ASSESSMENT OF FACTORS AFFECTING SUSTAINABILITY OF WATER SUPPLY SYSTEM IN ZANZIBAR: THE CASE STUDY OF URBAN WEST REGION UNGUJA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PROJECT MANAGEMENT (MPM) OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled: ***"Assessment of Factors Affecting Sustainability of Water Supply System in Zanzibar: The Case Study of Urban West Region Unguja"*** in partial fulfillment of the requirements for the degree of Master in Project Management of the Open University of Tanzania.

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Dr. Salvio E. Macha

(Supervisor)

…….

Date

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DECLARATION

I, **Nassir Mohamed Mwinyi**, do hereby declare that, this dissertation is entirely my own original work and that it has not been presented and will not be presented at any other University for a similar or any other academic award. In addition, all the sources that I have used or quoted have been indicated and acknowledged my means of complete references.

…….

Signature

…….

Date

DEDICATION

I dedicate this work to my lovely mother, Miss Aziza M. Khamis and my cute Daughter Nawal N. Mohamed for their love and encouragement to fulfill my dream and make them Proud of me.

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I really thank my Almighty God for giving me grace, strength, willingness and capability to pursue for Master's Degree Studies and accomplish the academic goal. This achievement is the contribution in terms of comments assistance, advice, constructive critics and encouragement from the number of people to whom I owe them the total gratitude and sincere respect.

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ABSTRACT

This is a study on assessing factors affecting sustainability of water supply system in Zanzibar Urban West Region Unguja. The study was guided by three hypotheses as predicting variables to sustainability of water supply system in Zanzibar, which were limited water infrastructures, low tariffs charged and the failure of water utility. The study was conducted using explanatory study design through causality testing approach between study variables. Data were obtained from the Zanzibar Water Authority (ZAWA) through questionnaires as the data collection tool from the selected sample size of the study. Data collected were well assembled and filled in the SPSS data sheet version 21.0 to produce adequate and relevant analytical tools to describe the entire causal relationship analysis in generating sufficient knowledge to fill the identified study gap. Descriptive statistics were first produced from the SPSS to show the profile of the respondents. Moreover, correlation and multiple regression analysis were described to show the relationship between study variables as being the independent on the dependent variable. Findings of the study showed that all three study hypotheses are positive and significant statistically on sustainability of water supply system as the dependent variable. This entails the fact that sustainability of water supply system in Zanzibar Urban West Region Unguja is negatively affected by limited water infrastructures, low tariffs charged and the failure of water utility. The study recommends that the government should be strict on assuring that it well invests on water infrastructures to match with the current demand pertaining to water supply pattern in Zanzibar Urban West Region Unguja.

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LIST OF ABBREVIATIONS

FBM	Faculty of Business and Management
OUT	Open University of Tanzania
ZAWA	Zanzibar Water Authority
TAWASANET	Tanzania Water and Sanitation Network

CHAPTER ONE

STUDY CONTEXT

1.1 Introduction

The chapter shows the overall provision of the study and the specific context the inquiry is situated in assuring knowledge gap filling for that matter. The chapter well illustrated in sections within the chapter including the study background, study problem, study objectives, questions, relevance and the dissertation organization pattern. The description of the study and the relevant context is well described in a manner, which is stated as follows:

1.2 Background to the Problem

Water supply is an essential and primary need in several settings with human settlements and activities of different kinds and forms including domestic, constructions and several other non-domestic (Kuus, Nuorti & Hanninen, 2005). The supply of water in a setting whether a society, an entity or segment is usually effective and efficient provided that it is well supplied through the system of pumps or pipes (Kuusi, Klemets & Miettinen, 2004). The primary actor in assuring water supply in different settings that are available in countries and or society is the government through public utilities arrangements in specific area(s) for that matter (Nygard, Schimmer & Sobstad, 2006).

This is attributed by the concern that water supply system to carter for the needs of the each and everyone in the country, society and or setting is highly costing to the extent that the government is the sufficient entity to ensure that the supply is adequate and effective to the people and several actors and entities within the territory for that matter

(Vestergaard, Olsen, & Stensvold, 2007). Water supply and accessibility has been and still is the issue of concern especially in developing countries and economies since the quality of water received is poor in most settings, also, the availability is very scarce to the extent that even the degree towards responding to the needs of customers as people in need of the service is poor indeed (Penman, Brackin & Embrin, 1997).

Despite that, supply continuity has been an issue of great concern as well in most developing countries in Africa and several other parts of the world because water is not adequately and consistently provided (Ouis, 2002). It is mostly provided in few hours a day, sometimes provided in few days a week; and in some occasions water is supplied few days after some weeks (Reece, 2007). This indeed has brought about insufficient water supply system and practices in several countries in the developed world (Leal, 2009). Despite that, it has fostered a concern from some stakeholders and entities operating in such countries including the multinational corporations that in acquiring customer recognition and acceptance; they resort to the provision of water services and facilities to assure water supply in some areas through corporate social responsibility (CSR) measures (Nesfield, 2002).

Tanzania in particular the country constitutes the mainland area and island, which is Zanzibar, which leads to the United Republic of Tanzania (URT) (Harper, 2015). The country as a whole constitutes several concerns as challenges and obstacles in social, economic, political and cultural aspects whereas water supply is among the key notable issue in the country (Raphael, 2011). This is evident since water supply pattern in Tanzania in totality has been very poor indeed since accessibility has been decreasing instead of increasing for many years with poor sanitation as well in availability and

accessed water (Mashauri & Katko, 2012). Water supply is generally at low quality both in mainland and Zanzibar since the utilities responsible in handling water supply and provisions barely able to cover their operations and maintenance costs (URT, 2008).

In that case, access to water and sanitation has been very low Tanzania whereas the supply as well is very poor both in rural settings and urban setting though the situation is much worse in rural areas (Taylor, 2011). This also caused most water projects at one time to be dependent on donor funds provided by external donor organizations such as the World Bank, European Union and several others (URT, 2010). This has caused an issue of concern on the inquiry serving as the significant gap to be envisaged since most studies on water supply in Tanzania have been conducted in mainland. This includes Marandu (2009) for instance conducted a study on water supply projects in rural communities in the Mainland Tanzania.

Despite that, Pigeon (2012) also conducted a study on assessing performance of water supply system in Dar es Salaam region in line with the operations of Dar es Salaam Water Sewerage Corporation (DAWASCO). Taylor (2011) also waged an inquiry on water sanitation network in local government planning in Tanzania mainland. However, little or less studies have been performed on water supply system in Zanzibar as the significant gap to be filled with sufficient knowledge. In that case, the situation in Zanzibar on water supply specifically is worse in the sense that the supply is highly ineffective and poor both in rural and urban areas whereas the Zanzibar Water Authority (ZAWA) is considered ineffective as the entity dealing with water supply in the area (Harper, 2013).

This is evident in a way that in urban settings as in city centres and most alarming places in town such as Michenzani block the supply of water is very low and extremely inadequate (Harper, 2013). Also, in stone town a famous and historic site(s) people have dug wells to access water for consumption and use because the supplied water are extremely inadequate to the extent that they can stay for a week and more without being available (Skinner, 2014). This has brought about the practice and the situation that as time goes on the situation on water supply escalates towards worse.

The situation in Zanzibar on water supply is attributed by certain concerns as determinants whereas Harper (2013) suggests that limited water infrastructure affects water supply system since the population as time goes grows rapidly in the area both in rural and urban settings while the infrastructures in place are the same all years. Despite that, the other concern is the low tariffs charged on water services, which makes the government to take the burden of service provision for free to the people. Since the burden is severe the supply pattern and system gets to be well affected.

Moreover, failure of the utility to cover the operation and maintenance cost as a result of low water charges imposed and limited efficiency. In that case, it is necessary to undertake the study in assessing factors affecting sustainability of water supply system in Zanzibar especially in Urban West Region Unguja.

1.3 Statement of the Problem

Water supply in Zanzibar is an issue of great concern since it has been and still is very poor to the extent that the situation is escalating towards declining as days are mounting

for that matter (Petterson, 2002). This is an issue of concern for the inquiry to be undertaken as the significant gap since several studies on water supply in Tanzania have been focusing on mainland Tanzania (Kendall, 2014). This is evident with Taylor (2011) envisaged assessment on water sanitation network in local government planning in mainland Tanzania. Also, Marandu (2009) waged a study on water supply projects in rural communities in Tanzania mainland.

Pigeon (2012) assessed the performance of water supply system in Dar es Salaam region. which also is streamlined in the mainland Tanzania. This signifies existing gap in Zanzibar on water supply system since less or little has been conducted in filling the knowledge gap of the study for that matter. Since that is the case, the reality on water supply system in Zanzibar is very poor and low which is attributed by several concerns. With that, Harper (2013) provides that the situation is caused by limited water infrastructures in place, low tariffs charged on water services and failure of the water utility to cover operations and maintenance costs. The situation still persists such that the study is undertaken in assessing factors affecting sustainability of water supply system in Zanzibar.

1.4 Research Objectives

1.4.1 General Objective

The general objective of the study was to assess the factors affecting sustainability of water supply system in Zanzibar.

1.4.2 Specific Objectives

(i) To determine the extent to which limited water infrastructures affect sustainability of water supply system in Zanzibar.

(ii) To examine the extent to which low tariffs charged affect sustainability of water supply system in Zanzibar.

(iii) To assess the extent to which failure of water utility affect sustainability of water supply system in Zanzibar Urban West Region Unguja.

1.5 Research Questions

(i) To what extent does limited water infrastructures affect sustainability of water supply system in Zanzibar Urban West Region Unguja?

(ii) To what extent does low tariffs charged affect sustainability of water supply system in Zanzibar Urban West Region Unguja?

(iii) To what extent does failure of water utility affect sustainability of water supply system in Zanzibar Urban West Region Unguja?

1.6 Significance of the Study

The study is important since it serve as the sufficient knowledge being generated on water supply system and pattern in line with the realities of Zanzibar. This is important since several studies in different regions and parts of the mainland do not address the realities of the Zanzibar situation, which is put to light and documentation using the study. The study also fosters the generation of sufficient and adequate information relevant to the stakeholders, the government and the community on measures to be employed to overcome the situation. The study also serves as the breakthrough to the conduct of several other studies in the future. Finally, the completion of the study enables total completion of the degree program for that matter.

1.7 Organization of the Study

The study has five respective chapters to satisfy the entire process of undertaking the study including the first one comprising of the description of the study problem and its context. The second chapter discusses the literature review of the study. The third chapter also described the research methodology of the study. The fourth chapter as well presents the results, analysis and the discussion of the study results. The last chapter discusses the summary of the study, conclusion and the recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter describes the literature review of the study with several in line to complement the study being performed on assessing factors affecting sustainability of water supply system in Zanzibar Urban West Region Unguja. The chapter described the theoretical reviews, which consist of views of various scholars in connection with the study. The chapter presents the empirical studies as significant gaps fostering the occurrence and undertaking of the study. Furthermore, the chapter highlights the conceptual framework, which describes the study hypotheses and the way they influence each other towards knowledge gap filling. Therefore, the chapter consist of the following:

2.2 Definition of Terms

2.2.1 Water Supply

Water supply refers to the sufficient provision of water to the need areas and segments by the government commercial entities, individuals, organizations and others through a well-designed and set system(s) of pump and pipes (Bowen & McCarthy, 1983). The practice is embedded to assure that water is adequately supplied in the required area and or destination in a manner that assures sustainability (Kurian & McCarney, 2010).

2.2.2 Sustainability

Sustainability refers to the process whereby changes are well maintained in a balanced situation whereas the resources and all that needs to be undertaken and utilized meets the needs and goals to be attended in a manner that is long term without degrading (Adams &vJeanrenaud, 2008).

2.3 Theoretical Reviews

2.3.1 Theory of Change

This is an approach and model used and applied in planning, evaluation and participation processes to influence social changes in several areas where changes are deemed necessary such as society, localities, an organization, or any entity for that matter (Brest, 2010). The theory is used by several actors such as the government, nongovernmental organizations, firms and others to promote and influence social change. The theory elaborates the process involved in influencing changes by outlining causal linkages in an initiative namely shorter term, intermediate and long term outcomes (Funnel & Rodgers, 2011).

The identified changes are considered as the outcomes showing each outcome in logical relationship to all the others, as well as chronological flow. The links between outcomes are explained by rationales or statements of why one outcome is thought to be a pre-requisite for the other (Clark & Taplin, 2012). The theory clearly shows the distinction between desired and actual outcomes requiring stakeholders to model their desired outcomes before they decide on forms of intervention to achieve those outcomes.

The theory can begin at any stage of an initiative depending on the intended use. A theory developed at the outset is best at informing the planning of an initiative (Brest, 2010). Having worked out a change model, practitioners can make more informed decisions about strategy and tactics. As monitoring and evaluation data become available, stakeholders can periodically refine as the evidence indicates (Taplin, Clark, Collins & Colby, 2013). Moreover, the theory can be developed retrospectively by reading program documents, talking to stakeholders and analyzing data. This is often

done during evaluations reflecting what has worked or not in order to understand the past and plan for the future (Chris, 2011).

The theory is significant to the study in a way that it shows the reality pertaining to the importance of changes in the society issues pertaining to social, political and economic concerns in the country. The issue is that water supply has been and still is a major issue of concern as a problem and a demand, which the mass needs to be attained by the government. Therefore, the theory advocates for the government through various efforts and stakeholders engagement to influence massive changes and advocacies to make sure that the problem of limited supply of water is combated.

2.3.2 Stakeholder Approach

This is a theory which provides that policy makers should formulate and implement processes which satisfy stakeholders' needs in order to ensure the long-term success of the several project undertakings (Post, Preston & Sachs, 2002). According to the degree of participation of the different groups, the company can take advantage of market imperfections in order to create valuable opportunities. It emphasizes active management of the business environment, relationships and the promotion of shared interests (Freeman & McVea, 2001). This approach is based on the stakeholder theory, which arises as a counterpart to the dominant way of understanding business and management that is focused on shareholders satisfaction (Freeman, Harrison, Wicks & Parmar, 2010).

The approach is more able to create and guarantee competitive advantage because it creates a link between the firm and stakeholders. The latter perceive the coherent application of the organizational values and relate values with their own (Freeman & McVea, 2001). Therefore, the company tends to have information required from stakeholders in order to treat them well and develop important initiatives. This escalates firms' reputation and loyalty among customers and other stakeholders, which create stronger brand recognition of the firm.

Even if there are limits in loyalty and reputation can be damaged, the two key elements can make a big difference creating barriers to other companies that may want to have information about stakeholder utility functions (Oubihi, 2016). A firm that follows the stakeholder approach gets the information needed to work for satisfying the stakeholders' needs, making it easier to develop expertise. The acquired skills can be transmitted, promoted and reinforced across the business operation of the firm creating core competencies.

The theory has been criticized on two grounds namely presence of divergent interests and the notion of overvaluing stakeholders. The presence of divergent interests is such that stakeholders may produce divergent views making it difficult to reach consensus. Each stakeholder may care mostly about its own benefits or self-interests (Oubihi, 2016). Therefore, trying to satisfy a large number of players complicates governance (Oubihi, 2016). It can result in time consuming in engaging all the parties.

The notion of overvaluing stakeholders on the other hand implies concentration in getting information about stakeholders' utility function; sometimes costs can exceed the

benefits. Therefore, in its intention to create value, managing for stakeholders can end up allocating too many resources to stakeholders. Also, having into account that the power among stakeholders is not equal, some powerful actors can get much of the firm's profitability. And with that distribution of value, shareholders cannot expect a maximization of returns (Harrison, Bosse & Phillips, 2010).

The theory is important to study since it asserts the fact that any venture for it to be progressive it has to be turned into the business form even if it is a public investment to assure prosperity, sustainability and growth. However, with water supply initiatives in Zanzibar Urban West Region Unguja; the issue is that water is supplied by the government at extremely low cost which are unrealistic for the water authority to be able to carter for adequate delivery. The government Zanzibar must transform into competitive aggressiveness practice towards corporate entrepreneurship strategies to assure sustainability and the growth of the water supply in the area.

2.4 Empirical Reviews

Kendall (2016) carried a study on assessing the challenges facing Zanzibar as the tourist area and destination in Tanzania. The study was performed in Zanzibar using survey design whereas findings revealed that several areas have been noted to possess weaknesses such as security at some point to the tourists and several others associated with delays and bureaucracy. However, little has been addressed on water supply system prior to its sustainability which is the gap that has been filled by the study.

Harper (2017) conducted a study on assessing the dynamics caused by the urbanization and population increase towards tourism and settlements. The study was performed in

Zanzibar through survey approach with findings reveal that the area is culminated with several challenges including sanitation and living expenses amount to its increase. Since that is the case. Little has been assessed on water supply on its sustainability which is also a main challenge in the area. In that case, the study has been performed to address the matter.

Nickson and Francey (2003) conducted a study on assessing the challenges on institutional reforms on urban marketing in water supply in tapping the market for that matter. The study is being conducted in the context of United States of America (USA) whereas the survey design was the methodology which was used to foster the generation and filling of the knowledge gap of the study. Findings of the study indicated that the pattern of rules and regulations on water supply by the government must be flexible always to go with the market demand and the requirement. Moreover, water as the commodity must be viewed as the service to be provided to the customers to assure growth of the initiatives in achieving adequate service delivery in terms of service supply.

This has been the practice throughput the country and the entire western world in guaranteeing adequate water supply services towards sustainability and adequacy. This signifies a gap to be articulated in Tanzanian context specifically in Zanzibar Urban West Region Unguja on water supply pattern and services that it is deemed to be ineffective. The concern on the study is that institutional arrangements are not compatible with the market needs and requirements such that the charges imposed are highly low to the extent that it is a program fully funded by the government. This has

also affected the infrastructure pattern and the operation of the water authority. Therefore, the study is being conducted to assess factors affecting sustainability of water supply system in Zanzibar Urban West Region Unguja.

Kurian and McCarney (2010) also envisaged a study on assessing factors influencing the adequate service delivery of water and sanitation facilities in Peri-urban settings. The study is well connected in European context with cross sectional survey as the study methodology. The findings indicated that several factors may be deemed to influence service delivery pattern on water and sanitation on adequacy such that the infrastructures and facilities have been improved further as population increase takes place. Also, the services are significantly charged to anyone enjoying the service as not too expensive and not cheap to guarantee sufficient income generation for the continuity of the services on performance outcomes.

This entails a gap to be envisaged as well in Tanzania specifically in Zanzibar Urban West Region Unguja on water supply pattern since it is highly poor and insufficient. This is attributed by the fact that the infrastructures in place are still the old ones without taking into account of the massive population growth. Also, the charges imposed for the services are highly insignificant for the government and service providers to generate sufficient income to perform operations well. This has been severely affecting water supply pattern in the area, which necessitated to wage an inquiry. Therefore, the study is performed to assess factors influencing sustainability of water supply system in Zanzibar Urban West Region Unguja.

2.5 Conceptual Framework

This is a model, which consists of description of variables of the study and the pattern of exerting influence in assuring the filling of the gap of knowledge (Rodman, 1980). The variables in place are independent as the predicting ones; and the dependent variable, which are clearly shown in Figure 2.1.

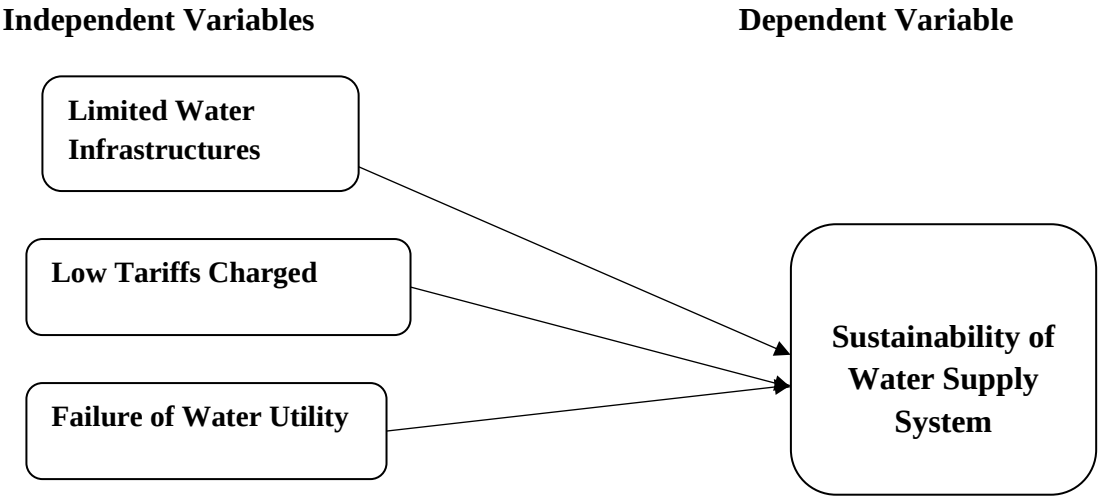

Figure 2.1: Conceptual Framework

Source: Researcher (2018)

2.5.1 Operationalization of the Study Variables

The conceptual model describes the study, which assesses factors affecting sustainability if water supply system in Zanzibar Urban West Region Unguja. The main study assumption is that sustainability of water supply system in Zanzibar Urban West Region Unguja is negatively affected by several factors. In that case, three hypotheses were developed from Harper (2013) which are stated as follows:

H1. Limited water infrastructures negatively affect sustainability of water supply system in Zanzibar Urban West Region Unguja.

H2. Low tariffs charged negatively affect sustainability of water supply system in Zanzibar Urban West Region Unguja.

H3. Failure of water utility negatively affect sustainability of water supply system in Zanzibar Urban West Region Unguja.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the study methodology which was used to facilitate the completion of the study in the realization of the study intended goals and objectives. The methodology include steps which were undertaken in practice to foster the knowledge gap filling for that matter which entails that all that is stated in the chapter were practised as stated in the realization of the knowledge gap filling. In that case, the chapter consisted the following:

3.2 Research Design

Research design is an appraoch which directs the study towards the generation of the information to fill the gap whcih is being envisaged (Robson, 1993). The design of the study are several since they depend on the nature of the undertaking of the stiudy itself. Since that is the case, the study used explanatory study design whereas the information was obtained through the causal relationship assessment between study variables.

3.3 Research Approach

Since the study used explanatory study design, the approach of the study was quantitative since the causal relationship assessment seeks to be performed using inferential analysis whereas the analytical means were quantitaitve by nature and orientation.

3.4 Research Philosophy

This refers to the study paradigm, which entails the existing views on the undertaking of the scientific studies (Goodwin, 2005). The views are several with two mainly leading and dominating the area which are positivism and phenomenology. They all have significant implication on the information gathering process and the reality being studied.

Therefore, study for that matter used positivism philosophy since the information to fill the knowledge gap were collected using the structured instrument which was the questionnaire. The reality being studied was grouped and tested using study hypotheses.

3.5 Area of the Study

The area selected for the study wasZanzibar Water Authority (ZAWA) in the respective area because it is the only entity mandated with the task of supplying and handling water services and supplies in ZanzibarUrban West Region Unguja. The entity is monopoly since it is the only in the area specifically for the provision and supply of water service to the people and all other actors whcih is also public owned for that matter.

3.6 Types of Data

The study used both primary data and secondary data. Primary data were collected from the field as the first hand information which serve as new knowledge to fill the study gap. Secondary data on the other hand were obtained from sources of variety in nature both published and unpublished ones in relation to the study hypotheses.

3.7 Sampling Design

Sampling design entails the populaiton of the study whereas the sample size is expected to generated (Sarndal, 1992). The populaiton of the study include participants in the

respective organization chosen as the study case for the generation of adeqaute primary data to fill the study knowledge gap. The area comprised of the total populaiton of about 489 employees.

3.7.1 Sampling Unit

Sampling unit entails the subjects used and applied in the information generation process in generation of primary data (Bailey, 2008). They include several actors such as objects, solutions, individuals, creatures, plants and others depending on the needs and requirements of the study. The study in particular consisted of individuals as the unit of analysis.

3.7.2 Sample Size

Sample size is the actual selected group of participants to the study specifically for the purpsoe of generating primary data on the inquired issue (Emmel, 2013). The study consisted of the employees of the entity as the relevant sample size because they were sufficient members skilled and knowledgeable in generating relevant priamry data to fill the study gap. In that case, the sample size include 100 respodents from the selected area to capture sufficient number for the conduct of inferentia analysis.

The gathering of the sample size has been influnced with assertion by Webb (1991) suggesting that as the area population comprising of 100 to 1000 members, 10% can be taken as the sample size. Also, as the area populatin lies between 1000 and 2000, 5% can be taken as the sample size. Moreover, as the population exeeeds 2000, 1% can be used as the sample size. However, the area populaiton is between 100 and 1000 such

that with 10% ratio and requirement the selected sample size is valid and accurate to guarantee generation of adeqaute primary data.

3.7.3 Sample Procedure

Sample procedure entails the meachanism(s) used in study undertaking to justify the selection of the relevant sample size(s) (Kish, 1965). The study used purposive sampling technique since the issue of inquiry requires participants to possess a good understanding of the subject to be able to provide adeqautea and reliable primary data.

3.8 Methods of Data Collection

3.8.1 Method of Secondary Data Collection

The method was going through documents of variety in nature both published and unpblished ones in relation to the researched study. The gathered data were used to support primary data in the discussion of the study results.

3.8.2 Methods of Primary Data Collection

3.8.2.1 Questionnaires

Questionnaire refers to the list of questions printed on papers seeking response on the inquired issue (Gillham, 2008). The tool is usually a paper which is suipplied to the respondents to be filled by them without being assisted and influenced by the researcher. The method was applied to the respondents to collect the data in short period of time. Despite that, the tool was used since the study requires quantitative data such that questionnaire is the only primary data collection tool which may generate such information.

3.9 Validity and Reliability

These are measurements which are essential in enabling data quality attainment in fostering information presentation process. The purpose of the measurements is to determine accuracy and consistence of the study variables which are assessed to foster knowledge creation and generation for that matter. Validity to start with was first performed before reliability to determine accuracy of the study variables through pilot testing approach before data collection for the approval of the questionnaire. Thereafter, reliability analysis was performed after data collection and computation to determine consistence of the study variables which were measured and attained using Cronbach Alpha test. Therefore, the analysis is well described in Table 3.1.

Table 3.1: Cronbach Alpha Test

Study Variables	**Cronbach Alpha Values**
Limited Water Infrastructures	0.865
Low Tariffs Charged	0.903
Failure of Water Utility	0.859
Sustainability of Water Supply System	0.825

Source: Field Data

Table 3.1 shows the information on reliability test on all study variables both independent and dependent ones whereas they are all consistent and reliable; as they are subject to inferential analysis performance in disseminating the causal relationship between study variables. This is well acknowledged by the fact that Ritter (2010) further suggests that reliability test on study variables is best performed using Cronbach Alpha analysis whereas once the values are 0.7 and above; then the constructs are reliable and

vice versa. However, the values of the constructs are all above 0.8 as they range between 0.825 – 0.903 which is certain that they are all reliable and consistent.

3.10 Maeasurement of the Variables

Since the study focused on causality testing approach, variables were measured using Likert scale approach set in the questionnaire as the data collection tool to enable the generation of the relevant quantifiable data signfiicant to perform inferential analysis to fill the study knowledge gap. The measurements were in a scale of five ranging from strongly agree to disagree.

3.11 Data Analysis

The data collected were quantitatively arranged whereas first were computed in SPSS to generate relevant statistical analytical tests to present the results and foster knowledge gap filling process. With that, descriptive statistics were first generated to show the profile of the respondents. Thereafter, correlation and multiple regression analysis were performed to show the relationship between study variables.

3.11 Ethical Issues

The study adhered to ethical standards whereas first the study was consistent with the Open University of Tanzania (OUT) requirements. Also, the information gathering process was in line with the permission from the university whereas the collected facts from the field respected confidentiality of the respondents in assuring that their privacy were well respected.

CHAPTER FOUR

FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

The chapter highlights the findings of the study as information obtained from the field with relevant analysis of the findings and the discussion of the facts as collected from the field. The presentation of findings, analysis and discussion is in line with the study hypotheses to assure the knowledge gap filling process through causality testing. Therefore, the study is well described in the following manner.

4.2 Response Rate

The study generated information through primary sources with a sample size of 100 respondents supposed to provide relevant primary data on the study being undertaken. Since that is the case, the rate of response was such that all 100 respondents were obtained in the respective study area selected for the study such that the rate was positive by 100%.

4.3 Respondents Characteristics

Respondents' key aspects, which consisted of features were well assessed to generate information on the overview and insight of the Zanzibar Water Authority (ZAWA) members as employees of the entity through key characteristic elements of age, gender and the level of education of the respondents. In that case, they are described in a manner that constitutes the following:

4.3.1 Age

The study required respondents to generate information on their age, which were well described and illustrated in Table 4.1.

Table 4.1: Age

Age	Frequency	Percent
21-35	37	37.0
36-50	47	47.0
50+	16	16.0
Total	**100**	**100.0**

Source: Field Data

Table 4.1 shows findings on age of the respondents, which were certain that 37 respondents (37%) were aged between 21-35 years; while 47 respondents (47%) were aged between 36-50 years; and 16 respondents (16%) were aged above 50 years. This implies that employees in Zanzibar Water Authority (ZAWA) composed of all age categories as being the youth and the young, mid aged and the aged ones. The view corresponds with Harper (2013) suggesting that the Zanzibar Water Authority (ZAWA) is a large public entity which consist of employees in all age groups and categories including the young ones, mid-aged and the aged ones. Despite that, the aged ones are phasing out as a result of retirement in different sections, departments, units and branches.

4.3.2 Gender

Besides that, the respondents provided facts on their gender with the findings being shown in Table 4.2.

Table 4.2: Gender

Gender	Frequency	Percent
Male	67	67.0
Female	33	33.0
Total	**100**	**100.0**

Source: Field Data

Table 4.2 highlights findings on gender of respondents whereas male respondents were 67 (67%) while female respondents were 33 (33%). This implies that Zanzibar Water Authority (ZAWA) as a public organization is open and free to all people regardless of their sex orientation to become employees and practitioners. The statement aligns with Lyne (2013) stating that all public organizations in Zanzibar including the water authority adhere to equality on employing people whereas everyone regardless of gender orientation is free to work and being employed despite of the religious status and situations in Zanzibar.

4.3.3 The Level of Education

Moreover, the respondents also information on the level of education which are well described in Table 4.3.

Table 4.3: Level of Education

Education Level	**Frequency**	**Percent**
Secondary Education	27	27.0
Certificate	13	13.0
Diploma	42	42.0
First Degree	18	18.0
Total	**100**	**100.0**

Source: Field Data

Table 4.3 describes the findings on education level of the respondents, which are certain that 27 respondents (27%) were secondary education holders; 13 respondents (13%) were certificate holders; 42 respondents (42%) were diploma holders; 18 respondents (18%) were first degree holders. The implication of the findings is that most employees

in the entity as being water authority in Zanzibar consist of basic and limited education with less practitioners possessing high education skills and competence.

The view is claim is well asserted by Wolfgang (2008) states that in Zanzibar specifically in public entities most employees have limited education levels with most being basic education holders whereas some occupying positions above the skills and knowledge they possess. The situation also encounters water authority as well in Zanzibar, which has been among the cause of massive underperformance in service delivery pattern to the public by the government entities.

4.4 Findings, Analysis and Discussion as per Study Hypotheses

The findings, analysis and the discussion pattern is well presented using measures of central tendency as being mean and standard deviation; as well as correlation and multiple regression analysis. In that case, the presentaiton and elaboration is performed in the manner which is as follows:

4.4.1 Mean and Standard Deviation

The analytical tools as measures of central tendency were performed to show the variable among the independent ones with the highest influence on the dependent variable through the mean; together with the level of respondents' opinion in terms of the level of variation using standard deviation. Therefore, findings are shown in the Table 4.4.

Table 4.4: Mean and Standard Deviation

Standard Deviation	Mean	Standard Deviation	N
Sustainability of Water Supply System	2.220	1.4253	100
Limited Water Infrastructures	2.510	1.4456	100
Low Tariffs Charged	2.604	1.4600	100
Failure of Water Utility	2.476	1.4506	100

Source: Field Data

Table 4.4 shows the values of mean and standard deviation on study variables both independent and dependent ones whereas the highest mean among the three study predicting variables is on low tariffs charged with the value of 2.604. This implies that sustainability of water supply system in Zanzibar is negatively affected by low tariffs charged on the services, which shows the variable to possess highest influence than others being studied. Standard deviation on the other hand shows that the variance of values between variables of the study is not very minimal and low signifying that respondent's opinion were nearly close to each other.

4.4.2 Correlation and Multiple Regression

The analysis as the inferential undertaking is performed to vividly show the existing relationship between study variables as between independent ones on the dependent variable. Despite that, the inferential analysis on the relationship between variables is first led by the inclusive testing of all study hypotheses on the dependent variable which is well described using model summary test shown in Table 4.5.

Table 4.5: Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of Estimate	Change Statistics			Durbin- Watson
1	.763	.780	.775	61.112	.605	89.746	.000	1.701

Source: Field Data

Study Hypotheses: Limited Water Infrastructures, Low Tariffs Charged and Failure of Water Utility.

Dependent Variable: Sustainability of Water Supply System.

Table 4.5 shows findings on the inclusive testing of all study hypotheses on the dependent variable, which is well determined by the respective of R^2. This entails that sustainability of water supply system is well influenced by limited water infrastructures, low tariffs charged and failure of water utility by 78% with the other remaining influence propagated by other factors besides the study hypotheses. This signifies that the study assumptions are all positive and qualified for undertaking further inferential analysis.

4.4.2.1 Correlation Analysis

Correlation analysis is articulated to show the variable among study hypotheses, which correlate best with sustainability of water supply system as the dependent variable. The analysis is well described in Table 4.6.

Table 4.6: Correlation Analysis

Correlation Analysis		**Sustainability of Water Supply System**	**Limited Water Infrastructures**	**Low Tariffs Charged**	**Failure of Water Utility**
Person corr.	Sustainability of Water Supply System	1	0.461	0.569	0.334
	Limited Water Infrastructures	0.461	1	0.07	0.040
	Low Tariffs Charged	0.569	0.04	1	0.112
	Failure of Water Utility	0.334	0.009	0.009	1
Sig. (1-tailed)	Sustainability of Water Supply System	1	0	0	0
	Limited Water Infrastructures	0	1	0.008	0.04
	Low Tariffs Charged	0.534	0.003	1	0.007
	Failure of Water Utility	0	0.03	0.007	1
N	Sustainability of Water Supply System	100	100	100	100
	Limited Water Infrastructures	100	100	100	100
	Low Tariffs Charged	100	100	100	100
	Failure of Water Utility	100	100	100	100

Source: Field Data

Table 4.6 shows values of correlation analysis on the study variable, which denotes that the highest correlation lies between low tariffs charged and limited water infrastructures. Despite that, the highest correlation is on low tariffs charged which shows that sustainability of water supply in Zanzibar in most mostly affected negatively by low tariffs charged. Since the correlation is significant the coefficient is still small implying that there is no multicollinearity. This is a problem, which is well tackled using multiple regression analysis.

4.4.2.2 Multiple Regression Analysis

Multiple regression analysis is well performed to show the influence of each study hypotheses on the sustainability of water supply system as the dependent variable with findings shown in Table 4.7.

Table 4.7: Multiple Regression Analysis

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
	B	Std. error	Beta		
(constant)	-26.112	7.658		-1.221	.133
Limited Water Infrastructures	3.051	.210	.531	12.336	.000
Low Tariffs Charged	3.374	.266	.540	12.590	.000
Failure of Water Utility	3.198	.249	.509	12.253	.000

Source: Field Data

Table 4.7 shows findings on multiple regression analysis which shows that all study hypotheses as independent variables as being limited water infrastructures, low tariffs charged and failure of water utility are positive and significant on statistical note on sustainability of water supply system as the dependent variable. This entails that

sustainability of water supply system in Zanzibar is negative affected by limited water infrastructures, low tariffs charged and failure of water utility.

4.5 Discussion of the Study Findings

4.5.1 Limited Water Infrastructures and Sustainability of Water Supply System

The study through Table 4.7 has findings which show that limited water infrastructures as the study hypotheses and independent variable is positive and significant statistically with the T value of 12.336 on sustainability of water supply system as the dependent variable. This denotes the fact that in Zanzibar water supply system is negatively affected by limited water infrastructure whereas the claim is also in line with Harper (2013) stating that the island since its independence and self-rule as a sovereign entity; most of the water infrastructures have remained the same in various areas both in rural and urban settings while the population has been increasing tremendously and the localities as well have been expanding. This has caused negative effect and implication on sustainability of water supply system since at the moment the available infrastructures are unrealistic with the population, which is at present in the area.

Kendall (2014) also states that Zanzibar despite the being the place which is highly attractive in tourism and several historical moments; it is faced with several social, economic and political issues as challenges whereas among them is water supply in the area by the government. The supply of water has been and still is insufficient which is a major setback both in urban and rural settings. Several reasons could amount to that whereas among them is limited water infrastructures in the area such that most of water systems in place are old and have been set to serve the population which about 30 years ago. With time escalation several changes have occurred including population increase

and urbanization growth which have caused the water supply to be insufficient because the infrastructures in most cases have remained the same.

4.5.2 Low Tariffs Charged and Sustainability of Water Supply System

The study indicated that low tariffs charged as the independent variable is positive and significant on statistical ground at .000 level on sustainability of water supply system as the dependent variable. This entails the fact that sustainability of water supply system in Zanzibar is affected negatively by low tariffs charged. The view aligns with Petterson (2002) providing that water supply services in the area is very poor since it is amounted by several reasons. However, the key concern is that tariffs charged on the services are very low which becomes unrealistic for the authority to deliver effectively and efficiently.

Shen (2016) also suggests that water supply system in Zanzibar has indeed being highly unsustainable whereas among the reasons for the persisting situation has been the charges imposed as they are too low in urban settings and in rural settings the services are provided for free. With that, water supply has been left as the government burden, which becomes difficult for the entity to provide water in a manner that is effective and sustainable. This is a serious issue of concern to be addressed to assure the performance of water supply system.

4.5.3 Failure of Water Utility and Sustainability of Water Supply System

The study indicated that failure of water utility as the study hypotheses and independent variable is positive and significant on statistical note at .000 level on sustainability of water supply system as the dependent variable. This implies that water supply sustainability system in Zanzibar is negatively affected by failure of the water utility to

perform as expected in realizing its objectives. The statement is supported by Hashim (2009) suggesting that the water authority in Zanzibar as being Zanzibar Water Authority (ZAWA) has been failed in delivering to the public as far as water supply system is concerned.

This is attributed by the fact that the entity depends from the funding from the central government, which has always been insufficient and highly limited in relation to the requirements to assure adequate and reliable performance. This has been the issue of concern since the resources required for the entity to deliver and perform well are massive such that the government has not been in a position to feed the entity with deliverables, which are strong and adequate to assure performance pattern, which is effective and efficient. In that note, the study is described in model as stipulated by Schwarz (2006), which states as follows:

$$SWSS = \beta o + \beta 1LWI + \beta 2LTC + \beta 3FWU + e$$

Where by:

SWSS = Sustainability of Water Supply System

βo = Constant Factor

β1LWI = Low Water Infrastructures

β2LTC = Low Tariffs Charged

β3FWU = Failure of Water Utility

e = Random Variable

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter highlights the inclusive summary of the study in line with the causal relationship, which has been performed to assure the generation of new knowledge on assessment of factors affecting sustainability of water supply system in Zanzibar. The chapter also describes the conclusion of the study and the recommendations in line with the study hypotheses. In that case, the chapter highlights all components of the chapter in a manner that is as follows:

5.2 Summary

This is an inclusive summary of the study on assessing factors affecting sustainability of water supply system in Zanzibar. The study was guided by three hypotheses as predicting variables to sustainability of water supply system in Zanzibar, which were limited water infrastructures, low tariffs charged and the failure of water utility. The study was conducted using explanatory study design through causality testing approach between study variables.

Data were obtained from the Zanzibar Water Authority (ZAWA) through questionnaires as the data collection tool from the selected sample size of the study. Data collected were well assembled and filled in the SPSS data sheet version 21.0 to produce adequate and relevant analytical tools to describe the entire causal relationship analysis in generating sufficient knowledge to fill the identified study gap. Descriptive statistics were first produced from the SPSS to show the profile of the respondents. Moreover, correlation and multiple regression analysis were described to show the relationship between study variables as being the independent on the dependent

variable. Findings of the study showed that all three study hypotheses are positive and significant statistically on sustainability of water supply system as the dependent variable. This entails the fact that sustainability of water supply system in Zanzibar is negatively affected by limited water infrastructures, low tariffs charged and the failure of water utility.

5.3 Conclusion

Sustainability of water supply system in Zanzibar Urban West Region Unguja is indeed affected negatively by limited water infrastructures, low tariffs charged and the failure of water utility as independent variables and hypotheses. This is attributed by the concern that the three independent variables are all positive and significant on statistical note on sustainability of water supply system in Zanzibar Urban West Region Unguja. This is a major problem in Zanzibar whereas most areas are highly suffering from water shortage both in urban and rural settings whereas drastic measures must be taken to overcome the situation since it is worse at the moment; and as time goes on it escalates to worst.

5.4 Recommendations

Since the situation on sustainability of water supply system in Zanzibar Urban West Region Unguja is worse, the study recommends that first on water infrastructures the government must well invest in designing and set new water infrastructures both in urban and rural settings to match with the current demand in the area since the available infrastructures do not match with the current demand in the area. The view corresponds with Harper (2013) suggesting that water infrastructures are very little in Zanzibar to assure sufficient water supply in the area. This is a concern which needs to be well

addressed through massive investment to be undertaken by the government to set new infrastructures and facilities in place for the provision and acquisition of adequate water supply.

Despite that, the study recommends that tariffs on water services should increase to the level of affordability from being too low to enable the Zanzibar Water Authority (ZAWA) to accumulate at least enough to perform development activities to assure sufficient water supply. The view is supported by Hashim (2009) suggesting that the government should raise the charges imposed on water services to assure that the water authority as the entity collects sufficient revenue to foster the delivery of water services effectively.

Moreover, the study recommends that the government should be strict on water authority of Zanzibar (ZAWA) on laissez-faire practices that most of the practitioners and the modality of working and undertaking activities has been and still is constitutes high degree of laissez-faire practices. This has been a setback because even when resources are available to undertake certain initiatives to improve water supply still laziness and laissez-faire practices have been undermining the efficiency of the entity.

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APPENDICES

Appendix I: Questionnaire

This is a questionnaire on the study titled ***"Assessment of Factors Affecting Sustainability of Water Supply System in Zanzibar".***

Dear Respondent;

Thank you in advance for devoting your time to participate in this study. Basically, the study is for academic purposes and for partial fulfillment of the award of a Masters in Project Management pursued in Open University of Tanzania (OUT). I request that you participate in this study with free will and high degree of honest and openness. This is key towards achieving the intended goal of the study. No names of individuals or entities are required and strict confidentiality will be maintained in handling your responses. Individual responses will not be identified in the analysis and report of the study.

SECTION A: General Information

1. Gender?
    a. Male
    b. Female

2. Age?
    a. 21-35
    b. 36-50
    c. 50+

3. Education Level

    a. Bachelor Degree

    b. Masters and Above

    c. Diploma

    d. Certificate

    e. Secondary Education

    f. Primary Education

    g. Other (specify) …….

4. Marital Status

    a. Single

    b. Married

    c. Living with a partner

    d. Widow

    e. Divorced

    f. Widower

SECTION B: Limited Water Infrastructures and Sustainability of Water Supply System

The following are the attributes of limited water infrastructures on sustainability of water supply system which are rated in Likert scale format seeking your response. Kindly respond on the appropriate answer by ticking (√) the appropriate box on the scale expressed in numbers within boxes.

Strongly Disagree Disagree Neutral Agree Strongly Agree

1 2 3 4 5

S/N	STATEMENTS	1	2	3	4	5
1.	Water systems available are in shortage compared to the population affecting sustainability in water supply system.					
2.	Water infrastructures are too old with poor maintenance affecting sustainability of water supply system.					
3.	Water infrastructures have not been added in several parts of the area since they were set in the first government.					
4.	The available water infrastructures do not satisfy the demand of the people in the area.					

SECTION C: Low Tariffs Charged and Sustainability of Water Supply System

The following are the attributes of low tariffs charged on sustainability of water supply system which are rated in Likert scale format seeking your response. Kindly respond on the appropriate answer by ticking (√) the appropriate box on the scale expressed in numbers within boxes.

Strongly Disagree Disagree Neutral Agree Strongly Agree

1 2 3 4 5

S/N	STATEMENTS	1	2	3	4	5
1.	The charges imposed to the users of the service are unrealistic to foster sustainability in water supply system.					
2.	The tariffs imposed are too low which makes difficult the entity responsible to perform maintenance and installation of other water settings.					
3.	The cost of the service provision and tariffs charged in covering the costs are not reaching breakeven which affects sustainability in water supply system.					
4.	The lower tariffs imposed on water services have resulted into the poor service delivery on water supply system.					

SECTION D: Failure of Water Utility and Sustainability of Water Supply System

The following are the attributes of failure of water utility and sustainability of water supply system which are rated in Likert scale format seeking your response. Kindly respond on the appropriate answer by ticking (√) the appropriate box on the scale expressed in numbers within boxes.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

S/N	STATEMENTS	1	2	3	4	5
1.	The entity has failed to realize its objectives which affects the sustainability of water supply system in the area.					
2.	The entity constitutes the management and the practitioners with high level of incompetence affecting sustainability of water supply system.					
3.	The organization comprise of rigidity and complexity affecting its performance leading to low sustainability of water supply system.					
4.	The organization manpower is limited to adequate practitioners affecting the performance leading poor water supply sustainability.					

SECTION E: Dependent Variable: Sustainability of Water Supply System

The following are the attributes of sustainability of water supply system which are rated in Likert scale format seeking your response. Kindly respond on the appropriate answer by ticking (√) the appropriate box on the scale expressed in numbers within boxes.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

S/N	STATEMENTS	1	2	3	4	5
1.	Sustainability of water supply system is affected by limited water infrastructures.					
2.	Sustainability of water supply system is affected by low tariffs charged.					
3.	Sustainability of water supply system is affected by failure of water utility.					

THANK YOU FOR YOUR TIME