and Development Policy in Uganda.

Olorunfemi, S. (2014). Determinants of Urbanization in Nigeria: Implication For Sustainable Development. *International Journal of Technical Research and Applications,* 2, 50-57.

Olotuah, A. O. & Adesiji, O. S. Housing Poverty, Slum Formation, and Deviant Behaviour. Online Proceedings of the Housing Studies Association Conference, University of Lincoln, Lincoln, Uk, 2005. 8-9 Page,

C. & Meyer, D. (2000). *Applied Research Design for Business and Management,* Australia, Mcgraw-Hill Companies.

Quisumbing, A. R., Brown, L. R., Feldstein, H. S., Haddad, L. & Peña, C. (1995). Women: The Key To Food Security. *Food Policy Statement,* 21.

Sarantakos, S. (2012). *Social Research*, Palgrave Macmillan.

Satterthwaite, D. & Mitlin, D. (2012). *Urban Poverty in the Global South: Scale and Nature*, Routledge.

Sekaran, U. (2003). *Research Methods For Business: A Skill Building Approach,* London, John Wiley & Sons. Silverman, D. Instances Or Sequences? Improving the State of the Art of Qualitative Research. Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, (2005).

Weeks, J. (1994). Economic Aspects of Rural-Urban Migration.

National Water and Sewerage Corporation (2013/14), *Annual Report*

National Water and Sewerage Corporation (2014/15), *Annual Report. Continuous Improvement for Sustainable and Equitable Service Delivery.*

National Water and Sewerage Corporation, (2016/17), *Annual Report. Continuous Improvement for Sustainable and Equitable Service Delivery.*

NWSC 2018 *available at https://www.nwsc.co.ug/index.php/resources/program/44-switch-areas/248-lira)*

RoU (2003). "Uganda Food and Nutrition Policy." (2008). "*National Slum Upgrading Strategy and Action Plan."*

Sage, G.H. (1990). *American urban growth, power and ideology.* Washington D.C: Human Kinetics.

Smith, R. (1988*). Community support in urban areas*. New York: Heinemann Kingswood.

Swanson, R. (1995). *History of urbanization in developing countries* (4th Ed). New York: Brown and Benchmark.

USAID (2013). *Sustainable Service Delivery in an Increasingly Urbanized World/USAID Policy, Washington, DC available*

Vamplew, W. (1994). *Water and sanitation in Indonesia-A social history. Melbourne: Cambridge University Press (Indonesia).*

Smith, W. (2012). "Urban development imagination." *International Journal of Development* 5(1): 53-80.

Hove M and Tirimbo A (2011). *Assessment of Harare water service delivery. Journal of sustainable development in Africa (volume 13, no.4, 2011). ISSN: 1520-5509*

Manzungu, V.R. and Kapungu, N. (2010). "*Urban domestic water crisis in Zimbabwe. "Journal of Sustainable Development in Africa 12 (2): 254-262.*

Bayliss, K. (2003). *Utility privatization in Sub-Saharan Africa: a case study of water. The Journal of Modern African Studies, 41(04), 507–531.*

Somlyody, L., Yates, D. & Varis, O. 2001. *Challenges to freshwater management. Ecohydrology and Hydrobiology 1(1-2): 65-96.*

Turton, A.R. 1997. *Southern African Hydro politics: Developmental Trajectories of Zambezi Basin States and South Africa. MEWREW Occasional Paper No. 7. Water Issues Study Group, School of Oriental and African Studies (SOAS), University of London. Originally presented at the Second Southern African Water and Wastewater Conference. Water Africa Õ97. 15-19 September 1997. Harare, Zimbabwe.*

Brook-Cowen, P. 1997. "*The Private Sector in Water and Sanitation: How to Get Started*". *The Private Sector in Infrastructure: Strategy, Regulation, and Risk. The World Bank, Washington*

Briscoe, John (September 1996). "*Water as an Economic Good: The Idea and What it Means in Practice.*" *Paper presented at the World Congress of the International Commission on Irrigation and Drainage, Cairo, Egypt.*

APPENDICES

Appendix I: Questionnaire for Community Members

Dear respondent,

The researcher is **Okite George,** a student of Kyambogo University carrying out a research to investigate, "The influence of Urbanization on performance of Public Utilities: A Case of National Water and Sewerage Corporation Lira Municipality, Uganda". You have been selected to participate in this study through random sampling. The research is for academic purpose only. Your positive contribution towards the success of this work will be highly appreciated.

Section A: Background Information

1. Age Group (years)

1. 18-25 ☐
2. 26-36 ☐
3. 37-45 ☐
4. 46 and Above ☐

2. Gender

1. Male ☐
2. Female ☐

3. Education

1. None ☐
2. Primary ☐
3. O - Level ☐
4. A - Level ☐
5. Others (Specify).....

4. Occupation

1. Casual laborer ☐
2. Public Servant ☐
3. NGO worker ☐
4. Trader ☐
5. Self employed ☐

SECTION B:

Please evaluate yourself using the most suitably agreed alternatives as indicated in the following table. You are humbly requested to try as much as possible to honestly give the most view in the following statement below:
Likely response options

5	4	3	2	1
Strongly agree	Agree	Not sure	Disagree	Strongly disagree

	Question	Answer (options)				
		5	**4**	**3**	**2**	**1**
	URBANIZATION AND PERFORMANCE OF NWSC					
5	Urbanization leaders to increased population and this affects performance of NWSC					
6	The unplanned urban settlement due to rural urban migration affects the delivery of services by NWSC					
7	Urbanization affects the level of infrastructure development and this influences performance of NWSC					
8	Urbanization affects the level of water and sewerage extension i					
	CHALLENGES FACED BY NWSC IN THE DELIVERY OF SERVICES IN LMC					
9	Discriminatory urban planning is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization					
10	Contamination of water as a result of primitive behaviour is a challenge faced by NWSC in the performance of her duties in your area as a result					

	of urbanization					
11	Lack of political will is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization					
12	Policy reform is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization					
13	Unplanned water supply is a challenge faced by NWSC in the performance of her duties in your area as a result of urbanization.					
PERFORMANCE OF NATIONAL WATER AND SEWERAGE COOPERATION						
14	Improved waste management facilitated NWSC					
15	Community participation ad engagement in NWSC services in lira municipality					
16	Improved utility management and services					
17	Improved sewerage channels within the Lira municipality					
18	Intensified water connection within Lira municipality is a result of NWSC					

Appendix II: Key Informant Interview Guide

My name is Okite George, a student of Masters of Construction Technology and Management of Kyambogo University. This research is meant to secure information on "The influence of urbanization on performance of public utilities: A case of National Water and Sewerage Corporation in Lira municipality, Uganda". Feel free to participate in this study since it purely for academic purpose.

URBANIZATION AND PERFORMNCE OF NWSC

1. Do you think that urbanization affects delivery of services by NWSC in LMC?
2. How has the unplanned urban settlement affected the delivery of services by NWSC in LMC?
3. Do you think that urbanization affects the level of water and sewerage extension in your area?

4. Comment on the relationship between water supply, sewerage system and settlement in the municipality?

CHALLENGES FACED BY NWSC IN THE DELIVERY OF SERVICES IN LMC

1. What are the challenges faced by NWSC with regard to urban growth and development in the delivery of services in LMC?
2. How have these challenges been addressed?
3. What do you think should be done by government to address the existing challenges?

PERFORMANCE OF NWSC

1. What are some of the indicators for the performance of NWSC?
2. How has urban growth influenced the delivery of services by NWSC in LMC?
3. Is the urban growth rate being matched with an equivalent delivery of public utilities by NWSC in LMC?

THANK YOU FOR YOUR COOPERATION

Appendix III: Table for determining sample size from a given population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size.

Appendix IV: Reliability Test

Urbanization

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	372	100.0
	Excluded[a]	0	.0
	Total	372	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.768	.768	4

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Covariances	.43	.911	.676	1.587	.742	.061	4

Challenges

Case Processing Summary

		N	%
Cases	Valid	372	100.0
	Excluded[a]	0	.0
	Total	372	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.987	.987	5

Summary Item Statistics

	Mean	Minimum	Maximum	Maximum / Minimum	Variance	N of Items
Inter-Item Covariances	.38	-.594	.951	-1.603	.134	5

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
38.72	23.988	4.898	5

Performance OF NWSC

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.768	.769	5

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Covariance	0.39	.362	.436	.798	1.206	.068	5